Appendix K Preliminary Hydrology Analysis

Appendices

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PRELIMINARY HYDROLOGY ANALYSIS

FOR

BREA 265

City of Brea

County of Orange

PREPARED FOR:

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FEBRUARY 11, 2022

W.O. #4213-3

PRELIMINARY HYDROLOGY ANALYSIS

FOR

BREA 265

City of Brea

County of Orange

PREPARED UNDER THE SUPERVISION OF:

Tu Trinh, R.C.E. 71555 — Date: 2/11/2022

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SECTION 1

PROJECT LOCATION

The project site is Brea 265 in the City of Brea (City), County of Orange. The Brea 265 is divided into 3 separate areas called WEST, EAST and SOUTHEAST. The WEST is located on the west of Valencia Avenue and north of Brea Sports Park. The EAST is located on the east of Valencia Avenue and Rose Drive, and south of Carbon Canyon Road. The SOUTHEAST is located on the east of Rose Drive and north of Blake Road (see attached Vicinity Map for details).

STUDY PURPOSE

This preliminary hydrology study is to support the Preliminary/Conceptual Draft Water Quality Management Plan.

METHODOLOGY

The hydrology calculations were prepared using the *Orange County Hydrology Manual* as incorporated in the Advanced Engineering Software (AES) "RATSC" program. Flood routing analysis was prepared using the 1986 *Orange County Hydrology Manual* as incorporated in the Advanced Engineering Software (AES) "FLOODSC" program.

The Hydrologic Classification of Soils map (Soil Map) contained in the Orange County Hydrology Manual was used to determine the hydrologic soil type. Based on the Soil Map included in this section, approximate 85% of the project area, within the tract boundary, is in soil type D and approximate 15% of the project area, within the tract boundary, is a mix of soil types A and B spreading throughout the project site. Soil type D is used in this study for both existing and proposed conditions.

Land use for the existing condition is natural cover with existing road asphalt. Land use for proposed condition is based on the latest Tentative Tract Map. The impervious percentage varies from commercial (90%) for street, high density residential (80%), and low density residential (50%).

Based on the City of Brea Master Plan of Drainage (City MPD), dated December 2013, this hydrology study determines the 10-year peak storm runoffs produced from the project site in the existing and proposed conditions within the property boundary, and to detain any excess flows produced from the development.

In addition, the 100-year peak storm runoffs produced from the project site in the existing and proposed conditions within the property boundary are also studied for reference. Exit path of excess flow between the 10-yr and 100-yr storm events are shown on the hydrology maps for existing condition and also on the hydrology maps for the proposed condition (100-yr study). The over flow path was determined based on the existing and/or proposed grades, followed from high elevation to low elevation until it exits the property boundary.

Street capacity up to the right-of-way is also studied to verify that the excess flow between the 100-yr and 10-yr storm is contained in the street at or below the right-of-way. If there is no street, the over flow path will follow the existing and/or proposed v-ditch. As discussed in the group meeting today, 2/10/2022, with City staffs, these calculations will be submitted for review in the design phase.

The City MPD does not mention any issue regarding flooding to the school, sport park, etc. In 2009 – 2011 H&A prepared an improvement plan for the City, included in the reference section of the hydrology report, to repair the channel and improve the inlet to intercept runoff from upstream areas with Q50 = 569cfs.

Hunsaker and Associates (H&A) did not investigate and/or analyze all the downstream SD systems. All approved/as-built SD improvement plans immediately downstream of the proposed SD were obtained from the City used as references and included in Section 10. For instance, the double 48" RCP crossing Rose Drive and then connected to the 5'x8' RCB within the La Floresta project designed by H&A. This SD system was approved by the City in 2006 (reviewed by Willdan Engineering) and it was designed for the 100-yr storm event of 365cfs. The approved hydraulic calculation in 2006 ended at the upstream end of the 5'x8' RCB. This approved hydraulic calculation is now updated to include the double 48" RCP and will be submitted to the City for review at the design phase of improvement plans. Few profiles on reference plans showed HGL with or without designed flow rate. Some of the reference plans only showed plan view and no profile and HGL.

H&A does not have every existing SD plan for downstream areas of the proposed development within the City boundaries, for instance, the 84" RCP in Voyager Avenue. Moreover, H&A has proposed several detention basins within the project to detain the runoff produced from the development to the existing level or below the existing level and not intended to improve the capacity of existing SD systems within the City boundaries.

DISCUSSION

This hydrology study is limited within the property boundary; flows produced from the off-site areas discharged into the site would be the same in both existing and proposed conditions. Any excess flows produced from the development shall be detained within the property so that it shall not cause any negative impacts to the surrounding areas.

Existing Condition – WEST

The WEST is divided into 3 drainage areas called "A", "B" and "C" as shown on the hydrology map. Storm runoff produced from these 3 drainage areas eventually is discharged into Loftus Channel.

Drainage Area "A" has an area of 59.7ac and produced a 10-year storm runoff of 102.8cfs. This runoff is discharged into the existing 78" RCP located in Brea Sports Park (Reference SD plan in Section 10). Capacity of this SD is shown on the 10-yr summary table in this section 1.

Drainage Area "B" has an area of 20.7ac and produced a 10-year storm runoff of 41.5cfs. This runoff is discharged into the existing 24" RCP and 60" RCP located in Lambert Road (Reference SD plan in Section 10). Capacity of these SD are shown on the 10-yr summary table in this section 1.

Drainage Area "C" has an area of 16.0ac and produced a 10-year storm runoff of 28.3cfs. This runoff is discharged into the existing 60" RCP located in Bluegrass Street (Reference SD plan in Section 10). Capacity of this SD is shown on the 10-yr summary table in this section 1.

Existing Condition – EAST
This Drainage Area has an area of 134.1ac and produced a 10-year storm runoff of 214.9cfs. This runoff is discharged into the existing 2x48" RCP crossing Rose Drive and then 5'x8' RCB, and eventually is discharged into the Carbon Canyon Channel (Reference SD plan in Section 10). Capacity of this SD is shown on the 10-yr summary table in this section 1.

Existing Condition – SOUTHEAST
This Drainage Area has a total area of 49.7ac and produced a total 10-year storm runoff of 90.0cfs. Runoff produced from sub-areas B1 and B2 is discharged into Carbon Canyon Channel. Runoff produced from sub-areas B3, B4 and B5 is discharged into the existing 36" CMP that connected to Carbon Canyon Channel under Rose Drive. Runoff produced from sub-area B6 and B7 is discharged into the existing 36" RCP located in Blake Road, crossing Rose Drive, and then connected to Carbon Canyon Channel (Reference SD plan in Section 10). Capacity of these SD are shown on the 10-yr summary table in this section 1.

Proposed Condition – WEST
The WEST is also divided into 3 drainage areas called "A", "B" and "C" as shown on the hydrology map. Storm runoff produced from these 3 drainage areas eventually is discharged into Loftus Channel.

Drainage Area "A" has an area of 66.9ac and produced a 10-year storm runoff of 152.1cfs (without detention basin). This runoff is discharged into the existing 78" RCP located in Brea Sports Park. Two basins are proposed in this area to treat low flows produced from the development for water quality purpose. The basin at node 33 is also used to detain the excess 10-year storm runoff produced from the development. To detain the excess flow of 49.3cfs (152.1cfs – 102.8cfs) a flow-by basin volume needs to be approximately 0.9ac.ft. Details of all diversion structures used for water quality and 10-year peak storm shall be provided in the final design.

Drainage Area "B" has an area of 16.2ac and produced a 10-year storm runoff of 34.5cfs. This runoff is discharged into the existing 60" RCP located in Lambert Road. An open basin is proposed at the southwest corner of this area to treat low flows produced from the development for water quality purpose. A detention basin is not needed in this area, because the 10-year runoff produced from the development is lower than that of the existing condition.

Drainage Area "C" has an area of 10.5ac and produced a 10-year storm runoff of 28.2cfs. This runoff is discharged into the existing 60" RCP located in Bluegrass Street. A underground water quality basin is proposed for this area together with two Modular Wetland Units to treat the low flows produced from the site. A flood control basin is not needed in this area, because the 10-year runoff produced from the development is lower than that of the existing condition.

Proposed Condition – EAST

This Drainage Area has a total area of 136.7ac. The major area is 132.9ac and produces a 10-year storm runoff of 300.2cfs (without detention basin) discharged into the existing 2x48" RCP crossing Rose Drive. The minor area is 3.8ac and produces a 10-year storm runoff of 6.7cfs discharged into the existing 24" RCP crossing Rose Drive. Four basins are proposed in this area to treat low flows produced from the development for water quality purpose. The two basins at nodes 86 and 193 are also used to detain the excess 10-year storm runoff produced from the development. To detain the excess flow of 92.0cfs (300.2cfs + 6.7cfs – 214.9cfs), the flow-by basin at node 86 needs an approximate volume of 0.6ac.ft, and the flow-by basin at node 193 needs an approximate volume of 1.0ac.ft. Details of all diversion structures used for water quality and 10-year peak storm shall be provided in the final design. Storm runoff produced from this drainage area eventually is discharged into the Carbon Canyon Channel.

Proposed Condition – SOUTHEAST

Drainage Area "B" has a total area of 49.1ac and produced a total 10-year storm runoff of 115.3cfs (without detention basin). Runoff produced from sub-areas B1 through B17a is discharged into the existing 36" CMP crossing Rose Drive and then connected to the Carbon Canyon Channel. Runoff produced from sub-area B18 through B39 is discharged into the existing 36" RCP located in Blake Road, crossing Rose Drive, and then connected to Carbon Canyon Channel. Runoff produced from sub-areas B40 and B41 directly into Carbon Canyon Channel. A basin are proposed in this drainage area to treat low flows produced from the development for water quality purpose. The basin is also used to detain the excess 10-year storm runoff produced from the development. To detain the excess flow of 25.3cfs (115.3cfs – 90.0cfs) a flow-by basin volume needs to be approximately 0.5ac.ft. Details of all diversion structures used for water quality and 10-year peak storm shall be provided in the final design.

Notes:
A study for the 2-yr storm event is also provided for the West Area to address the Hydro-Modification, because a section of the Loftus Channel is not improved. Flow rates, time of concentration, and volume of the existing and proposed condition are summarized in a table and included in this section.

All Water Quality and Flood Control Basins presented in this preliminary hydrology report with mass grading are consistent with the approved entitlement phase; however, they are subject for minor changes regarding shapes and dimensions in the final design.

For Water Quality calculations and other related references, please see the Preliminary/Conceptual Water Quality Management Plan for more details.

Conclusion:
H&A preliminary hydrology study is generally consistent with the City MPD regarding soil type, land-use, pervious percentage, etc., in that both studied the 10-yr storm event.

H&A preliminary hydrology study also studied the proposed condition of Brea 265 project and addressed the water quality issue due to the development. Several open and underground basins are also proposed throughout the project site to detain the excess runoffs due to the development to the level of the existing condition or below, so that there won't be any negative impact to the surrounding existing structures and facilities.

W.O. #4213-3, BREA 265
2/10/2022

10-YR STUDY FOR WEST - AREAS 'A', 'B' & 'C'

				PROPOSED CONDITION			PROPOSED CONDITION						
	EXISTING CONDITION			Without Detention Basin			With Detention Basin(s)			DIFFERENCES			
	A	B	C	A	B	C	A	B	C	A	B	C	
AREA (ac)	59.70	20.70	16.00	66.90	16.20	10.50	66.90	16.20	10.50	7.20	-4.50	-5.50	AREA (ac)
Q (cfs)	102.80	41.50	28.30	152.10	34.50	28.20	97.60	34.50	28.20	-5.20	-7.00	-0.10	Q (cfs)

Area "A" - Discharge to existing 78" RCP - Sheets C-3.02 and C-3.07 - Brea Sport Park - As-Built Drawings 1-2009 - Unknown capacity
H&A improved the headwall per City - dated 2-28-2011 - Capacity Q50 = 569 cfs

Area "B" - Discharge to existing 24" and 60" RCP - Sheets 5 - 7 of 28 - Lambert Road imp plan - City approval 5-31-2001 - Unknown capacity

Area "C" - Discharge to existing 60" RCP - Sheet 1 of 1 - Union Oil Company Tr. 8242 Offsite - As-built 9-12-1980 - Unknown capacity

10-YR STUDY FOR EAST - AREA 'A'

		PROPOSED CONDITION	PROPOSED CONDITION		
	EXISTING CONDITION	Without Detention Basin	With Detention Basin(s)	DIFFERENCES	
AREA (ac)	134.10	136.70	136.70	2.60	AREA (ac)
Q (cfs)	214.90	306.90	208.10	-6.80	Q (cfs)

Discharge to existing double 48" RCP and 5'x8' RCB designed for Q100 = 365.1cfs
Sheet 3 of 3, T.T. 16934 - Remedial Grading, City approval 11/08/2006

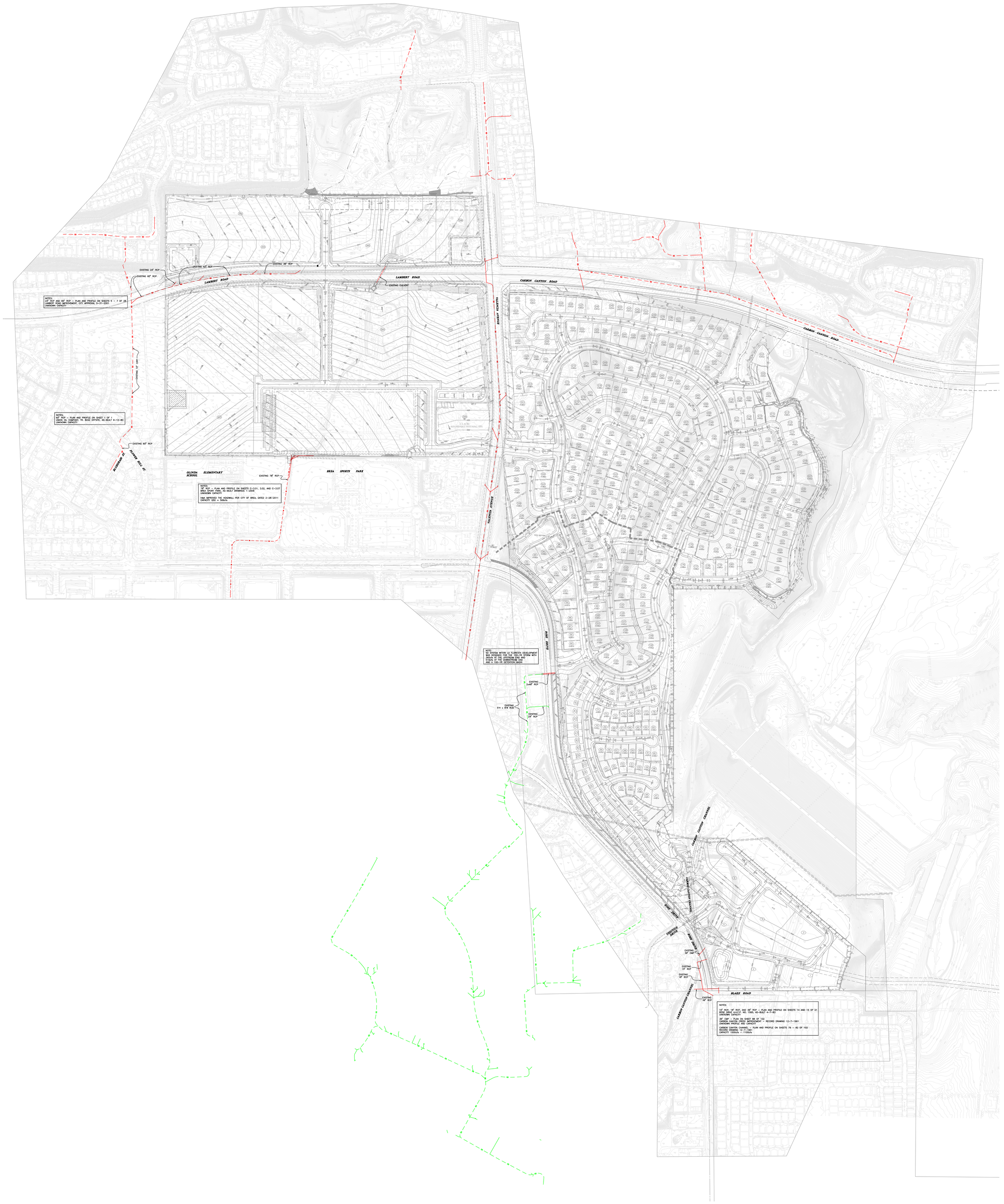
10-YR STUDY FOR SOUTHEAST - AREA 'B'

		PROPOSED CONDITION	PROPOSED CONDITION		
	EXISTING CONDITION	Without Detention Basin	With Detention Basin(s)	DIFFERENCES	
AREA (ac)	49.70	49.10	49.10	-0.60	AREA (ac)
Q (cfs)	90.00	115.30	85.30	-4.70	Q (cfs)

Discharge to existing 36" CMP, 36" RCP, 15" RCP, and Carbon Canyon Channel

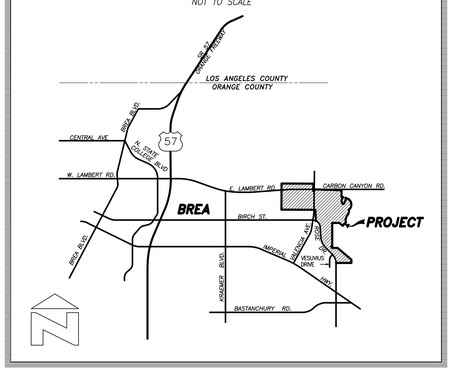
15" RCP and 36" RCP - plan and profile on sheets 14 and 15 of 21 - Blake Rd and Rose Dr. SD - As-Built 4-7-1983 - Unknown capacity

36" CMP - sheet 88 of 102 - Carbon Canyon Creek Improvement - Record Drawing 12-7-1961 - Unknown profile and capacity
Carbon Canyon Channel - Sheets 79 - 90 of 102 - Record Drawing 12-7-1961 - Capacity 1000cfs - 1100cfs



VICINITY MAP

NOT TO SCALE



LEGEND

EXISTING SD 10-YR CAPACITY PER CITY MPD

EXISTING SD 100-YR CAPACITY – LA FLORESTA DEVELOPMENT

1" = 150'

150 75 0 150 450

GRAPHIC SCALE 1"=100'

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BREA 265 DEVELOPMENT EXISTING SD CAPACITY IN DOWNSTREAM AREAS

WO: 4213-3

F:\0477\Engineering\SY_Hydrology\Existing SD Capacity Exhibit.dwg

W.O. #4213-3, BREA 265
2021.10.30
BASIN VOLUME CALCULATIONS

WEST - AREA 'A' - NODE 33

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
472.00		2941	0.068				
	2.00			0.105	0.211	0.211	9174
474.00		6233	0.143				
	2.00			0.184	0.368	0.579	25221
476.00		9814	0.225				
	2.00			0.270	0.539	1.118	48714
478.00		13679	0.314				
	2.00			0.373	0.746	1.864	81205
480.00		18812	0.432				
	2.00			0.492	0.985	2.849	124095
482.00		24078	0.553				
	1.00			0.588	0.588	3.436	149690
483.00		27112	0.622				

Vrequired = 41,255 cu.ft
Water Surface Elevation (max) = 478 ft
Freeboard = 5 ft

W.O. #4213-3, BREA 265
2021.10.30
BASIN VOLUME CALCULATIONS

WEST - AREA 'B'

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
485.00		5090	0.117				
	0.50			0.180	0.090	0.090	3914
485.50		10564	0.243				
	1.00			0.345	0.345	0.434	18922
486.50		19453	0.447				
	1.00			0.473	0.473	0.907	39513
487.50		21729	0.499				
	1.00			0.526	0.526	1.433	62433
488.50		24111	0.554				
	1.00			0.582	0.582	2.015	87786
489.50		26595	0.611				
	1.00			0.640	0.640	2.655	115673
490.50		29179	0.670				

Vrequired = 18,905 cuft for WQ
Water Surface Elevation (max) = 486.5 ft
Freeboard = 4 ft

EAST - NODE 86

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
439.50		3253	0.075				
	0.50			0.082	0.041	0.041	1777
440.00		3853	0.088				
	2.00			0.119	0.237	0.278	12119
442.00		6489	0.149				
	2.00			0.183	0.367	0.645	28096
444.00		9488	0.218				
	2.00			0.256	0.513	1.158	50433
446.00		12849	0.295				
	1.00			0.316	0.316	1.474	64190
447.00		14666	0.337				

Vrequired = 29,403 cuft
Water Surface Elevation (max) = 445 ft
Freeboard = 2 ft

EAST - NODE 193

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
442.00		18529	0.425				
	1.00			0.452	0.452	0.452	19673
443.00		20816	0.478				
	1.00			0.505	0.505	0.956	41661
444.00		23160	0.532				
	1.00			0.559	0.559	1.516	66021
445.00		25560	0.587				
	4.00			0.703	2.814	4.329	188591
449.00		35725	0.820				
	1.00			0.851	0.851	5.180	225657
450.00		38408	0.882				

Vrequired = 57,980 cuft
Water Surface Elevation (max) = 445 ft
Freeboard = 5 ft

W.O. #4213-3, BREA 265
2021.10.30
BASIN VOLUME CALCULATIONS

SOUTHEAST - NODE 63

ELEV. (ft)	CONTOUR INTERVAL (ft)	AREA (sqft)	AREA (acre)	MEAN AREA (acre)	VOLUME (ac.ft)	TOTAL VOLUME (ac.ft)	TOTAL VOLUME (cuft)
395.00		13510.00	0.310				
	1.00			0.327	0.327	0.327	14231
396.00		14951.00	0.343				
	1.00			0.360	0.360	0.687	29930
397.00		16448.00	0.378				
	1.00			0.395	0.395	1.083	47155
398.00		18001.00	0.413				
	1.00			0.432	0.432	1.514	65961
399.00		19611.00	0.450				
	1.00			0.469	0.469	1.984	86405
400.00		21278.00	0.488				

Vrequired = 19,430 cuft
Water Surface Elevation (max) = 397 ft
Freeboard = 3 ft

W.O. #4213-3, BREA 265
1/14/2022

2-YR STUDY - WEST - AREAS 'A', 'B' & 'C'

FOR HYDRO-MODIFICATION DUE TO PART OF LOFTUS CHANNEL NOT IMPROVED

	EXISTING CONDITION			PROPOSED CONDITION			DIFFERENCES			
	A	B	C	A	B	C	A	B	C	
AREA (ac)	59.70	20.70	16.00	66.90	16.20	10.50	7.20	-4.50	-5.50	**AREA (ac)**
Q (cfs)	49.90	20.40	13.50	80.80	18.20	15.20	30.90	-2.20	1.70	**Q (cfs)**
Tc (min)	16.86	13.44	16.78	13.99	13.16	8.73	-2.87	-0.28	-8.05	**Tc (min)**
V (ac.ft)	1.97	0.76	0.55	8.12	1.69	1.40	6.15	0.93	0.85	**V (ac.ft)**

W.O. #4213-3, BREA 265
2/10/2022

100-YR STUDY FOR REFERENCE ONLY - NOT FOR DESIGN

100-YR STUDY FOR WEST - AREAS 'A', 'B' & 'C'

				PROPOSED CONDITION			PROPOSED CONDITION						
	EXISTING CONDITION			Without Detention Basin			With Detention Basin(s)			DIFFERENCES			
	A	B	C	A	B	C	A	B	C	A	B	C	
AREA (ac)	59.70	20.70	16.00	66.90	16.20	10.50	66.90	16.20	10.50	7.20	-4.50	-5.50	AREA (ac)
Q (cfs)	166.40	67.20	46.40	238.00	53.90	43.80	164.10	53.90	43.80	-2.30	-13.30	-2.60	Q (cfs)

Area "A" - Discharge to existing 78" RCP - Sheets C-3.02 and C-3.07 - Brea Sport Park - As-Built Drawings 1-2009 - Unknown capacity
H&A improved the headwall per City - dated 2-28-2011 - Capacity Q50 = 569 cfs

Area "B" - Discharge to existing 24" and 60" RCP - Sheets 5 - 7 of 28 - Lambert Road imp plan - City approval 5-31-2001 - Unknown capacity

Area "C" - Discharge to existing 60" RCP - Sheet 1 of 1 - Union Oil Company Tr. 8242 Offsite - As-built 9-12-1980 - Unknown capacity

100-YR STUDY FOR EAST - AREA 'A'

		PROPOSED CONDITION	PROPOSED CONDITION		
	EXISTING CONDITION	Without Detention Basin	With Detention Basin(s)	DIFFERENCES	
AREA (ac)	134.10	136.70	136.70	2.60	AREA (ac)
Q (cfs)	351.50	479.40	347.60	-3.90	Q (cfs)

Discharge to existing double 48" RCP and 5'x8' RCB designed for Q100 = 365.1cfs
Sheet 3 of 3, T.T. 16934 - Remedial Grading, City approval 11/08/2006

100-YR STUDY FOR SOUTHEAST - AREA 'B'

		PROPOSED CONDITION	PROPOSED CONDITION		
	EXISTING CONDITION	Without Detention Basin	With Detention Basin(s)	DIFFERENCES	
AREA (ac)	49.70	49.10	49.10	-0.60	AREA (ac)
Q (cfs)	146.60	180.70	144.80	-1.80	Q (cfs)

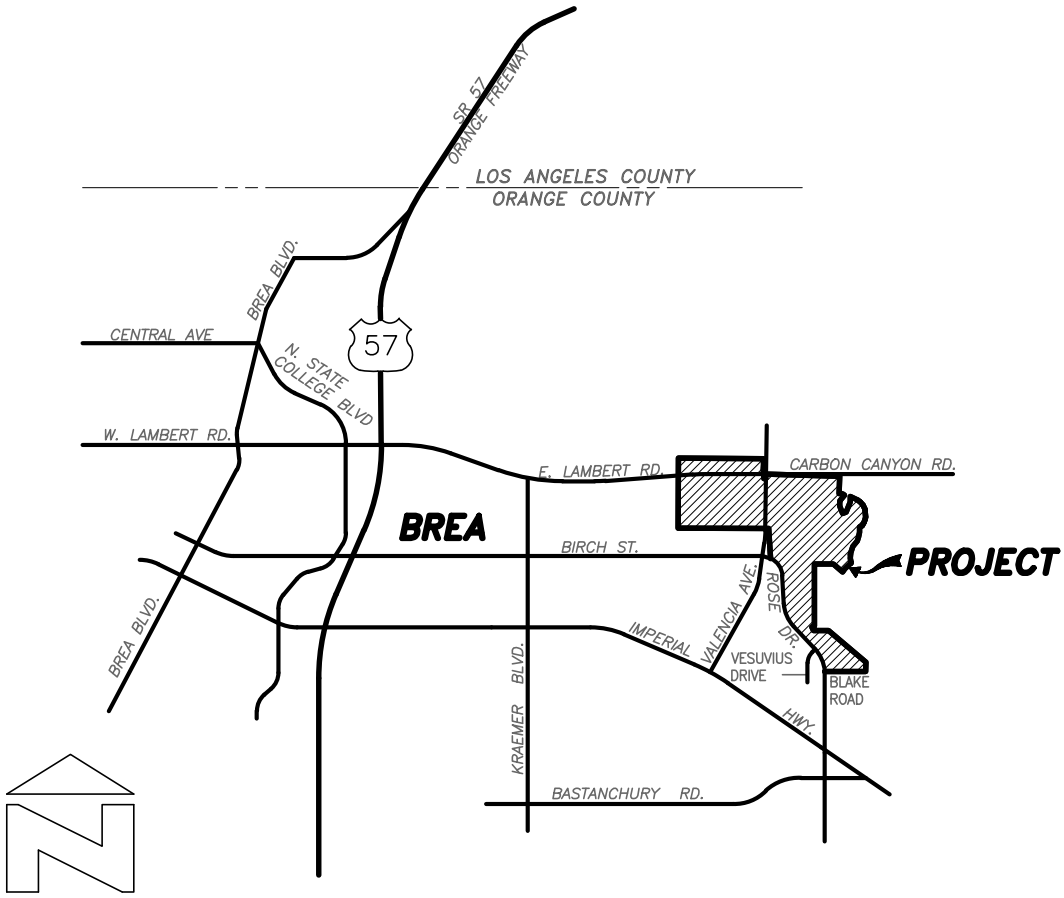
Discharge to existing 36" CMP, 36" RCP, 15" RCP, and Carbon Canyon Channel

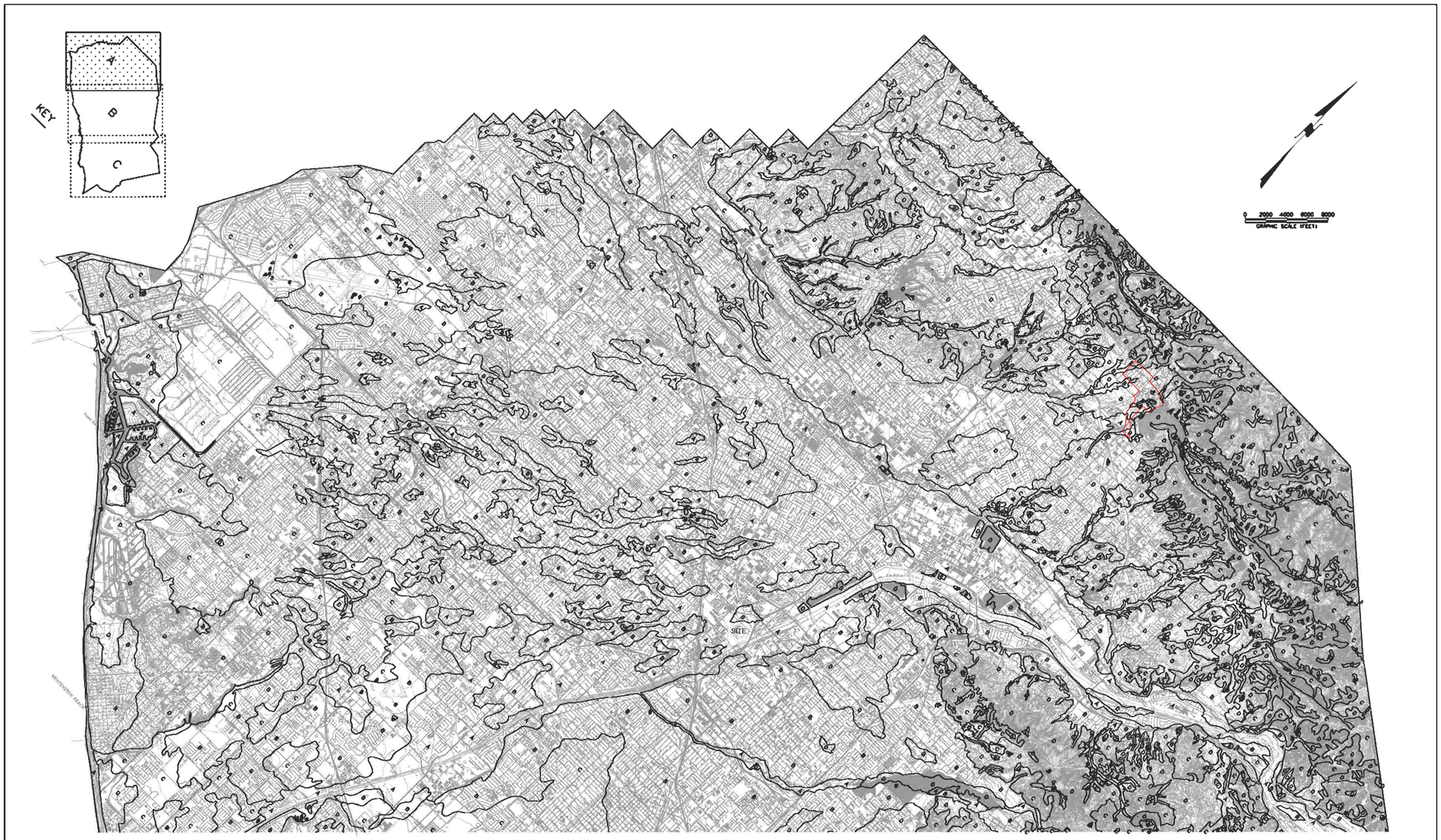
15" RCP and 36" RCP - plan and profile on sheets 14 and 15 of 21 - Blake Rd and Rose Dr. SD - As-Built 4-7-1983 - Unknown capacity

36" CMP - sheet 88 of 102 - Carbon Canyon Creek Improvement - Record Drawing 12-7-1961 - Unknown profile and capacity
Carbon Canyon Channel - Sheets 79 - 90 of 102 - Record Drawing 12-7-1961 - Capacity 1000cfs - 1100cfs

VICINITY MAP

NOT TO SCALE





ORANGE COUNTY
HYDROLOGY MANUAL

HYDROLOGIC CLASSIFICATION OF SOILS
ORANGE COUNTY, CALIFORNIA
PLATE A

SECTION 2

HYDROLOGY CALCULATIONS

EXISTING CONDITION

WEST – AREAS ‘A’, ‘B’ & ‘C’

10-YR STUDY

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* EXISTING - WEST - AREAS 'A', 'B' & 'C'                                *
 ************************************************************************

  FILE NAME: WEST-E.DAT
  TIME/DATE OF STUDY: 17:54 01/08/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    514.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.241
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.11      0.20     1.000    93   11.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.35
  TOTAL AREA(ACRES) =      1.11   PEAK FLOW RATE(CFS) =      2.35

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    497.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0269
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.359
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        6.99      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.26
 AVERAGE FLOW DEPTH(FEET) =   0.26   TRAVEL TIME(MIN.) =   1.65
 Tc(MIN.) =   12.89
 SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =   13.58
 EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      15.74

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   7.57
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.30  DOWNSTREAM(FEET) =   492.00
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS   6.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
 GIVEN PIPE DIAMETER(INCH) = 132.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.74
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   13.11
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    479.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0255
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.243
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.16      0.20     1.000    93
 COMMERCIAL                  D        1.06      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.915
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.74
 AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.97
 Tc(MIN.) =   14.08
 SUBAREA AREA(ACRES) =    11.22       SUBAREA RUNOFF(CFS) =   20.80
 EFFECTIVE AREA(ACRES) =     19.32     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.95
```

```
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      35.69

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.59   FLOW VELOCITY(FEET/SEC.) =   9.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    479.00  DOWNSTREAM(FEET) =    453.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0261
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.112
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       40.34      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      70.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.48
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.56
  Tc(MIN.) =   15.64
  SUBAREA AREA(ACRES) =    40.34       SUBAREA RUNOFF(CFS) =   69.41
  EFFECTIVE AREA(ACRES) =     59.66     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.98
  TOTAL AREA(ACRES) =       59.7         PEAK FLOW RATE(CFS) =     102.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.75   FLOW VELOCITY(FEET/SEC.) =  11.91
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    524.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.25      0.20     0.100    75    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.79
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.79

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  497.50
  STREET LENGTH(FEET) =   980.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   4.44   Tc(MIN.) =   10.75
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.618
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.69      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D        5.71      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.903
  SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =   14.04
  EFFECTIVE AREA(ACRES) =      6.65    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      14.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  19.73
  FLOW VELOCITY(FEET/SEC.) =  4.26   DEPTH*VELOCITY(FT*FT/SEC.) =   1.99
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.62
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   11.34
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.539
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D        2.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.962
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    5.53
  EFFECTIVE AREA(ACRES) =      9.27   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3       PEAK FLOW RATE(CFS) =      19.68

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.80
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.68
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =    1960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.93
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.467
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    75
  NATURAL POOR COVER
  "BARREN"                   D        8.58      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.981
  SUBAREA AREA(ACRES) =    8.77      SUBAREA RUNOFF(CFS) =   17.92
  EFFECTIVE AREA(ACRES) =     18.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       18.0       PEAK FLOW RATE(CFS) =      37.00

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.00
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   12.40
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.40
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.412
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        2.69      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.69      SUBAREA RUNOFF(CFS) =    5.36
  EFFECTIVE AREA(ACRES) =     20.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       20.7       PEAK FLOW RATE(CFS) =      41.48

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.50  DOWNSTREAM(FEET) =    503.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.337
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.544
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    75    6.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.50  DOWNSTREAM ELEVATION(FEET) =  498.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.59
  STREET FLOW TRAVEL TIME(MIN.) =   1.91   Tc(MIN.) =    8.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.048
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.25      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.56
  FLOW VELOCITY(FEET/SEC.) =  2.42   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.50  DOWNSTREAM(FEET) =    484.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   590.00   CHANNEL SLOPE =  0.0246
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.600
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                  D        2.57      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.73
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   2.64
  Tc(MIN.) =   10.88
  SUBAREA AREA(ACRES) =     2.57       SUBAREA RUNOFF(CFS) =    5.55
  EFFECTIVE AREA(ACRES) =      3.11     AREA-AVERAGED Fm(INCH/HR) =   0.17
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.84
  TOTAL AREA(ACRES) =        3.1          PEAK FLOW RATE(CFS) =       6.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   4.20
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    465.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0194
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.156
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                  D       12.90      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.89
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   4.20
  Tc(MIN.) =   15.08
  SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   22.71
  EFFECTIVE AREA(ACRES) =     16.01     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.97
  TOTAL AREA(ACRES) =       16.0          PEAK FLOW RATE(CFS) =      28.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   4.42
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =    2110.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.0  TC(MIN.) =     15.08
  EFFECTIVE AREA(ACRES) =     16.01  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.970
  PEAK FLOW RATE(CFS)   =      28.28
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

EAST – AREA 'A'

10-YR STUDY

```
******************************************************************************
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                          Analysis prepared by:

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          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* EXISTING - EAST - AREA 'A'                                            *
 ***********************************************************************

  FILE NAME: EAST-E.DAT
  TIME/DATE OF STUDY: 10:59 01/05/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    523.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.149
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.00      0.20     1.000    93   10.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.26

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    499.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   460.00   CHANNEL SLOPE =  0.0304
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.554
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        2.55      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.96
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.11
 AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   1.08
 Tc(MIN.) =   11.23
 SUBAREA AREA(ACRES) =     2.55       SUBAREA RUNOFF(CFS) =    5.40
 EFFECTIVE AREA(ACRES) =      3.55     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       7.52

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   7.91
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   805.00   CHANNEL SLOPE =  0.0484
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.305
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        4.63      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.91
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.10
 AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   2.20
 Tc(MIN.) =   13.43
 SUBAREA AREA(ACRES) =     4.63       SUBAREA RUNOFF(CFS) =    8.77
 EFFECTIVE AREA(ACRES) =      8.18     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =      15.50

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   6.52
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1565.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    396.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1695.00   CHANNEL SLOPE =  0.0378
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       74.55      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      75.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.93
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   4.08
  Tc(MIN.) =   17.50
  SUBAREA AREA(ACRES) =    74.55       SUBAREA RUNOFF(CFS) =  119.43
  EFFECTIVE AREA(ACRES) =     82.73     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       82.7         PEAK FLOW RATE(CFS) =     132.54

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =   8.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       51.42      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   51.42      SUBAREA RUNOFF(CFS) =   82.38
  EFFECTIVE AREA(ACRES) =    134.15   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      134.1       PEAK FLOW RATE(CFS) =     214.92
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      134.1  TC(MIN.) =     17.50
  EFFECTIVE AREA(ACRES) =    134.15  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     214.92
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

SOUTHEAST – AREA 'B'

10-YR STUDY

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******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                            *
* 10-YR STUDY                                                            *
* EXISTING - SOUTHEAST - AREA 'B'                                        *
 ***********************************************************************

  FILE NAME: SE-E-10.DAT
  TIME/DATE OF STUDY: 19:53 01/06/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.217
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.290
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        0.63      0.20     1.000    93    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.75
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.75

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
--------------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    391.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1275.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.712
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       13.35      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.35
 AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   2.89
 Tc(MIN.) =   10.11
 SUBAREA AREA(ACRES) =    13.35       SUBAREA RUNOFF(CFS) =   30.18
 EFFECTIVE AREA(ACRES) =     13.98     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       14.0          PEAK FLOW RATE(CFS) =      31.61

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.34   FLOW VELOCITY(FEET/SEC.) =   9.34
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1575.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
--------------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.357
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "BARREN"                    D        2.21      0.20     1.000    93   12.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      4.29
 TOTAL AREA(ACRES) =      2.21   PEAK FLOW RATE(CFS) =      4.29

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
--------------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    404.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.0094
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.946
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.49      0.20     1.000    93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.59
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.10
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   5.13
  Tc(MIN.) =   18.05
  SUBAREA AREA(ACRES) =    10.49       SUBAREA RUNOFF(CFS) =   16.48
  EFFECTIVE AREA(ACRES) =     12.70     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       12.7         PEAK FLOW RATE(CFS) =      19.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   3.58
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    404.00  DOWNSTREAM(FEET) =    388.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00   CHANNEL SLOPE =  0.0225
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.818
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        7.61      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.21
  AVERAGE FLOW DEPTH(FEET) =   0.75   TRAVEL TIME(MIN.) =   2.27
  Tc(MIN.) =   20.32
  SUBAREA AREA(ACRES) =     7.61       SUBAREA RUNOFF(CFS) =   11.08
  EFFECTIVE AREA(ACRES) =     20.31     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       20.3         PEAK FLOW RATE(CFS) =      29.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =   5.44
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.53      0.20     1.000    93    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    401.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1430.00   CHANNEL SLOPE =  0.0413
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.275
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       14.88      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   6.01
  Tc(MIN.) =   13.74
  SUBAREA AREA(ACRES) =    14.88       SUBAREA RUNOFF(CFS) =   27.79
  EFFECTIVE AREA(ACRES) =     15.41     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       15.4         PEAK FLOW RATE(CFS) =      28.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   4.76
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1730.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.4  TC(MIN.) =     13.74
  EFFECTIVE AREA(ACRES) =     15.41  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      28.78
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 3

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

10-YR STUDY

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3, BREA CENTRAL                                           *
* 10-YR STUDY                                                          *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                             *
 ***********************************************************************

  FILE NAME: W-A-10.DAT
  TIME/DATE OF STUDY: 18:42 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.183
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    75    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.96
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.96

******************************************************************************
```

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.96
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   11.23
  EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      14.85

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.23
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.85
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    9.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.68
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.780
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   11.24
  EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      25.42

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.42
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.325
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.26      0.20      0.100    75    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    6.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.37
  FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.51
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.08
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.26

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.43
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.26

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.42   10.47    2.659  0.20( 0.04) 0.20      10.3       1.00
      2        2.26    8.43    3.008  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.48    8.43    3.008  0.20( 0.04) 0.19       9.1       5.00
      2       27.42   10.47    2.659  0.20( 0.04) 0.19      11.1       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.42    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.03
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.42
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.58
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      27.42

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20     0.100    75    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.26

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
```

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.25
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =   10.23
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.694
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    3.95
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.66

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.95
 FLOW VELOCITY(FEET/SEC.) =  3.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       25.48    8.55    2.985  0.20( 0.04) 0.19       9.1       5.00
     1       27.42   10.58    2.642  0.20( 0.04) 0.19      11.1       1.00
     2        5.66   10.23    2.694  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       30.73    8.55    2.985  0.20( 0.03) 0.17      11.1       5.00
     2       32.73   10.23    2.694  0.20( 0.04) 0.18      13.2       8.00
     3       32.96   10.58    2.642  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.96    Tc(MIN.) =    10.58
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.96
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.96

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   3.86   Tc(MIN.) =   10.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.595
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.08
  FLOW VELOCITY(FEET/SEC.) =  3.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.92
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.73    8.72    2.952  0.20( 0.03) 0.17      11.1       5.00
      1       32.73   10.39    2.670  0.20( 0.04) 0.18      13.2       8.00
      1       32.96   10.74    2.619  0.20( 0.04) 0.18      13.5       1.00
      2        4.89   10.92    2.595  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    8.72    2.952  0.20( 0.03) 0.16      12.8       5.00
      2       37.52   10.39    2.670  0.20( 0.03) 0.17      15.2       8.00
      3       37.82   10.74    2.619  0.20( 0.03) 0.17      15.6       1.00
      4       37.54   10.92    2.595  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.82    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.58   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
```

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  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.82
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.58
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.82

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.877
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.31      0.20      0.100    75    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
```

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    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  3.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.40

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   3.36
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    9.58    2.797  0.20( 0.03) 0.16      12.8       5.00
      1       37.52   11.24    2.552  0.20( 0.03) 0.17      15.2       8.00
      1       37.82   11.57    2.510  0.20( 0.03) 0.17      15.6       1.00
      1       37.54   11.78    2.485  0.20( 0.03) 0.17      15.6      11.00
      2        3.40    6.94    3.364  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       34.12    6.94    3.364  0.20( 0.03) 0.16      10.4      14.00
      2       38.00    9.58    2.797  0.20( 0.03) 0.16      13.9       5.00
      3       40.10   11.24    2.552  0.20( 0.03) 0.16      16.3       8.00
      4       40.35   11.57    2.510  0.20( 0.03) 0.16      16.7       1.00
      5       40.04   11.78    2.485  0.20( 0.03) 0.16      16.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.35    Tc(MIN.) =    11.57
  EFFECTIVE AREA(ACRES) =      16.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.35
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.85
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.85
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.71
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.35

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    75    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.87
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   3.36
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.12    7.24    3.283  0.20( 0.03) 0.16      10.4      14.00
      1       38.00    9.86    2.751  0.20( 0.03) 0.16      13.9       5.00
      1       40.10   11.53    2.515  0.20( 0.03) 0.16      16.3       8.00
      1       40.35   11.85    2.476  0.20( 0.03) 0.16      16.7       1.00
      1       40.04   12.06    2.451  0.20( 0.03) 0.16      16.7      11.00
      2        1.86    6.96    3.359  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.42    6.96    3.359  0.20( 0.03) 0.15      10.6      17.00
      2       35.94    7.24    3.283  0.20( 0.03) 0.15      11.0      14.00
      3       39.52    9.86    2.751  0.20( 0.03) 0.16      14.5       5.00
      4       41.49   11.53    2.515  0.20( 0.03) 0.16      16.9       8.00
      5       41.72   11.85    2.476  0.20( 0.03) 0.16      17.3       1.00
      6       41.40   12.06    2.451  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.72    Tc(MIN.) =    11.85
  EFFECTIVE AREA(ACRES) =      17.33   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.72
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.93
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.33
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.72

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.54
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      4.54

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.54
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.059
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   10.16
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      14.43

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.19
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.42    7.04    3.336  0.20( 0.03) 0.15      10.6      17.00
      1       35.94    7.33    3.262  0.20( 0.03) 0.15      11.0      14.00
      1       39.52    9.94    2.738  0.20( 0.03) 0.16      14.5       5.00
      1       41.49   11.61    2.505  0.20( 0.03) 0.16      16.9       8.00
      1       41.72   11.93    2.466  0.20( 0.03) 0.16      17.3       1.00
      1       41.40   12.14    2.442  0.20( 0.03) 0.16      17.4      11.00
      2       14.43    8.19    3.059  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.96    7.04    3.336  0.20( 0.03) 0.17      15.2      17.00
      2       49.71    7.33    3.262  0.20( 0.03) 0.17      15.8      14.00
      3       51.56    8.19    3.059  0.20( 0.03) 0.17      17.5      19.00
      4       52.41    9.94    2.738  0.20( 0.03) 0.17      19.9       5.00
      5       53.27   11.61    2.505  0.20( 0.03) 0.17      22.2       8.00
      6       53.32   11.93    2.466  0.20( 0.03) 0.17      22.6       1.00
      7       52.88   12.14    2.442  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      53.32    Tc(MIN.) =    11.93
  EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.32
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   13.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.20
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.433
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    75    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.86

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.538
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20      0.100    75    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.36
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.26
  TOTAL STREAM AREA(ACRES) =       0.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.96    8.35    3.026  0.20( 0.03) 0.17      15.2      17.00
      1       49.71    8.63    2.970  0.20( 0.03) 0.17      15.8      14.00
      1       51.56    9.49    2.812  0.20( 0.03) 0.17      17.5      19.00
      1       52.41   11.24    2.552  0.20( 0.03) 0.17      19.9       5.00
      1       53.27   12.87    2.361  0.20( 0.03) 0.17      22.2       8.00
      1       53.32   13.20    2.328  0.20( 0.03) 0.17      22.6       1.00
      1       52.88   13.41    2.307  0.20( 0.03) 0.17      22.7      11.00
      2        0.86    6.70    3.433  0.20( 0.02) 0.10       0.3      22.00
      3        0.82    6.36    3.538  0.20( 0.02) 0.10       0.3      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.36    3.538  0.20( 0.03) 0.17      12.1      40.00
      2       46.29    6.70    3.433  0.20( 0.03) 0.17      12.7      22.00
      3       50.42    8.35    3.026  0.20( 0.03) 0.17      15.7      17.00
      4       51.14    8.63    2.970  0.20( 0.03) 0.17      16.3      14.00
      5       52.91    9.49    2.812  0.20( 0.03) 0.17      18.0      19.00
      6       53.64   11.24    2.552  0.20( 0.03) 0.17      20.4       5.00
      7       54.41   12.87    2.361  0.20( 0.03) 0.17      22.8       8.00
      8       54.44   13.20    2.328  0.20( 0.03) 0.17      23.2       1.00
      9       53.99   13.41    2.307  0.20( 0.03) 0.17      23.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.44    Tc(MIN.) =    13.20
  EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       23.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.33
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.33
  RAINFALL INTENSITY(INCH/HR) =   2.31
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      23.18
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      54.44

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    5.67
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.00

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   3.42    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   19.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      20.53

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.53
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.10
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.10
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.50    3.493  0.20( 0.03) 0.17      12.1      40.00
      1       46.29    6.84    3.392  0.20( 0.03) 0.17      12.7      22.00
```

```
     1       50.42    8.48    2.999  0.20( 0.03) 0.17      15.7      17.00
     1       51.14    8.76    2.943  0.20( 0.03) 0.17      16.3      14.00
     1       52.91    9.63    2.789  0.20( 0.03) 0.17      18.0      19.00
     1       53.64   11.38    2.534  0.20( 0.03) 0.17      20.4       5.00
     1       54.41   13.01    2.347  0.20( 0.03) 0.17      22.8       8.00
     1       54.44   13.33    2.314  0.20( 0.03) 0.17      23.2       1.00
     1       53.99   13.54    2.294  0.20( 0.03) 0.17      23.2      11.00
     2       20.53    9.10    2.880  0.20( 0.04) 0.19       8.0      24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.50    3.493  0.20( 0.03) 0.17      17.8      40.00
      2       64.50    6.84    3.392  0.20( 0.03) 0.17      18.8      22.00
      3       70.36    8.48    2.999  0.20( 0.03) 0.17      23.2      17.00
      4       71.36    8.76    2.943  0.20( 0.03) 0.17      24.0      14.00
      5       72.37    9.10    2.880  0.20( 0.03) 0.17      25.0      24.00
      6       72.78    9.63    2.789  0.20( 0.03) 0.17      26.1      19.00
      7       71.68   11.38    2.534  0.20( 0.03) 0.17      28.4       5.00
      8       71.09   13.01    2.347  0.20( 0.03) 0.17      30.8       8.00
      9       70.88   13.33    2.314  0.20( 0.03) 0.17      31.2       1.00
     10       70.29   13.54    2.294  0.20( 0.03) 0.17      31.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      72.78    Tc(MIN.) =     9.63
  EFFECTIVE AREA(ACRES) =      26.06   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.78
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.10
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.06
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.78

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20     0.200    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.35
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.99
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =    8.47
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      12.52

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.52
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    8.69
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.69
  RAINFALL INTENSITY(INCH/HR) =   2.96
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.99    3.350  0.20( 0.03) 0.17      17.8      40.00
      1       64.50    7.33    3.259  0.20( 0.03) 0.17      18.8      22.00
      1       70.36    8.96    2.906  0.20( 0.03) 0.17      23.2      17.00
      1       71.36    9.24    2.855  0.20( 0.03) 0.17      24.0      14.00
      1       72.37    9.58    2.798  0.20( 0.03) 0.17      25.0      24.00
      1       72.78   10.10    2.713  0.20( 0.03) 0.17      26.1      19.00
      1       71.68   11.85    2.476  0.20( 0.03) 0.17      28.4       5.00
      1       71.09   13.48    2.299  0.20( 0.03) 0.17      30.8       8.00
      1       70.88   13.81    2.268  0.20( 0.03) 0.17      31.2       1.00
      1       70.29   14.02    2.249  0.20( 0.03) 0.17      31.2      11.00
      2       12.52    8.69    2.958  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.57    6.99    3.350  0.20( 0.04) 0.18      21.5      40.00
      2       76.16    7.33    3.259  0.20( 0.04) 0.18      22.6      22.00
      3       81.89    8.69    2.958  0.20( 0.04) 0.18      27.0      29.00
      4       82.65    8.96    2.906  0.20( 0.04) 0.18      27.7      17.00
      5       83.43    9.24    2.855  0.20( 0.04) 0.18      28.6      14.00
      6       84.20    9.58    2.798  0.20( 0.04) 0.18      29.5      24.00
      7       84.25   10.10    2.713  0.20( 0.04) 0.18      30.6      19.00
      8       82.13   11.85    2.476  0.20( 0.04) 0.18      33.0       5.00
      9       80.78   13.48    2.299  0.20( 0.04) 0.18      35.3       8.00
     10       80.44   13.81    2.268  0.20( 0.04) 0.18      35.7       1.00
     11       79.76   14.02    2.249  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      84.25    Tc(MIN.) =    10.10
  EFFECTIVE AREA(ACRES) =      30.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.25
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.14
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.25
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.24
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      30.60
  TOTAL STREAM AREA(ACRES) =      35.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.25

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.83
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    5.44
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.44
  RAINFALL INTENSITY(INCH/HR) =   3.87
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       74.57    7.14    3.311  0.20( 0.04) 0.18      21.5      40.00
     1       76.16    7.48    3.223  0.20( 0.04) 0.18      22.6      22.00
     1       81.89    8.83    2.931  0.20( 0.04) 0.18      27.0      29.00
     1       82.65    9.10    2.881  0.20( 0.04) 0.18      27.7      17.00
     1       83.43    9.38    2.831  0.20( 0.04) 0.18      28.6      14.00
     1       84.20    9.71    2.775  0.20( 0.04) 0.18      29.5      24.00
     1       84.25   10.24    2.692  0.20( 0.04) 0.18      30.6      19.00
     1       82.13   11.99    2.459  0.20( 0.04) 0.18      33.0       5.00
     1       80.78   13.62    2.286  0.20( 0.04) 0.18      35.3       8.00
     1       80.44   13.95    2.255  0.20( 0.04) 0.18      35.7       1.00
     1       79.76   14.16    2.236  0.20( 0.04) 0.18      35.8      11.00
     2        2.83    5.44    3.867  0.20( 0.18) 0.90       0.8      34.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       69.36    5.44    3.867  0.20( 0.04) 0.21      17.2      34.00
     2       76.98    7.14    3.311  0.20( 0.04) 0.20      22.3      40.00
     3       78.50    7.48    3.223  0.20( 0.04) 0.20      23.4      22.00
     4       84.00    8.83    2.931  0.20( 0.04) 0.20      27.8      29.00
     5       84.72    9.10    2.881  0.20( 0.04) 0.20      28.6      17.00
     6       85.47    9.38    2.831  0.20( 0.04) 0.20      29.4      14.00
     7       86.19    9.71    2.775  0.20( 0.04) 0.20      30.4      24.00
     8       86.18   10.24    2.692  0.20( 0.04) 0.20      31.4      19.00
     9       83.87   11.99    2.459  0.20( 0.04) 0.19      33.8       5.00
    10       82.40   13.62    2.286  0.20( 0.04) 0.19      36.1       8.00
    11       82.03   13.95    2.255  0.20( 0.04) 0.19      36.5       1.00
    12       81.34   14.16    2.236  0.20( 0.04) 0.19      36.6      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      86.19    Tc(MIN.) =     9.71
 EFFECTIVE AREA(ACRES) =      30.36   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       36.6
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.67
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      86.19
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.75
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.75
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      30.36
  TOTAL STREAM AREA(ACRES) =      36.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      86.19

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.88
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      5.88

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.88
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.70
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       69.36    5.48    3.851  0.20( 0.04) 0.21      17.2      34.00
      1       76.98    7.18    3.300  0.20( 0.04) 0.20      22.3      40.00
      1       78.50    7.52    3.214  0.20( 0.04) 0.20      23.4      22.00
      1       84.00    8.86    2.924  0.20( 0.04) 0.20      27.8      29.00
```

```
     1       84.72    9.14    2.874  0.20( 0.04) 0.20      28.6      17.00
     1       85.47    9.42    2.824  0.20( 0.04) 0.20      29.4      14.00
     1       86.19    9.75    2.768  0.20( 0.04) 0.20      30.4      24.00
     1       86.18   10.28    2.686  0.20( 0.04) 0.20      31.4      19.00
     1       83.87   12.03    2.454  0.20( 0.04) 0.19      33.8       5.00
     1       82.40   13.66    2.282  0.20( 0.04) 0.19      36.1       8.00
     1       82.03   13.99    2.252  0.20( 0.04) 0.19      36.5       1.00
     1       81.34   14.20    2.232  0.20( 0.04) 0.19      36.6      11.00
     2        5.88    7.70    3.170  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.46    5.48    3.851  0.20( 0.04) 0.21      18.7      34.00
      2       82.69    7.18    3.300  0.20( 0.04) 0.20      24.2      40.00
      3       84.32    7.52    3.214  0.20( 0.04) 0.20      25.4      22.00
      4       85.13    7.70    3.170  0.20( 0.04) 0.20      26.1      37.00
      5       89.42    8.86    2.924  0.20( 0.04) 0.20      29.9      29.00
      6       90.05    9.14    2.874  0.20( 0.04) 0.20      30.6      17.00
      7       90.70    9.42    2.824  0.20( 0.04) 0.20      31.5      14.00
      8       91.31    9.75    2.768  0.20( 0.04) 0.20      32.4      24.00
      9       91.15   10.28    2.686  0.20( 0.04) 0.20      33.5      19.00
     10       88.41   12.03    2.454  0.20( 0.04) 0.20      35.8       5.00
     11       86.61   13.66    2.282  0.20( 0.04) 0.19      38.2       8.00
     12       86.19   13.99    2.252  0.20( 0.04) 0.19      38.6       1.00
     13       85.46   14.20    2.232  0.20( 0.04) 0.19      38.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      91.31    Tc(MIN.) =     9.75
  EFFECTIVE AREA(ACRES) =      32.42   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       38.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.31
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      32.42
  TOTAL STREAM AREA(ACRES) =      38.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      91.31

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.55      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    1.64
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.41

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.46    6.18    3.594  0.20( 0.04) 0.21      18.7      34.00
      1       82.69    7.85    3.134  0.20( 0.04) 0.20      24.2      40.00
      1       84.32    8.19    3.059  0.20( 0.04) 0.20      25.4      22.00
      1       85.13    8.38    3.021  0.20( 0.04) 0.20      26.1      37.00
      1       89.42    9.54    2.804  0.20( 0.04) 0.20      29.9      29.00
      1       90.05    9.80    2.761  0.20( 0.04) 0.20      30.6      17.00
      1       90.70   10.08    2.717  0.20( 0.04) 0.20      31.5      14.00
      1       91.31   10.41    2.667  0.20( 0.04) 0.20      32.4      24.00
      1       91.15   10.94    2.592  0.20( 0.04) 0.20      33.5      19.00
      1       88.41   12.71    2.379  0.20( 0.04) 0.20      35.8       5.00
      1       86.61   14.34    2.220  0.20( 0.04) 0.19      38.2       8.00
      1       86.19   14.66    2.192  0.20( 0.04) 0.19      38.6       1.00
      1       85.46   14.87    2.174  0.20( 0.04) 0.19      38.6      11.00
      2        2.41    7.06    3.332  0.20( 0.02) 0.10       0.8      40.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       76.74    6.18    3.594  0.20( 0.04) 0.21      19.4      34.00
      2       81.18    7.06    3.332  0.20( 0.04) 0.20      22.4      40.00
      3       84.96    7.85    3.134  0.20( 0.04) 0.20      25.0      40.00
      4       86.54    8.19    3.059  0.20( 0.04) 0.20      26.2      22.00
      5       87.31    8.38    3.021  0.20( 0.04) 0.20      26.9      37.00
      6       91.45    9.54    2.804  0.20( 0.04) 0.20      30.7      29.00
      7       92.05    9.80    2.761  0.20( 0.04) 0.20      31.4      17.00
      8       92.67   10.08    2.717  0.20( 0.04) 0.20      32.3      14.00
      9       93.24   10.41    2.667  0.20( 0.04) 0.20      33.2      24.00
     10       93.03   10.94    2.592  0.20( 0.04) 0.20      34.3      19.00
     11       90.13   12.71    2.379  0.20( 0.04) 0.19      36.6       5.00
     12       88.22   14.34    2.220  0.20( 0.04) 0.19      39.0       8.00
     13       87.77   14.66    2.192  0.20( 0.04) 0.19      39.4       1.00
     14       87.03   14.87    2.174  0.20( 0.04) 0.19      39.5      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.24    Tc(MIN.) =    10.41
  EFFECTIVE AREA(ACRES) =      33.23   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       39.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.62
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.24
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      33.23
  TOTAL STREAM AREA(ACRES) =      39.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      93.24

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
```

```
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.43      0.20      0.100    75    6.83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.31
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   3.39
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       76.74    6.25    3.571  0.20( 0.04) 0.21      19.4      34.00
     1       81.18    7.13    3.313  0.20( 0.04) 0.20      22.4      40.00
     1       84.96    7.92    3.119  0.20( 0.04) 0.20      25.0      40.00
     1       86.54    8.26    3.045  0.20( 0.04) 0.20      26.2      22.00
     1       87.31    8.44    3.007  0.20( 0.04) 0.20      26.9      37.00
     1       91.45    9.61    2.792  0.20( 0.04) 0.20      30.7      29.00
     1       92.05    9.86    2.750  0.20( 0.04) 0.20      31.4      17.00
     1       92.67   10.14    2.707  0.20( 0.04) 0.20      32.3      14.00
     1       93.24   10.48    2.657  0.20( 0.04) 0.20      33.2      24.00
     1       93.03   11.00    2.584  0.20( 0.04) 0.20      34.3      19.00
     1       90.13   12.77    2.372  0.20( 0.04) 0.19      36.6       5.00
     1       88.22   14.40    2.214  0.20( 0.04) 0.19      39.0       8.00
     1       87.77   14.73    2.186  0.20( 0.04) 0.19      39.4       1.00
     1       87.03   14.94    2.168  0.20( 0.04) 0.19      39.5      11.00
     2        1.31    6.83    3.394  0.20( 0.02) 0.10       0.4      42.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       78.00    6.25    3.571  0.20( 0.04) 0.21      19.8      34.00
     2       81.00    6.83    3.394  0.20( 0.04) 0.20      21.8      42.00
     3       82.46    7.13    3.313  0.20( 0.04) 0.20      22.8      40.00
     4       86.15    7.92    3.119  0.20( 0.04) 0.20      25.4      40.00
     5       87.71    8.26    3.045  0.20( 0.04) 0.20      26.7      22.00
     6       88.47    8.44    3.007  0.20( 0.04) 0.20      27.3      37.00
     7       92.52    9.61    2.792  0.20( 0.04) 0.20      31.1      29.00
     8       93.10    9.86    2.750  0.20( 0.04) 0.20      31.9      17.00
     9       93.71   10.14    2.707  0.20( 0.04) 0.19      32.7      14.00
    10       94.26   10.48    2.657  0.20( 0.04) 0.19      33.7      24.00
    11       94.02   11.00    2.584  0.20( 0.04) 0.19      34.7      19.00
    12       91.04   12.77    2.372  0.20( 0.04) 0.19      37.1       5.00
    13       89.06   14.40    2.214  0.20( 0.04) 0.19      39.4       8.00
    14       88.61   14.73    2.186  0.20( 0.04) 0.19      39.8       1.00
    15       87.86   14.94    2.168  0.20( 0.04) 0.19      39.9      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      94.26    Tc(MIN.) =    10.48
 EFFECTIVE AREA(ACRES) =      33.66   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
```

```
  TOTAL AREA(ACRES) =       39.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.40
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.26
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.84
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.84
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      33.66
  TOTAL STREAM AREA(ACRES) =      39.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      94.26

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.424
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =    8.05
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.090
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.16
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.72
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.18

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.23

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
```

```
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.88
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.88
  RAINFALL INTENSITY(INCH/HR) =   3.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       78.00    6.63    3.452  0.20( 0.04) 0.21      19.8      34.00
      1       81.00    7.21    3.291  0.20( 0.04) 0.20      21.8      42.00
      1       82.46    7.50    3.217  0.20( 0.04) 0.20      22.8      40.00
      1       86.15    8.30    3.037  0.20( 0.04) 0.20      25.4      40.00
      1       87.71    8.63    2.970  0.20( 0.04) 0.20      26.7      22.00
      1       88.47    8.81    2.934  0.20( 0.04) 0.20      27.3      37.00
      1       92.52    9.97    2.733  0.20( 0.04) 0.20      31.1      29.00
      1       93.10   10.23    2.694  0.20( 0.04) 0.20      31.9      17.00
      1       93.71   10.51    2.653  0.20( 0.04) 0.19      32.7      14.00
      1       94.26   10.84    2.606  0.20( 0.04) 0.19      33.7      24.00
      1       94.02   11.37    2.536  0.20( 0.04) 0.19      34.7      19.00
      1       91.04   13.14    2.334  0.20( 0.04) 0.19      37.1       5.00
      1       89.06   14.77    2.182  0.20( 0.04) 0.19      39.4       8.00
      1       88.61   15.10    2.155  0.20( 0.04) 0.19      39.8       1.00
      1       87.86   15.31    2.138  0.20( 0.04) 0.19      39.9      11.00
      2        2.18    8.05    3.090  0.20( 0.02) 0.10       0.8      44.00
      3        2.23    6.88    3.380  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.21    6.63    3.452  0.20( 0.04) 0.20      21.1      34.00
      2       83.56    6.88    3.380  0.20( 0.04) 0.20      22.0      40.00
      3       85.26    7.21    3.291  0.20( 0.04) 0.20      23.2      42.00
      4       86.70    7.50    3.217  0.20( 0.04) 0.20      24.3      40.00
      5       89.22    8.05    3.090  0.20( 0.04) 0.19      26.1      44.00
      6       90.30    8.30    3.037  0.20( 0.04) 0.19      27.0      40.00
      7       91.76    8.63    2.970  0.20( 0.04) 0.19      28.2      22.00
      8       92.48    8.81    2.934  0.20( 0.04) 0.19      28.8      37.00
      9       96.26    9.97    2.733  0.20( 0.04) 0.19      32.6      29.00
     10       96.78   10.23    2.694  0.20( 0.04) 0.19      33.4      17.00
     11       97.33   10.51    2.653  0.20( 0.04) 0.19      34.2      14.00
     12       97.82   10.84    2.606  0.20( 0.04) 0.19      35.2      24.00
     13       97.48   11.37    2.536  0.20( 0.04) 0.19      36.2      19.00
     14       94.22   13.14    2.334  0.20( 0.04) 0.19      38.6       5.00
     15       92.04   14.77    2.182  0.20( 0.04) 0.19      40.9       8.00
     16       91.55   15.10    2.155  0.20( 0.04) 0.19      41.4       1.00
     17       90.77   15.31    2.138  0.20( 0.04) 0.19      41.4      11.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      97.82    Tc(MIN.) =    10.84
  EFFECTIVE AREA(ACRES) =      35.18   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       41.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.82
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =   12.21
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.71
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.82
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   12.62
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.57
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.57

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.82
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.933
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.31      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   24.24
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.70
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.41
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.559
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    75    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.22      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.43
  FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       2.43
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.43
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.24
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.41    9.88    2.748  0.20( 0.04) 0.20      10.9      48.00
      2        2.43    8.24    3.048  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.76    8.24    3.048  0.20( 0.04) 0.19      10.0      51.00
      2       30.60    9.88    2.748  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.60    Tc(MIN.) =     9.88
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.60
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.26
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.26
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =      11.79
 TOTAL STREAM AREA(ACRES) =      11.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.60

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.803
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20      0.100    75    5.60
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.58
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.60
 RAINFALL INTENSITY(INCH/HR) =   3.80
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.17
 TOTAL STREAM AREA(ACRES) =       0.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       28.76    8.63    2.970  0.20( 0.04) 0.19      10.0      51.00
     1       30.60   10.26    2.689  0.20( 0.04) 0.19      11.8      48.00
     2        0.58    5.60    3.803  0.20( 0.02) 0.10       0.2      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.57    5.60    3.803  0.20( 0.04) 0.19       6.7      53.00
     2       29.21    8.63    2.970  0.20( 0.04) 0.19      10.2      51.00
     3       31.00   10.26    2.689  0.20( 0.04) 0.19      12.0      48.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      31.00    Tc(MIN.) =    10.26
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.00
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.00

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20      0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   14.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    8.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.006
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =    9.26
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       9.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.39
  FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.57    6.11    3.618  0.20( 0.04) 0.19       6.7      53.00
      1       29.21    9.11    2.879  0.20( 0.04) 0.19      10.2      51.00
      1       31.00   10.74    2.620  0.20( 0.04) 0.19      12.0      48.00
      2        9.83    8.45    3.006  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.15    6.11    3.618  0.20( 0.04) 0.19       9.3      53.00
      2       38.02    8.45    3.006  0.20( 0.04) 0.19      13.1      56.00
      3       38.62    9.11    2.879  0.20( 0.04) 0.19      13.8      51.00
      4       39.55   10.74    2.620  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.55    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
```

```
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.27
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               D        1.10      0.20     0.850    75   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.29
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      2.29

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   2.48    Tc(MIN.) =   14.24
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.228
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK               D        8.75      0.20     0.850    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =   16.21
 EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      18.25

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.24
 RAINFALL INTENSITY(INCH/HR) =   2.23
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.25

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.15    6.29    3.561  0.20( 0.04) 0.19       9.3      53.00
     1       38.02    8.62    2.971  0.20( 0.04) 0.19      13.1      56.00
     1       38.62    9.28    2.848  0.20( 0.04) 0.19      13.8      51.00
     1       39.55   10.91    2.597  0.20( 0.04) 0.19      15.6      48.00
     2       18.25   14.24    2.228  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.41    6.29    3.561  0.20( 0.08) 0.40      13.7      53.00
     2       53.05    8.62    2.971  0.20( 0.08) 0.40      19.0      56.00
     3       54.09    9.28    2.848  0.20( 0.08) 0.40      20.3      51.00
     4       56.02   10.91    2.597  0.20( 0.08) 0.41      23.2      48.00
     5       52.10   14.24    2.228  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      56.02    Tc(MIN.) =    10.91
 EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
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```
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.02
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   11.12
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.41    6.51    3.491  0.20( 0.08) 0.40      13.7      53.00
     2       53.05    8.83    2.930  0.20( 0.08) 0.40      19.0      56.00
     3       54.09    9.49    2.811  0.20( 0.08) 0.40      20.3      51.00
     4       56.02   11.12    2.568  0.20( 0.08) 0.41      23.2      48.00
     5       52.10   14.46    2.209  0.20( 0.09) 0.45      25.5      59.00
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       82.21    8.52    2.991  0.20( 0.04) 0.20      21.1      34.00
     2       83.56    8.73    2.950  0.20( 0.04) 0.20      22.0      40.00
     3       85.26    9.06    2.888  0.20( 0.04) 0.20      23.2      42.00
     4       86.70    9.34    2.837  0.20( 0.04) 0.20      24.3      40.00
     5       89.22    9.88    2.747  0.20( 0.04) 0.19      26.1      44.00
     6       90.30   10.13    2.709  0.20( 0.04) 0.19      27.0      40.00
     7       91.76   10.46    2.660  0.20( 0.04) 0.19      28.2      22.00
     8       92.48   10.64    2.634  0.20( 0.04) 0.19      28.8      37.00
     9       96.26   11.79    2.484  0.20( 0.04) 0.19      32.6      29.00
    10       96.78   12.04    2.453  0.20( 0.04) 0.19      33.4      17.00
    11       97.33   12.28    2.425  0.20( 0.04) 0.19      34.2      14.00
    12       97.82   12.62    2.389  0.20( 0.04) 0.19      35.2      24.00
    13       97.48   13.14    2.333  0.20( 0.04) 0.19      36.2      19.00
    14       94.22   14.95    2.167  0.20( 0.04) 0.19      38.6       5.00
    15       92.04   16.60    2.041  0.20( 0.04) 0.19      40.9       8.00
    16       91.55   16.92    2.019  0.20( 0.04) 0.19      41.4       1.00
    17       90.77   17.14    2.004  0.20( 0.04) 0.19      41.4      11.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      119.81    6.51    3.491  0.20( 0.06) 0.29      29.8      53.00
     2      134.36    8.52    2.991  0.20( 0.06) 0.29      39.4      34.00
     3      136.31    8.73    2.950  0.20( 0.06) 0.29      40.8      40.00
     4      137.15    8.83    2.930  0.20( 0.06) 0.29      41.4      56.00
     5      138.65    9.06    2.888  0.20( 0.06) 0.29      42.7      42.00
     6      140.55    9.34    2.837  0.20( 0.06) 0.29      44.2      40.00
     7      141.50    9.49    2.811  0.20( 0.06) 0.29      45.0      51.00
     8      143.77    9.88    2.747  0.20( 0.06) 0.29      47.1      44.00
     9      145.15   10.13    2.709  0.20( 0.06) 0.29      48.4      40.00
    10      147.00   10.46    2.660  0.20( 0.06) 0.29      50.2      22.00
    11      147.93   10.64    2.634  0.20( 0.06) 0.29      51.1      37.00
    12      150.09   11.12    2.568  0.20( 0.06) 0.28      53.6      48.00
    13      151.50   11.79    2.484  0.20( 0.06) 0.28      56.3      29.00
    14      151.73   12.04    2.453  0.20( 0.06) 0.29      57.2      17.00
    15      151.99   12.28    2.425  0.20( 0.06) 0.29      58.2      14.00
    16      152.09   12.62    2.389  0.20( 0.06) 0.29      59.4      24.00
    17      151.13   13.14    2.333  0.20( 0.06) 0.29      60.8      19.00
    18      147.22   14.46    2.209  0.20( 0.06) 0.29      63.4      59.00
    19      145.29   14.95    2.167  0.20( 0.06) 0.29      64.1       5.00
    20      140.02   16.60    2.041  0.20( 0.06) 0.29      66.4       8.00
    21      138.97   16.92    2.019  0.20( 0.06) 0.29      66.9       1.00
    22      137.84   17.14    2.004  0.20( 0.06) 0.29      66.9      11.00
  TOTAL AREA(ACRES) =        66.9
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      152.09  Tc(MIN.) =   12.617
  EFFECTIVE AREA(ACRES) =     59.40  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       66.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       66.9  TC(MIN.) =     12.62
  EFFECTIVE AREA(ACRES) =     59.40  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.286
  PEAK FLOW RATE(CFS)   =     152.09

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      119.81    6.51    3.491  0.20( 0.06) 0.29      29.8      53.00
      2      134.36    8.52    2.991  0.20( 0.06) 0.29      39.4      34.00
      3      136.31    8.73    2.950  0.20( 0.06) 0.29      40.8      40.00
      4      137.15    8.83    2.930  0.20( 0.06) 0.29      41.4      56.00
      5      138.65    9.06    2.888  0.20( 0.06) 0.29      42.7      42.00
      6      140.55    9.34    2.837  0.20( 0.06) 0.29      44.2      40.00
      7      141.50    9.49    2.811  0.20( 0.06) 0.29      45.0      51.00
      8      143.77    9.88    2.747  0.20( 0.06) 0.29      47.1      44.00
      9      145.15   10.13    2.709  0.20( 0.06) 0.29      48.4      40.00
     10      147.00   10.46    2.660  0.20( 0.06) 0.29      50.2      22.00
     11      147.93   10.64    2.634  0.20( 0.06) 0.29      51.1      37.00
     12      150.09   11.12    2.568  0.20( 0.06) 0.28      53.6      48.00
     13      151.50   11.79    2.484  0.20( 0.06) 0.28      56.3      29.00
     14      151.73   12.04    2.453  0.20( 0.06) 0.29      57.2      17.00
     15      151.99   12.28    2.425  0.20( 0.06) 0.29      58.2      14.00
     16      152.09   12.62    2.389  0.20( 0.06) 0.29      59.4      24.00
     17      151.13   13.14    2.333  0.20( 0.06) 0.29      60.8      19.00
     18      147.22   14.46    2.209  0.20( 0.06) 0.29      63.4      59.00
     19      145.29   14.95    2.167  0.20( 0.06) 0.29      64.1       5.00
     20      140.02   16.60    2.041  0.20( 0.06) 0.29      66.4       8.00
     21      138.97   16.92    2.019  0.20( 0.06) 0.29      66.9       1.00
     22      137.84   17.14    2.004  0.20( 0.06) 0.29      66.9      11.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 10-YR STUDY, WITH A FLOW-BY DETENTION BASIN                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ************************************************************************

  FILE NAME: W-AB-10.DAT
  TIME/DATE OF STUDY: 18:50 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.183
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    75    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.96
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.96

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.96
 PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =    8.94
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.94
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   11.23
 EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      14.85

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.23
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.85
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    9.68
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.68
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.780
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   11.24
 EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      25.42

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.42
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.325
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.26      0.20      0.100    75    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    6.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.48
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.48
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.37
  FLOW VELOCITY(FEET/SEC.) =  1.95   DEPTH*VELOCITY(FT*FT/SEC.) =   0.51
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.008
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.08
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.26

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.43
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.26

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.42   10.47    2.659  0.20( 0.04) 0.20      10.3       1.00
      2        2.26    8.43    3.008  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.48    8.43    3.008  0.20( 0.04) 0.19       9.1       5.00
      2       27.42   10.47    2.659  0.20( 0.04) 0.19      11.1       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.42    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.03
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.42
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.58
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      27.42

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.552
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20      0.100    75    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.26
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.26

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
```

```
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.25
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.37
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   3.91   Tc(MIN.) =   10.23
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.694
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    3.95
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.66

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.95
 FLOW VELOCITY(FEET/SEC.) =  3.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       25.48    8.55    2.985  0.20( 0.04) 0.19       9.1       5.00
     1       27.42   10.58    2.642  0.20( 0.04) 0.19      11.1       1.00
     2        5.66   10.23    2.694  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       30.73    8.55    2.985  0.20( 0.03) 0.17      11.1       5.00
     2       32.73   10.23    2.694  0.20( 0.04) 0.18      13.2       8.00
     3       32.96   10.58    2.642  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      32.96    Tc(MIN.) =    10.58
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.96
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.96

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   3.86   Tc(MIN.) =   10.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.595
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.08
  FLOW VELOCITY(FEET/SEC.) =  3.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.92
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.73    8.72    2.952  0.20( 0.03) 0.17      11.1       5.00
      1       32.73   10.39    2.670  0.20( 0.04) 0.18      13.2       8.00
      1       32.96   10.74    2.619  0.20( 0.04) 0.18      13.5       1.00
      2        4.89   10.92    2.595  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    8.72    2.952  0.20( 0.03) 0.16      12.8       5.00
      2       37.52   10.39    2.670  0.20( 0.03) 0.17      15.2       8.00
      3       37.82   10.74    2.619  0.20( 0.03) 0.17      15.6       1.00
      4       37.54   10.92    2.595  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.82    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.58   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.82
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.58
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.82

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.877
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.31      0.20      0.100    75    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  3.40   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.23
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.40

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.94
  RAINFALL INTENSITY(INCH/HR) =   3.36
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.17    9.58    2.797  0.20( 0.03) 0.16      12.8       5.00
      1       37.52   11.24    2.552  0.20( 0.03) 0.17      15.2       8.00
      1       37.82   11.57    2.510  0.20( 0.03) 0.17      15.6       1.00
      1       37.54   11.78    2.485  0.20( 0.03) 0.17      15.6      11.00
      2        3.40    6.94    3.364  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       34.12    6.94    3.364  0.20( 0.03) 0.16      10.4      14.00
      2       38.00    9.58    2.797  0.20( 0.03) 0.16      13.9       5.00
      3       40.10   11.24    2.552  0.20( 0.03) 0.16      16.3       8.00
      4       40.35   11.57    2.510  0.20( 0.03) 0.16      16.7       1.00
      5       40.04   11.78    2.485  0.20( 0.03) 0.16      16.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.35    Tc(MIN.) =    11.57
  EFFECTIVE AREA(ACRES) =      16.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.35
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.85
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.85
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.71
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.35

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    75    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.359
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.29      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.87
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   3.36
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.12    7.24    3.283  0.20( 0.03) 0.16      10.4      14.00
      1       38.00    9.86    2.751  0.20( 0.03) 0.16      13.9       5.00
      1       40.10   11.53    2.515  0.20( 0.03) 0.16      16.3       8.00
      1       40.35   11.85    2.476  0.20( 0.03) 0.16      16.7       1.00
      1       40.04   12.06    2.451  0.20( 0.03) 0.16      16.7      11.00
      2        1.86    6.96    3.359  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.42    6.96    3.359  0.20( 0.03) 0.15      10.6      17.00
      2       35.94    7.24    3.283  0.20( 0.03) 0.15      11.0      14.00
      3       39.52    9.86    2.751  0.20( 0.03) 0.16      14.5       5.00
      4       41.49   11.53    2.515  0.20( 0.03) 0.16      16.9       8.00
      5       41.72   11.85    2.476  0.20( 0.03) 0.16      17.3       1.00
      6       41.40   12.06    2.451  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.72    Tc(MIN.) =    11.85
  EFFECTIVE AREA(ACRES) =      17.33   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.72
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.93
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.93
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.33
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.72

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.54
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      4.54

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.54
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.19
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.059
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   10.16
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      14.43

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.19
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.42    7.04    3.336  0.20( 0.03) 0.15      10.6      17.00
      1       35.94    7.33    3.262  0.20( 0.03) 0.15      11.0      14.00
      1       39.52    9.94    2.738  0.20( 0.03) 0.16      14.5       5.00
      1       41.49   11.61    2.505  0.20( 0.03) 0.16      16.9       8.00
      1       41.72   11.93    2.466  0.20( 0.03) 0.16      17.3       1.00
      1       41.40   12.14    2.442  0.20( 0.03) 0.16      17.4      11.00
      2       14.43    8.19    3.059  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       48.96    7.04    3.336  0.20( 0.03) 0.17      15.2      17.00
      2       49.71    7.33    3.262  0.20( 0.03) 0.17      15.8      14.00
      3       51.56    8.19    3.059  0.20( 0.03) 0.17      17.5      19.00
      4       52.41    9.94    2.738  0.20( 0.03) 0.17      19.9       5.00
      5       53.27   11.61    2.505  0.20( 0.03) 0.17      22.2       8.00
      6       53.32   11.93    2.466  0.20( 0.03) 0.17      22.6       1.00
      7       52.88   12.14    2.442  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      53.32    Tc(MIN.) =    11.93
  EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.32
  PIPE TRAVEL TIME(MIN.) =   1.26    Tc(MIN.) =   13.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.20
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.433
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20     0.100    75    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.86

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.538
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    75    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.82
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.82
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.36
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.26
  TOTAL STREAM AREA(ACRES) =       0.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.96    8.35    3.026  0.20( 0.03) 0.17      15.2      17.00
      1       49.71    8.63    2.970  0.20( 0.03) 0.17      15.8      14.00
      1       51.56    9.49    2.812  0.20( 0.03) 0.17      17.5      19.00
      1       52.41   11.24    2.552  0.20( 0.03) 0.17      19.9       5.00
      1       53.27   12.87    2.361  0.20( 0.03) 0.17      22.2       8.00
      1       53.32   13.20    2.328  0.20( 0.03) 0.17      22.6       1.00
      1       52.88   13.41    2.307  0.20( 0.03) 0.17      22.7      11.00
      2        0.86    6.70    3.433  0.20( 0.02) 0.10       0.3      22.00
      3        0.82    6.36    3.538  0.20( 0.02) 0.10       0.3      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.36    3.538  0.20( 0.03) 0.17      12.1      40.00
      2       46.29    6.70    3.433  0.20( 0.03) 0.17      12.7      22.00
      3       50.42    8.35    3.026  0.20( 0.03) 0.17      15.7      17.00
      4       51.14    8.63    2.970  0.20( 0.03) 0.17      16.3      14.00
      5       52.91    9.49    2.812  0.20( 0.03) 0.17      18.0      19.00
      6       53.64   11.24    2.552  0.20( 0.03) 0.17      20.4       5.00
      7       54.41   12.87    2.361  0.20( 0.03) 0.17      22.8       8.00
      8       54.44   13.20    2.328  0.20( 0.03) 0.17      23.2       1.00
      9       53.99   13.41    2.307  0.20( 0.03) 0.17      23.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      54.44    Tc(MIN.) =    13.20
  EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       23.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.81
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.33
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.33
  RAINFALL INTENSITY(INCH/HR) =   2.31
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      23.18
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      54.44

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.16
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    5.67
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.779
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.00

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   3.42    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   19.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      20.53

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.53
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.10
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.10
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.32    6.50    3.493  0.20( 0.03) 0.17      12.1      40.00
      1       46.29    6.84    3.392  0.20( 0.03) 0.17      12.7      22.00
```

```
     1       50.42    8.48    2.999  0.20( 0.03) 0.17      15.7      17.00
     1       51.14    8.76    2.943  0.20( 0.03) 0.17      16.3      14.00
     1       52.91    9.63    2.789  0.20( 0.03) 0.17      18.0      19.00
     1       53.64   11.38    2.534  0.20( 0.03) 0.17      20.4       5.00
     1       54.41   13.01    2.347  0.20( 0.03) 0.17      22.8       8.00
     1       54.44   13.33    2.314  0.20( 0.03) 0.17      23.2       1.00
     1       53.99   13.54    2.294  0.20( 0.03) 0.17      23.2      11.00
     2       20.53    9.10    2.880  0.20( 0.04) 0.19       8.0      24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.50    3.493  0.20( 0.03) 0.17      17.8      40.00
      2       64.50    6.84    3.392  0.20( 0.03) 0.17      18.8      22.00
      3       70.36    8.48    2.999  0.20( 0.03) 0.17      23.2      17.00
      4       71.36    8.76    2.943  0.20( 0.03) 0.17      24.0      14.00
      5       72.37    9.10    2.880  0.20( 0.03) 0.17      25.0      24.00
      6       72.78    9.63    2.789  0.20( 0.03) 0.17      26.1      19.00
      7       71.68   11.38    2.534  0.20( 0.03) 0.17      28.4       5.00
      8       71.09   13.01    2.347  0.20( 0.03) 0.17      30.8       8.00
      9       70.88   13.33    2.314  0.20( 0.03) 0.17      31.2       1.00
     10       70.29   13.54    2.294  0.20( 0.03) 0.17      31.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      72.78    Tc(MIN.) =     9.63
  EFFECTIVE AREA(ACRES) =      26.06   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  39.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.78
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.10
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.06
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.78

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20     0.200    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.35
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.99
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =    8.47
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      12.52

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.52
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    8.69
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.69
  RAINFALL INTENSITY(INCH/HR) =   2.96
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.14    6.99    3.350  0.20( 0.03) 0.17      17.8      40.00
      1       64.50    7.33    3.259  0.20( 0.03) 0.17      18.8      22.00
      1       70.36    8.96    2.906  0.20( 0.03) 0.17      23.2      17.00
      1       71.36    9.24    2.855  0.20( 0.03) 0.17      24.0      14.00
      1       72.37    9.58    2.798  0.20( 0.03) 0.17      25.0      24.00
      1       72.78   10.10    2.713  0.20( 0.03) 0.17      26.1      19.00
      1       71.68   11.85    2.476  0.20( 0.03) 0.17      28.4       5.00
      1       71.09   13.48    2.299  0.20( 0.03) 0.17      30.8       8.00
      1       70.88   13.81    2.268  0.20( 0.03) 0.17      31.2       1.00
      1       70.29   14.02    2.249  0.20( 0.03) 0.17      31.2      11.00
      2       12.52    8.69    2.958  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.57    6.99    3.350  0.20( 0.04) 0.18      21.5      40.00
      2       76.16    7.33    3.259  0.20( 0.04) 0.18      22.6      22.00
      3       81.89    8.69    2.958  0.20( 0.04) 0.18      27.0      29.00
      4       82.65    8.96    2.906  0.20( 0.04) 0.18      27.7      17.00
      5       83.43    9.24    2.855  0.20( 0.04) 0.18      28.6      14.00
      6       84.20    9.58    2.798  0.20( 0.04) 0.18      29.5      24.00
      7       84.25   10.10    2.713  0.20( 0.04) 0.18      30.6      19.00
      8       82.13   11.85    2.476  0.20( 0.04) 0.18      33.0       5.00
      9       80.78   13.48    2.299  0.20( 0.04) 0.18      35.3       8.00
     10       80.44   13.81    2.268  0.20( 0.04) 0.18      35.7       1.00
     11       79.76   14.02    2.249  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      84.25    Tc(MIN.) =    10.10
  EFFECTIVE AREA(ACRES) =      30.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.25
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
```

```
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.20   RAINFALL INTENSITY(INCH/HR) =  2.70
  EFFECTIVE AREA(ACRES) =    10.90
  TOTAL AREA(ACRES) =    12.75        PEAK FLOW RATE(CFS) =     30.00
  AREA-AVERAGED Fm(INCH/HR) =   0.04  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.18
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.00
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.25
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.25
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      10.90
  TOTAL STREAM AREA(ACRES) =      12.75
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.00

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       2.83
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    5.44
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.44
  RAINFALL INTENSITY(INCH/HR) =   3.87
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.00   10.25    2.691  0.20( 0.04) 0.18      10.9       1.00
      2        2.83    5.44    3.867  0.20( 0.18) 0.90       0.8      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.82    5.44    3.867  0.20( 0.05) 0.27       6.6      34.00
      2       31.93   10.25    2.691  0.20( 0.05) 0.23      11.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.93    Tc(MIN.) =    10.25
  EFFECTIVE AREA(ACRES) =      11.71   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       13.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.76
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.93
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.30
  RAINFALL INTENSITY(INCH/HR) =   2.68
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.23
  EFFECTIVE STREAM AREA(ACRES) =      11.71
```

```
  TOTAL STREAM AREA(ACRES) =      13.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.93

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.88
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      5.88

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.88
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.70
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.82    5.49    3.846  0.20( 0.05) 0.27       6.6      34.00
      1       31.93   10.30    2.683  0.20( 0.05) 0.23      11.7       1.00
      2        5.88    7.70    3.170  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       30.92    5.49    3.846  0.20( 0.05) 0.26       8.1      34.00
      2       34.50    7.70    3.170  0.20( 0.05) 0.24      11.0      37.00
      3       36.89   10.30    2.683  0.20( 0.05) 0.23      13.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.89    Tc(MIN.) =    10.30
  EFFECTIVE AREA(ACRES) =      13.77   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.17
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.89
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   2.57
  AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.23
  EFFECTIVE STREAM AREA(ACRES) =      13.77
  TOTAL STREAM AREA(ACRES) =      15.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      36.89

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.332
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.55      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.55      SUBAREA RUNOFF(CFS) =     1.64
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.41

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.92    6.35    3.540  0.20( 0.05) 0.26       8.1      34.00
      1       34.50    8.54    2.987  0.20( 0.05) 0.24      11.0      37.00
      1       36.89   11.14    2.565  0.20( 0.05) 0.23      13.8       1.00
      2        2.41    7.06    3.332  0.20( 0.02) 0.10       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.23    6.35    3.540  0.20( 0.05) 0.24       8.8      34.00
      2       34.49    7.06    3.332  0.20( 0.05) 0.24       9.8      40.00
      3       36.66    8.54    2.987  0.20( 0.05) 0.23      11.8      37.00
      4       38.75   11.14    2.565  0.20( 0.04) 0.22      14.6       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.75    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =      14.58   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =       16.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.75
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.22
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   2.55
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =      14.58
  TOTAL STREAM AREA(ACRES) =      16.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.75

********************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20     0.100    75    6.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.31

********************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   3.39
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.23    6.44    3.513  0.20( 0.05) 0.24       8.8       34.00
      1       34.49    7.14    3.309  0.20( 0.05) 0.24       9.8       40.00
      1       36.66    8.62    2.970  0.20( 0.05) 0.23      11.8       37.00
      1       38.75   11.22    2.555  0.20( 0.04) 0.22      14.6        1.00
      2        1.31    6.83    3.394  0.20( 0.02) 0.10       0.4       42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       34.50    6.44    3.513  0.20( 0.05) 0.24       9.2       34.00
      2       35.25    6.83    3.394  0.20( 0.05) 0.23       9.8       42.00
      3       35.76    7.14    3.309  0.20( 0.05) 0.23      10.3       40.00
      4       37.81    8.62    2.970  0.20( 0.05) 0.23      12.2       37.00
      5       39.73   11.22    2.555  0.20( 0.04) 0.21      15.0        1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.73    Tc(MIN.) =    11.22
  EFFECTIVE AREA(ACRES) =      15.01   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       16.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.73
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.67
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =      15.01
  TOTAL STREAM AREA(ACRES) =      16.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.73

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.424
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =    8.05
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.090
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.16
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.72
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.78
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.18

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.23
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.23

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.88
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.88
  RAINFALL INTENSITY(INCH/HR) =   3.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.50    6.90    3.374  0.20( 0.05) 0.24       9.2      34.00
      1       35.25    7.30    3.267  0.20( 0.05) 0.23       9.8      42.00
      1       35.76    7.61    3.191  0.20( 0.05) 0.23      10.3      40.00
      1       37.81    9.08    2.885  0.20( 0.05) 0.23      12.2      37.00
      1       39.73   11.67    2.498  0.20( 0.04) 0.21      15.0       1.00
      2        2.18    8.05    3.090  0.20( 0.02) 0.10       0.8      44.00
      3        2.23    6.88    3.380  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.73    6.88    3.380  0.20( 0.04) 0.22      10.6      40.00
      2       38.77    6.90    3.374  0.20( 0.04) 0.22      10.6      34.00
      3       39.50    7.30    3.267  0.20( 0.04) 0.22      11.3      42.00
      4       40.00    7.61    3.191  0.20( 0.04) 0.22      11.7      40.00
      5       40.60    8.05    3.090  0.20( 0.04) 0.21      12.4      44.00
      6       41.75    9.08    2.885  0.20( 0.04) 0.21      13.8      37.00
      7       43.14   11.67    2.498  0.20( 0.04) 0.20      16.5       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.14    Tc(MIN.) =    11.67
  EFFECTIVE AREA(ACRES) =      16.53   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       18.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.14
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   13.35
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.96
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.14
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   13.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.60      0.20     0.200    75    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.57
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.57

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.57
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =    8.82
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.933
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        9.31      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     9.31      SUBAREA RUNOFF(CFS) =   24.24
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  26.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.70
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.41
  PIPE TRAVEL TIME(MIN.) =   1.06    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.41

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.559
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.20      0.20     0.100    75    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.22      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.43
  FLOW VELOCITY(FEET/SEC.) =  1.89   DEPTH*VELOCITY(FT*FT/SEC.) =   0.50
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.088
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.46      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.27
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       2.43

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.43
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.24
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.41    9.88    2.748  0.20( 0.04) 0.20      10.9      48.00
      2        2.43    8.24    3.048  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.76    8.24    3.048  0.20( 0.04) 0.19      10.0      51.00
      2       30.60    9.88    2.748  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.60    Tc(MIN.) =     9.88
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.60
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.26
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.26
  RAINFALL INTENSITY(INCH/HR) =   2.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.79
  TOTAL STREAM AREA(ACRES) =      11.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.60
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.803
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20     0.100    75    5.60
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.58
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.60
 RAINFALL INTENSITY(INCH/HR) =   3.80
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.17
 TOTAL STREAM AREA(ACRES) =       0.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.76    8.63    2.970  0.20( 0.04) 0.19      10.0      51.00
     1       30.60   10.26    2.689  0.20( 0.04) 0.19      11.8      48.00
     2        0.58    5.60    3.803  0.20( 0.02) 0.10       0.2      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       24.57    5.60    3.803  0.20( 0.04) 0.19       6.7      53.00
     2       29.21    8.63    2.970  0.20( 0.04) 0.19      10.2      51.00
     3       31.00   10.26    2.689  0.20( 0.04) 0.19      12.0      48.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      31.00    Tc(MIN.) =    10.26
 EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =       12.0
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
 FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.00
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.00

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20      0.100    75    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.64
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.64

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   14.35
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.70
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    8.45
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.006
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        3.47      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     3.47      SUBAREA RUNOFF(CFS) =     9.26
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       9.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.39
  FLOW VELOCITY(FEET/SEC.) =  3.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       24.57    6.11    3.618  0.20( 0.04) 0.19       6.7      53.00
      1       29.21    9.11    2.879  0.20( 0.04) 0.19      10.2      51.00
      1       31.00   10.74    2.620  0.20( 0.04) 0.19      12.0      48.00
      2        9.83    8.45    3.006  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.15    6.11    3.618  0.20( 0.04) 0.19       9.3      53.00
      2       38.02    8.45    3.006  0.20( 0.04) 0.19      13.1      56.00
      3       38.62    9.11    2.879  0.20( 0.04) 0.19      13.8      51.00
      4       39.55   10.74    2.620  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.55    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.27
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
```

```
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.487
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        1.10      0.20     0.850    75   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.29
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      2.29

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.29
  PIPE TRAVEL TIME(MIN.) =   2.48    Tc(MIN.) =   14.24
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.228
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        8.75      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =   16.21
  EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
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 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      18.25

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.24
 RAINFALL INTENSITY(INCH/HR) =   2.23
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.25

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.15    6.29    3.561  0.20( 0.04) 0.19       9.3      53.00
     1       38.02    8.62    2.971  0.20( 0.04) 0.19      13.1      56.00
     1       38.62    9.28    2.848  0.20( 0.04) 0.19      13.8      51.00
     1       39.55   10.91    2.597  0.20( 0.04) 0.19      15.6      48.00
     2       18.25   14.24    2.228  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.41    6.29    3.561  0.20( 0.08) 0.40      13.7      53.00
     2       53.05    8.62    2.971  0.20( 0.08) 0.40      19.0      56.00
     3       54.09    9.28    2.848  0.20( 0.08) 0.40      20.3      51.00
     4       56.02   10.91    2.597  0.20( 0.08) 0.41      23.2      48.00
     5       52.10   14.24    2.228  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      56.02    Tc(MIN.) =    10.91
 EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      56.02
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   11.12
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       46.41    6.51    3.491  0.20( 0.08) 0.40      13.7      53.00
    2       53.05    8.83    2.930  0.20( 0.08) 0.40      19.0      56.00
    3       54.09    9.49    2.811  0.20( 0.08) 0.40      20.3      51.00
    4       56.02   11.12    2.568  0.20( 0.08) 0.41      23.2      48.00
    5       52.10   14.46    2.209  0.20( 0.09) 0.45      25.5      59.00
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       38.73    9.11    2.878  0.20( 0.04) 0.22      10.6      40.00
    2       38.77    9.14    2.874  0.20( 0.04) 0.22      10.6      34.00
    3       39.50    9.53    2.806  0.20( 0.04) 0.22      11.3      42.00
    4       40.00    9.83    2.755  0.20( 0.04) 0.22      11.7      40.00
    5       40.60   10.26    2.688  0.20( 0.04) 0.21      12.4      44.00
    6       41.75   11.28    2.546  0.20( 0.04) 0.21      13.8      37.00
    7       43.14   13.87    2.263  0.20( 0.04) 0.20      16.5       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       80.04    6.51    3.491  0.20( 0.07) 0.34      21.2      53.00
    2       91.27    8.83    2.930  0.20( 0.07) 0.33      29.3      56.00
    3       92.22    9.11    2.878  0.20( 0.07) 0.34      30.1      40.00
    4       92.30    9.14    2.874  0.20( 0.07) 0.34      30.2      34.00
    5       93.53    9.49    2.811  0.20( 0.07) 0.33      31.4      51.00
    6       93.63    9.53    2.806  0.20( 0.07) 0.33      31.6      42.00
    7       94.49    9.83    2.755  0.20( 0.07) 0.33      32.6      40.00
    8       95.60   10.26    2.688  0.20( 0.07) 0.33      34.0      44.00
    9       97.59   11.12    2.568  0.20( 0.07) 0.33      36.7      48.00
   10       97.58   11.28    2.546  0.20( 0.07) 0.34      37.1      37.00
   11       95.94   13.87    2.263  0.20( 0.07) 0.35      41.6       1.00
   12       94.20   14.46    2.209  0.20( 0.07) 0.35      42.0      59.00
    TOTAL AREA(ACRES) =        43.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       97.59  Tc(MIN.) =   11.121
  EFFECTIVE AREA(ACRES) =     36.72  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       43.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       43.9  TC(MIN.) =     11.12
  EFFECTIVE AREA(ACRES) =     36.72  AREA-AVERAGED Fm(INCH/HR)=  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.335
  PEAK FLOW RATE(CFS)   =      97.59

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       80.04    6.51    3.491  0.20( 0.07) 0.34      21.2      53.00
    2       91.27    8.83    2.930  0.20( 0.07) 0.33      29.3      56.00
    3       92.22    9.11    2.878  0.20( 0.07) 0.34      30.1      40.00
    4       92.30    9.14    2.874  0.20( 0.07) 0.34      30.2      34.00
    5       93.53    9.49    2.811  0.20( 0.07) 0.33      31.4      51.00
    6       93.63    9.53    2.806  0.20( 0.07) 0.33      31.6      42.00
    7       94.49    9.83    2.755  0.20( 0.07) 0.33      32.6      40.00
    8       95.60   10.26    2.688  0.20( 0.07) 0.33      34.0      44.00
    9       97.59   11.12    2.568  0.20( 0.07) 0.33      36.7      48.00
   10       97.58   11.28    2.546  0.20( 0.07) 0.34      37.1      37.00
   11       95.94   13.87    2.263  0.20( 0.07) 0.35      41.6       1.00
   12       94.20   14.46    2.209  0.20( 0.07) 0.35      42.0      59.00
```

```
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - WEST AREA - DRAINAGE AREA 'B'                              *
 ************************************************************************

  FILE NAME: WEST-B.DAT
  TIME/DATE OF STUDY: 19:09 01/08/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    505.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.799
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.00      0.20     0.500    75    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.43
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.43

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.00  DOWNSTREAM(FEET) =   497.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.43
 PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   11.96
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.96
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.463
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D       10.02      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =   10.02      SUBAREA RUNOFF(CFS) =   21.31
 EFFECTIVE AREA(ACRES) =     11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      23.44

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   482.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.44
 PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   12.60
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    502.50  DOWNSTREAM(FEET) =    497.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.418
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.60      0.20     0.100    75    6.75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   720.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.05
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   3.94   Tc(MIN.) =   10.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.626
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.57      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.57      SUBAREA RUNOFF(CFS) =    3.68
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.60
  FLOW VELOCITY(FEET/SEC.) =  3.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.17
  TOTAL STREAM AREA(ACRES) =       2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.09

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
```

```
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.03      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.60
  TOTAL AREA(ACRES) =      1.03   PEAK FLOW RATE(CFS) =      3.60

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.60
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.03
  TOTAL STREAM AREA(ACRES) =       1.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.60

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.09   10.69    2.626  0.20( 0.02) 0.10       2.2       4.00
      2        3.60    5.24    3.953  0.20( 0.18) 0.90       1.0       6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.36    5.24    3.953  0.20( 0.10) 0.49       2.1       6.00
      2        7.42   10.69    2.626  0.20( 0.07) 0.36       3.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.42    Tc(MIN.) =    10.69
  EFFECTIVE AREA(ACRES) =       3.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.42
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.88
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.36    5.43    3.872  0.20( 0.10) 0.49       2.1       6.00
      2        7.42   10.88    2.600  0.20( 0.07) 0.36       3.2       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.44   12.60    2.390  0.20( 0.10) 0.50      11.0       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.99    5.43    3.872  0.20( 0.10) 0.50       6.8       6.00
      2       29.52   10.88    2.600  0.20( 0.09) 0.46      12.7       4.00
      3       30.25   12.60    2.390  0.20( 0.09) 0.47      14.2       1.00
    TOTAL AREA(ACRES) =        14.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       30.25  Tc(MIN.) =   12.600
  EFFECTIVE AREA(ACRES) =     14.22  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.60
  RAINFALL INTENSITY(INCH/HR) =   2.39
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      14.22
  TOTAL STREAM AREA(ACRES) =      14.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.25

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.225
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.581
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    75    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.73
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.73

********************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  61
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  482.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.41
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   4.31   Tc(MIN.) =   10.53
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.649
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.43      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    3.38
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  12.08
  FLOW VELOCITY(FEET/SEC.) =  3.25   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1095.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.53
  RAINFALL INTENSITY(INCH/HR) =   2.65
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.97
 TOTAL STREAM AREA(ACRES) =       1.97
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.66

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       23.99    5.43    3.872  0.20( 0.10) 0.50       6.8       6.00
     1       29.52   10.88    2.600  0.20( 0.09) 0.46      12.7       4.00
     1       30.25   12.60    2.390  0.20( 0.09) 0.47      14.2       1.00
     2        4.66   10.53    2.649  0.20( 0.02) 0.10       2.0       9.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.51    5.43    3.872  0.20( 0.09) 0.45       7.9       6.00
     2       33.82   10.53    2.649  0.20( 0.08) 0.42      14.3       9.00
     3       34.09   10.88    2.600  0.20( 0.08) 0.42      14.7       4.00
     4       34.45   12.60    2.390  0.20( 0.08) 0.42      16.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      34.45    Tc(MIN.) =    12.60
 EFFECTIVE AREA(ACRES) =      16.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =       16.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       16.2  TC(MIN.) =     12.60
 EFFECTIVE AREA(ACRES) =     16.19  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.423
 PEAK FLOW RATE(CFS)   =      34.45

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.51    5.43    3.872  0.20( 0.09) 0.45       7.9       6.00
     2       33.82   10.53    2.649  0.20( 0.08) 0.42      14.3       9.00
     3       34.09   10.88    2.600  0.20( 0.08) 0.42      14.7       4.00
     4       34.45   12.60    2.390  0.20( 0.08) 0.42      16.2       1.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - WEST AREA - DRAINAGE AREA 'C'                              *
 ************************************************************************

  FILE NAME: WEST-C.DAT
  TIME/DATE OF STUDY: 18:01 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.60  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.617
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.457
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.24      0.20      0.200    75    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.81
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      3.81

******************************************************************************
```

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.81
  PIPE TRAVEL TIME(MIN.) =   1.79    Tc(MIN.) =    8.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        5.21      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    5.21      SUBAREA RUNOFF(CFS) =   13.94
  EFFECTIVE AREA(ACRES) =      6.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      17.26

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.09      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.09      SUBAREA RUNOFF(CFS) =   10.94
  EFFECTIVE AREA(ACRES) =     10.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      28.20
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =      8.41
  EFFECTIVE AREA(ACRES) =     10.54  AREA-AVERAGED Fm(INCH/HR)=  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
  PEAK FLOW RATE(CFS)   =      28.20
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

EAST – AREA ‘A’

10-YR STUDY

```
**************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - EAST - AREA 'A'                                            *
 ************************************************************************

  FILE NAME: EAST.DAT
  TIME/DATE OF STUDY: 19:29 01/04/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.77      0.20      0.600    75   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      1.71
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   12.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.38
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.19
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.12
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.95
 TOTAL STREAM AREA(ACRES) =       1.95
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.94

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.747
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    75    9.88
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      2.46
 TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   12.68
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
 STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =   11.58
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.508
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    2.21
 EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.45

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.85
 FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.94   13.19    2.328  0.20( 0.12) 0.60       1.9       1.00
      2        4.45   11.58    2.508  0.20( 0.12) 0.60       2.1       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.19   11.58    2.508  0.20( 0.12) 0.60       3.8       4.00
      2        8.05   13.19    2.328  0.20( 0.12) 0.60       4.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.19    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =       3.78   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.19
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.63
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       4.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.19
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   10.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.634
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.87
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19   11.63    2.502  0.20( 0.12) 0.60       3.8       4.00
      1        8.05   13.24    2.323  0.20( 0.12) 0.60       4.0       1.00
      2        4.49   10.64    2.634  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.64    2.634  0.20( 0.11) 0.56       5.4       7.00
      2       12.45   11.63    2.502  0.20( 0.11) 0.57       5.8       4.00
      3       11.99   13.24    2.323  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.45    Tc(MIN.) =    11.63
  EFFECTIVE AREA(ACRES) =       5.75   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.45
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.66
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.75
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.45

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.858
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    75    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.71

********************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.669
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    1.72
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.66    2.631  0.20( 0.11) 0.56       5.4       7.00
      1       12.45   11.66    2.499  0.20( 0.11) 0.57       5.8       4.00
      1       11.99   13.26    2.321  0.20( 0.11) 0.57       6.0       1.00
      2        3.32   10.39    2.669  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.39    2.669  0.20( 0.11) 0.56       6.7      10.00
      2       15.66   10.66    2.631  0.20( 0.11) 0.56       6.9       7.00
      3       15.54   11.66    2.499  0.20( 0.11) 0.56       7.2       4.00
      4       14.86   13.26    2.321  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.66    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.66
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.94
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.66

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.62

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.73
  EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       1.35

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.68    2.629  0.20( 0.11) 0.56       6.7       10.00
      1       15.66   10.94    2.592  0.20( 0.11) 0.56       6.9        7.00
      1       15.54   11.94    2.465  0.20( 0.11) 0.56       7.2        4.00
      1       14.86   13.55    2.293  0.20( 0.11) 0.56       7.4        1.00
      2        1.35    5.00    4.060  0.20( 0.02) 0.10       0.4        6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.80    5.00    4.060  0.20( 0.10) 0.51       3.5        6.00
      2       16.45   10.68    2.629  0.20( 0.11) 0.54       7.1       10.00
      3       16.52   10.94    2.592  0.20( 0.11) 0.54       7.2        7.00
      4       16.36   11.94    2.465  0.20( 0.11) 0.54       7.6        4.00
      5       15.62   13.55    2.293  0.20( 0.11) 0.54       7.8        1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    10.94
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.97
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.351
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   3.35
  AREA-AVERAGED Fm(INCH/HR) =  0.02
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.39
  TOTAL STREAM AREA(ACRES) =       0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.80    5.03    4.044  0.20( 0.10) 0.51       3.5       6.00
      1       16.45   10.71    2.624  0.20( 0.11) 0.54       7.1      10.00
      1       16.52   10.97    2.587  0.20( 0.11) 0.54       7.2       7.00
      1       16.36   11.97    2.461  0.20( 0.11) 0.54       7.6       4.00
      1       15.62   13.58    2.290  0.20( 0.11) 0.54       7.8       1.00
      2        1.17    6.99    3.351  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.81    5.03    4.044  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    6.99    3.351  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.71    2.624  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   10.97    2.587  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   11.97    2.461  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.58    2.290  0.20( 0.10) 0.52       8.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.42    Tc(MIN.) =    10.97
  EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.42
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    75    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.76    9.03    2.893  0.20( 0.10) 0.50       0.7      16.00
      2        2.27    9.34    2.837  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.00    9.03    2.893  0.20( 0.11) 0.56       1.6      16.00
     2        4.00    9.34    2.837  0.20( 0.11) 0.56       1.6      17.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.00    Tc(MIN.) =     9.03
 EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.00
 PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.35
 LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.35
 RAINFALL INTENSITY(INCH/HR) =   2.84
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       1.60
 TOTAL STREAM AREA(ACRES) =       1.63
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
 ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.22      0.20     0.100    75    7.62
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.63
 TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    8.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.64
  FLOW VELOCITY(FEET/SEC.) =  2.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.97

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.00    9.35    2.837  0.20( 0.11) 0.56       1.6      16.00
      1        4.00    9.66    2.784  0.20( 0.11) 0.56       1.6      17.00
      2        0.97    8.41    3.013  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.81    8.41    3.013  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.35    2.837  0.20( 0.09) 0.47       2.0      16.00
```

```
     3        4.89    9.66    2.784  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.92    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.81    8.88    2.920  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.82    2.758  0.20( 0.09) 0.47       2.0      16.00
      3        4.89   10.13    2.709  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.81    5.08    4.025  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    7.03    3.340  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.75    2.619  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   11.01    2.582  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   12.01    2.457  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.62    2.286  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    5.08    4.025  0.20( 0.10) 0.48       4.8       6.00
      2       19.59    7.03    3.340  0.20( 0.10) 0.48       6.6      14.00
      3       21.10    8.88    2.920  0.20( 0.10) 0.49       8.1      19.00
      4       21.75    9.82    2.758  0.20( 0.10) 0.50       8.9      16.00
      5       21.90   10.13    2.709  0.20( 0.10) 0.50       9.1      17.00
      6       22.09   10.75    2.619  0.20( 0.10) 0.51       9.5      10.00
      7       22.07   11.01    2.582  0.20( 0.10) 0.51       9.6       7.00
      8       21.64   12.01    2.457  0.20( 0.10) 0.51       9.9       4.00
      9       20.51   13.62    2.286  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.09  Tc(MIN.) =   10.746
  EFFECTIVE AREA(ACRES) =      9.48  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.29
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.09
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.94
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.48
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.09

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    75    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.61   Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    0.79
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.00
  EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       2.78

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    6.34    3.542  0.20( 0.10) 0.48       4.8       6.00
      1       19.59    8.28    3.041  0.20( 0.10) 0.48       6.6      14.00
```

```
     1       21.10   10.09    2.715  0.20( 0.10) 0.49       8.1      19.00
     1       21.75   11.01    2.582  0.20( 0.10) 0.50       8.9      16.00
     1       21.90   11.32    2.541  0.20( 0.10) 0.50       9.1      17.00
     1       22.09   11.94    2.465  0.20( 0.10) 0.51       9.5      10.00
     1       22.07   12.21    2.434  0.20( 0.10) 0.51       9.6       7.00
     1       21.64   13.21    2.327  0.20( 0.10) 0.51       9.9       4.00
     1       20.51   14.87    2.174  0.20( 0.10) 0.51      10.2       1.00
     2        2.78    9.61    2.791  0.20( 0.03) 0.16       1.1      13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.97    6.34    3.542  0.20( 0.09) 0.44       5.6       6.00
      2       22.20    8.28    3.041  0.20( 0.09) 0.44       7.5      14.00
      3       23.48    9.61    2.791  0.20( 0.09) 0.45       8.8      13.00
      4       23.80   10.09    2.715  0.20( 0.09) 0.45       9.2      19.00
      5       24.32   11.01    2.582  0.20( 0.09) 0.46      10.0      16.00
      6       24.43   11.32    2.541  0.20( 0.09) 0.47      10.2      17.00
      7       24.54   11.94    2.465  0.20( 0.09) 0.47      10.6      10.00
      8       24.49   12.21    2.434  0.20( 0.09) 0.47      10.7       7.00
      9       23.95   13.21    2.327  0.20( 0.09) 0.47      11.1       4.00
     10       22.67   14.87    2.174  0.20( 0.10) 0.48      11.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.54    Tc(MIN.) =    11.94
  EFFECTIVE AREA(ACRES) =      10.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.08
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.60
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.54

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.14      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.64      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.25
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =    5.92
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    2.02
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   3.65
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =    7.07
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.07
  RAINFALL INTENSITY(INCH/HR) =   3.33
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.76
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.97    6.49    3.495  0.20( 0.09) 0.44       5.6       6.00
     1       22.20    8.42    3.011  0.20( 0.09) 0.44       7.5      14.00
     1       23.48    9.75    2.768  0.20( 0.09) 0.45       8.8      13.00
     1       23.80   10.23    2.694  0.20( 0.09) 0.45       9.2      19.00
     1       24.32   11.15    2.564  0.20( 0.09) 0.46      10.0      16.00
     1       24.43   11.46    2.523  0.20( 0.09) 0.47      10.2      17.00
     1       24.54   12.08    2.449  0.20( 0.09) 0.47      10.6      10.00
     1       24.49   12.35    2.418  0.20( 0.09) 0.47      10.7       7.00
     1       23.95   13.35    2.312  0.20( 0.09) 0.47      11.1       4.00
     1       22.67   15.01    2.162  0.20( 0.10) 0.48      11.3       1.00
     2        2.48    7.07    3.330  0.20( 0.15) 0.76       0.8      25.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       22.36    6.49    3.495  0.20( 0.09) 0.47       6.3       6.00
     2       23.11    7.07    3.330  0.20( 0.09) 0.47       6.9      25.00
     3       24.43    8.42    3.011  0.20( 0.09) 0.47       8.3      14.00
     4       25.53    9.75    2.768  0.20( 0.09) 0.47       9.6      13.00
     5       25.79   10.23    2.694  0.20( 0.10) 0.48      10.0      19.00
     6       26.20   11.15    2.564  0.20( 0.10) 0.48      10.8      16.00
     7       26.28   11.46    2.523  0.20( 0.10) 0.49      11.0      17.00
     8       26.34   12.08    2.449  0.20( 0.10) 0.49      11.4      10.00
     9       26.26   12.35    2.418  0.20( 0.10) 0.49      11.5       7.00
    10       25.64   13.35    2.312  0.20( 0.10) 0.49      11.8       4.00
    11       24.24   15.01    2.162  0.20( 0.10) 0.50      12.1       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      26.34    Tc(MIN.) =    12.08
 EFFECTIVE AREA(ACRES) =      11.38   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       12.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.36
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.34
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   12.16
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.16
 RAINFALL INTENSITY(INCH/HR) =   2.44
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      11.38
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.34

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.78   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.678
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  3.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   2.68
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.00

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       22.36    6.57    3.470  0.20( 0.09) 0.47       6.3       6.00
     1       23.11    7.15    3.308  0.20( 0.09) 0.47       6.9      25.00
     1       24.43    8.50    2.995  0.20( 0.09) 0.47       8.3      14.00
     1       25.53    9.83    2.755  0.20( 0.09) 0.47       9.6      13.00
     1       25.79   10.31    2.682  0.20( 0.10) 0.48      10.0      19.00
     1       26.20   11.23    2.553  0.20( 0.10) 0.48      10.8      16.00
     1       26.28   11.54    2.513  0.20( 0.10) 0.49      11.0      17.00
     1       26.34   12.16    2.440  0.20( 0.10) 0.49      11.4      10.00
     1       26.26   12.43    2.409  0.20( 0.10) 0.49      11.5       7.00
     1       25.64   13.43    2.304  0.20( 0.10) 0.49      11.8       4.00
     1       24.24   15.09    2.156  0.20( 0.10) 0.50      12.1       1.00
     2        5.00   10.34    2.678  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       26.52    6.57    3.470  0.20( 0.10) 0.50       7.7       6.00
     2       27.42    7.15    3.308  0.20( 0.10) 0.50       8.4      25.00
     3       29.05    8.50    2.995  0.20( 0.10) 0.50      10.1      14.00
     4       30.42    9.83    2.755  0.20( 0.10) 0.50      11.7      13.00
     5       30.78   10.31    2.682  0.20( 0.10) 0.50      12.2      19.00
     6       30.79   10.34    2.678  0.20( 0.10) 0.50      12.2      29.00
     7       30.95   11.23    2.553  0.20( 0.10) 0.50      12.9      16.00
     8       30.96   11.54    2.513  0.20( 0.10) 0.50      13.2      17.00
     9       30.87   12.16    2.440  0.20( 0.10) 0.51      13.6      10.00
    10       30.73   12.43    2.409  0.20( 0.10) 0.51      13.7       7.00
    11       29.90   13.43    2.304  0.20( 0.10) 0.51      14.0       4.00
    12       28.22   15.09    2.156  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      30.96    Tc(MIN.) =    11.54
 EFFECTIVE AREA(ACRES) =      13.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.89
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.96
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.89
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      13.16
  TOTAL STREAM AREA(ACRES) =      14.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.96

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.281
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.24      0.20     0.100    75    7.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.25
  RAINFALL INTENSITY(INCH/HR) =   3.28
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.70

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.568
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D       0.25      0.20      0.100    75    6.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   3.57
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.52    6.94    3.364  0.20( 0.10) 0.50       7.7       6.00
      1       27.42    7.51    3.215  0.20( 0.10) 0.50       8.4      25.00
      1       29.05    8.86    2.924  0.20( 0.10) 0.50      10.1      14.00
      1       30.42   10.18    2.701  0.20( 0.10) 0.50      11.7      13.00
      1       30.78   10.66    2.631  0.20( 0.10) 0.50      12.2      19.00
      1       30.79   10.68    2.628  0.20( 0.10) 0.50      12.2      29.00
      1       30.95   11.58    2.509  0.20( 0.10) 0.50      12.9      16.00
      1       30.96   11.89    2.471  0.20( 0.10) 0.50      13.2      17.00
      1       30.87   12.51    2.401  0.20( 0.10) 0.51      13.6      10.00
      1       30.73   12.77    2.372  0.20( 0.10) 0.51      13.7       7.00
      1       29.90   13.78    2.271  0.20( 0.10) 0.51      14.0       4.00
      1       28.22   15.45    2.127  0.20( 0.10) 0.51      14.2       1.00
      2        0.70    7.25    3.281  0.20( 0.02) 0.10       0.2      24.00
      3        0.80    6.26    3.568  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.26    3.568  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    6.94    3.364  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.25    3.281  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.51    3.215  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.86    2.924  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.18    2.701  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.66    2.631  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.68    2.628  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.58    2.509  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.89    2.471  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.51    2.401  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.77    2.372  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.78    2.271  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.45    2.127  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.05    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =      13.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.24
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.05
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.66
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        D        1.20      0.20     0.600    75    8.46
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.11
 TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
 FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
 STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.33
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    8.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
 STREET FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =    9.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.855
 SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.99      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.99      SUBAREA RUNOFF(CFS) =     2.44
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  5.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.435
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.73      0.20      0.600    75    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    7.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
 STREET FLOW TRAVEL TIME(MIN.) =   0.43   Tc(MIN.) =    7.13
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.314
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.24
 EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       3.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
 FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
 LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.13
 RAINFALL INTENSITY(INCH/HR) =   3.31
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.16
 TOTAL STREAM AREA(ACRES) =       1.16
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.33

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        5.39    9.24    2.855  0.20( 0.12) 0.60       2.2      33.00
     2        3.33    7.13    3.314  0.20( 0.12) 0.60       1.2      35.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.19    7.13    3.314  0.20( 0.12) 0.60       2.8      35.00
     2        8.25    9.24    2.855  0.20( 0.12) 0.60       3.4      33.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       8.25    Tc(MIN.) =     9.24
 EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        3.4
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.25
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19    7.28    3.272  0.20( 0.12) 0.60       2.8      35.00
      2        8.25    9.40    2.827  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.35    3.541  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    7.02    3.341  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.34    3.259  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.59    3.195  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.95    2.908  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.26    2.689  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.74    2.620  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.76    2.616  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.66    2.499  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.97    2.462  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.59    2.392  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.86    2.363  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.86    2.263  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.54    2.120  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    6.35    3.541  0.20( 0.10) 0.50       9.9      31.00
      2       36.04    7.02    3.341  0.20( 0.10) 0.50      10.9       6.00
      3       36.56    7.28    3.272  0.20( 0.10) 0.51      11.4      35.00
      4       36.64    7.34    3.259  0.20( 0.10) 0.51      11.4      24.00
      5       37.02    7.59    3.195  0.20( 0.10) 0.51      11.8      25.00
      6       38.57    8.95    2.908  0.20( 0.10) 0.51      13.8      14.00
      7       39.02    9.40    2.827  0.20( 0.10) 0.51      14.5      33.00
      8       39.43   10.26    2.689  0.20( 0.10) 0.51      15.5      13.00
      9       39.54   10.74    2.620  0.20( 0.10) 0.51      16.0      19.00
     10       39.55   10.76    2.616  0.20( 0.10) 0.51      16.0      29.00
     11       39.29   11.66    2.499  0.20( 0.10) 0.51      16.8      16.00
     12       39.17   11.97    2.462  0.20( 0.10) 0.51      17.0      17.00
     13       38.84   12.59    2.392  0.20( 0.10) 0.51      17.4      10.00
     14       38.60   12.86    2.363  0.20( 0.10) 0.51      17.5       7.00
     15       37.42   13.86    2.263  0.20( 0.10) 0.52      17.9       4.00
     16       35.24   15.54    2.120  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       39.55  Tc(MIN.) =   10.763
  EFFECTIVE AREA(ACRES) =     16.05  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   11.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.49
  RAINFALL INTENSITY(INCH/HR) =   2.52
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.05
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.789
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    75    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =    7.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.52      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.50
  EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.75
  FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.46
  RAINFALL INTENSITY(INCH/HR) =   3.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.86
  TOTAL STREAM AREA(ACRES) =       0.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    7.09    3.324  0.20( 0.10) 0.50       9.9      31.00
      1       36.04    7.76    3.156  0.20( 0.10) 0.50      10.9       6.00
      1       36.56    8.02    3.097  0.20( 0.10) 0.51      11.4      35.00
      1       36.64    8.07    3.086  0.20( 0.10) 0.51      11.4      24.00
      1       37.02    8.33    3.031  0.20( 0.10) 0.51      11.8      25.00
      1       38.57    9.68    2.781  0.20( 0.10) 0.51      13.8      14.00
      1       39.02   10.13    2.709  0.20( 0.10) 0.51      14.5      33.00
      1       39.43   10.99    2.585  0.20( 0.10) 0.51      15.5      13.00
      1       39.54   11.46    2.523  0.20( 0.10) 0.51      16.0      19.00
      1       39.55   11.49    2.520  0.20( 0.10) 0.51      16.0      29.00
      1       39.29   12.39    2.414  0.20( 0.10) 0.51      16.8      16.00
      1       39.17   12.70    2.380  0.20( 0.10) 0.51      17.0      17.00
      1       38.84   13.32    2.316  0.20( 0.10) 0.51      17.4      10.00
      1       38.60   13.58    2.290  0.20( 0.10) 0.51      17.5       7.00
      1       37.42   14.60    2.197  0.20( 0.10) 0.52      17.9       4.00
      1       35.24   16.28    2.064  0.20( 0.10) 0.52      18.1       1.00
      2        2.48    7.46    3.227  0.20( 0.02) 0.10       0.9      38.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.06	7.09	3.324	0.20(0.09)	0.47	10.7	31.00
2	37.90	7.46	3.227	0.20(0.09)	0.47	11.3	38.00
3	38.46	7.76	3.156	0.20(0.10)	0.48	11.8	6.00
4	38.94	8.02	3.097	0.20(0.10)	0.48	12.2	35.00
5	39.01	8.07	3.086	0.20(0.10)	0.48	12.3	24.00
6	39.35	8.33	3.031	0.20(0.10)	0.48	12.7	25.00
7	40.70	9.68	2.781	0.20(0.10)	0.48	14.7	14.00
8	41.10	10.13	2.709	0.20(0.10)	0.48	15.3	33.00
9	41.41	10.99	2.585	0.20(0.10)	0.49	16.4	13.00
10	41.48	11.46	2.523	0.20(0.10)	0.49	16.9	19.00
11	41.48	11.49	2.520	0.20(0.10)	0.49	16.9	29.00
12	41.15	12.39	2.414	0.20(0.10)	0.49	17.6	16.00
13	41.00	12.70	2.380	0.20(0.10)	0.49	17.9	17.00
14	40.61	13.32	2.316	0.20(0.10)	0.49	18.3	10.00
15	40.36	13.58	2.290	0.20(0.10)	0.49	18.4	7.00
16	39.11	14.60	2.197	0.20(0.10)	0.50	18.7	4.00
17	36.82	16.28	2.064	0.20(0.10)	0.50	18.9	1.00

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.48    Tc(MIN.) =    11.49
  EFFECTIVE AREA(ACRES) =      16.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.050
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        0.84      0.20     0.700    75    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      2.20
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      2.20

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =    9.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.750
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    4.33
  EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.67
  TOTAL STREAM AREA(ACRES) =       2.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.30

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20      0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.25
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      3.25

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    9.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.794
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    2.35
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.60
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.38
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.30    9.87    2.750  0.20( 0.13) 0.63       2.7      41.00
      2        5.38    9.60    2.794  0.20( 0.11) 0.56       2.2      43.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.62    9.60    2.794  0.20( 0.12) 0.60       4.8      43.00
      2       11.60    9.87    2.750  0.20( 0.12) 0.60       4.9      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.62    Tc(MIN.) =     9.60
  EFFECTIVE AREA(ACRES) =       4.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.62
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.00
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.83
  TOTAL STREAM AREA(ACRES) =       4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.62

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.21
  TOTAL STREAM AREA(ACRES) =       0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.76

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.072
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.45      0.20     0.600    75    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.13
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.45
  TOTAL STREAM AREA(ACRES) =       1.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.62   10.00    2.729  0.20( 0.12) 0.60       4.8      43.00
      1       11.60   10.27    2.688  0.20( 0.12) 0.60       4.9      41.00
      2        0.76    5.00    4.060  0.20( 0.02) 0.10       0.2      45.00
      3        3.85    8.13    3.072  0.20( 0.12) 0.60       1.5      46.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.00    4.060  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.13    3.072  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.00    2.729  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.27    2.688  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.54    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =       6.49   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.54
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.08    4.025  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.21    3.056  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.07    2.718  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.34    2.677  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       37.06    7.15    3.307  0.20( 0.09) 0.47      10.7      31.00
    2       37.90    7.53    3.211  0.20( 0.09) 0.47      11.3      38.00
    3       38.46    7.82    3.141  0.20( 0.10) 0.48      11.8       6.00
    4       38.94    8.08    3.083  0.20( 0.10) 0.48      12.2      35.00
    5       39.01    8.13    3.072  0.20( 0.10) 0.48      12.3      24.00
    6       39.35    8.39    3.018  0.20( 0.10) 0.48      12.7      25.00
    7       40.70    9.74    2.771  0.20( 0.10) 0.48      14.7      14.00
    8       41.10   10.19    2.700  0.20( 0.10) 0.48      15.3      33.00
    9       41.41   11.05    2.577  0.20( 0.10) 0.49      16.4      13.00
   10       41.48   11.53    2.516  0.20( 0.10) 0.49      16.9      19.00
   11       41.48   11.55    2.513  0.20( 0.10) 0.49      16.9      29.00
   12       41.15   12.45    2.407  0.20( 0.10) 0.49      17.6      16.00
   13       41.00   12.76    2.373  0.20( 0.10) 0.49      17.9      17.00
   14       40.61   13.38    2.310  0.20( 0.10) 0.49      18.3      10.00
   15       40.36   13.65    2.284  0.20( 0.10) 0.49      18.4       7.00
   16       39.11   14.66    2.192  0.20( 0.10) 0.50      18.7       4.00
   17       36.82   16.34    2.060  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       44.88    5.08    4.025  0.20( 0.10) 0.50      11.1      45.00
    2       51.29    7.15    3.307  0.20( 0.10) 0.50      15.6      31.00
    3       52.41    7.53    3.211  0.20( 0.10) 0.51      16.4      38.00
```

```
      4       53.19    7.82    3.141  0.20( 0.10) 0.51      17.1       6.00
      5       53.86    8.08    3.083  0.20( 0.10) 0.51      17.7      35.00
      6       53.97    8.13    3.072  0.20( 0.10) 0.51      17.8      24.00
      7       54.13    8.21    3.056  0.20( 0.10) 0.51      18.0      46.00
      8       54.42    8.39    3.018  0.20( 0.10) 0.51      18.4      25.00
      9       56.15    9.74    2.771  0.20( 0.10) 0.51      21.0      14.00
     10       56.53   10.07    2.718  0.20( 0.10) 0.51      21.7      43.00
     11       56.60   10.19    2.700  0.20( 0.10) 0.51      21.9      33.00
     12       56.61   10.34    2.677  0.20( 0.10) 0.51      22.1      41.00
     13       56.26   11.05    2.577  0.20( 0.10) 0.51      22.9      13.00
     14       55.96   11.53    2.516  0.20( 0.10) 0.51      23.4      19.00
     15       55.94   11.55    2.513  0.20( 0.10) 0.51      23.5      29.00
     16       54.97   12.45    2.407  0.20( 0.10) 0.52      24.2      16.00
     17       54.62   12.76    2.373  0.20( 0.10) 0.52      24.4      17.00
     18       53.85   13.38    2.310  0.20( 0.10) 0.52      24.8      10.00
     19       53.44   13.65    2.284  0.20( 0.10) 0.52      24.9       7.00
     20       51.63   14.66    2.192  0.20( 0.10) 0.52      25.3       4.00
     21       48.55   16.34    2.060  0.20( 0.10) 0.52      25.5       1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       56.61  Tc(MIN.) =   10.339
  EFFECTIVE AREA(ACRES) =     22.08  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.44
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.61
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.08
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      56.61

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
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```
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.588
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.27      0.20     0.200    75    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =    9.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.888
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    1.49
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.06
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
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 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.85
 TOTAL STREAM AREA(ACRES) =       0.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.18

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       44.88    5.20    3.969  0.20( 0.10) 0.50      11.1      45.00
     1       51.29    7.27    3.275  0.20( 0.10) 0.50      15.6      31.00
     1       52.41    7.65    3.182  0.20( 0.10) 0.51      16.4      38.00
     1       53.19    7.94    3.114  0.20( 0.10) 0.51      17.1       6.00
     1       53.86    8.20    3.057  0.20( 0.10) 0.51      17.7      35.00
     1       53.97    8.25    3.046  0.20( 0.10) 0.51      17.8      24.00
     1       54.13    8.33    3.030  0.20( 0.10) 0.51      18.0      46.00
     1       54.42    8.51    2.993  0.20( 0.10) 0.51      18.4      25.00
     1       56.15    9.86    2.751  0.20( 0.10) 0.51      21.0      14.00
     1       56.53   10.19    2.700  0.20( 0.10) 0.51      21.7      43.00
     1       56.60   10.31    2.682  0.20( 0.10) 0.51      21.9      33.00
     1       56.61   10.46    2.660  0.20( 0.10) 0.51      22.1      41.00
     1       56.26   11.17    2.561  0.20( 0.10) 0.51      22.9      13.00
     1       55.96   11.65    2.501  0.20( 0.10) 0.51      23.4      19.00
     1       55.94   11.67    2.498  0.20( 0.10) 0.51      23.5      29.00
     1       54.97   12.57    2.394  0.20( 0.10) 0.52      24.2      16.00
     1       54.62   12.88    2.361  0.20( 0.10) 0.52      24.4      17.00
     1       53.85   13.50    2.298  0.20( 0.10) 0.52      24.8      10.00
     1       53.44   13.77    2.272  0.20( 0.10) 0.52      24.9       7.00
     1       51.63   14.78    2.182  0.20( 0.10) 0.52      25.3       4.00
     1       48.55   16.46    2.051  0.20( 0.10) 0.52      25.5       1.00
     2        2.18    9.06    2.888  0.20( 0.04) 0.20       0.9      32.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.61    5.20    3.969  0.20( 0.10) 0.49      11.6      45.00
     2       53.28    7.27    3.275  0.20( 0.10) 0.49      16.2      31.00
     3       54.44    7.65    3.182  0.20( 0.10) 0.49      17.2      38.00
     4       55.26    7.94    3.114  0.20( 0.10) 0.49      17.8       6.00
     5       55.95    8.20    3.057  0.20( 0.10) 0.50      18.5      35.00
     6       56.06    8.25    3.046  0.20( 0.10) 0.50      18.6      24.00
     7       56.23    8.33    3.030  0.20( 0.10) 0.50      18.8      46.00
     8       56.54    8.51    2.993  0.20( 0.10) 0.50      19.2      25.00
     9       57.30    9.06    2.888  0.20( 0.10) 0.50      20.3      32.00
    10       58.22    9.86    2.751  0.20( 0.10) 0.50      21.9      14.00
    11       58.56   10.19    2.700  0.20( 0.10) 0.50      22.5      43.00
    12       58.62   10.31    2.682  0.20( 0.10) 0.50      22.7      33.00
    13       58.61   10.46    2.660  0.20( 0.10) 0.50      22.9      41.00
    14       58.19   11.17    2.561  0.20( 0.10) 0.50      23.8      13.00
    15       57.84   11.65    2.501  0.20( 0.10) 0.50      24.3      19.00
    16       57.82   11.67    2.498  0.20( 0.10) 0.50      24.3      29.00
    17       56.77   12.57    2.394  0.20( 0.10) 0.50      25.0      16.00
    18       56.39   12.88    2.361  0.20( 0.10) 0.51      25.3      17.00
    19       55.58   13.50    2.298  0.20( 0.10) 0.51      25.7      10.00
    20       55.15   13.77    2.272  0.20( 0.10) 0.51      25.8       7.00
    21       53.27   14.78    2.182  0.20( 0.10) 0.51      26.1       4.00
    22       50.09   16.46    2.051  0.20( 0.10) 0.51      26.4       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      58.62    Tc(MIN.) =    10.31
 EFFECTIVE AREA(ACRES) =      22.71   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       26.4
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.19
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.62
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   2.19   Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    2.61
  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.61
  FLOW VELOCITY(FEET/SEC.) =  2.45   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    3.58
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.74
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   12.51
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.51
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20     0.600    75    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    9.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.860
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    1.65
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  4.14   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.21
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
```

```
 EFFECTIVE STREAM AREA(ACRES) =       1.34
 TOTAL STREAM AREA(ACRES) =       1.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.30

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        7.74   12.51    2.400  0.20( 0.10) 0.50       3.6      22.00
     2        3.30    9.21    2.860  0.20( 0.12) 0.60       1.3      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       10.14    9.21    2.860  0.20( 0.11) 0.53       4.0      53.00
     2       10.49   12.51    2.400  0.20( 0.11) 0.53       4.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.49    Tc(MIN.) =    12.51
 EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.49
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.54
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.54
 RAINFALL INTENSITY(INCH/HR) =   2.40
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.53
 EFFECTIVE STREAM AREA(ACRES) =       4.93
 TOTAL STREAM AREA(ACRES) =       4.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.49

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    9.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    9.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.816
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.12      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  4.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.46
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.61

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       10.14    9.24    2.855  0.20( 0.11) 0.53       4.0      53.00
    1       10.49   12.54    2.397  0.20( 0.11) 0.53       4.9      22.00
    2        4.61    9.46    2.816  0.20( 0.12) 0.60       1.9      56.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       14.71    9.24    2.855  0.20( 0.11) 0.55       5.8      53.00
    2       14.78    9.46    2.816  0.20( 0.11) 0.55       5.9      56.00
    3       14.38   12.54    2.397  0.20( 0.11) 0.55       6.8      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      14.78    Tc(MIN.) =     9.46
 EFFECTIVE AREA(ACRES) =       5.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.78
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.52
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.52
 RAINFALL INTENSITY(INCH/HR) =   2.81
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       5.95
 TOTAL STREAM AREA(ACRES) =       6.83
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.78

****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.11      0.20     0.100    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.11
  TOTAL STREAM AREA(ACRES) =       0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.71    9.30    2.845  0.20( 0.11) 0.55       5.8      53.00
      1       14.78    9.52    2.807  0.20( 0.11) 0.55       5.9      56.00
      1       14.38   12.60    2.390  0.20( 0.11) 0.55       6.8      22.00
      2        0.40    5.00    4.060  0.20( 0.02) 0.10       0.1      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.82    5.00    4.060  0.20( 0.11) 0.54       3.2      59.00
      2       14.99    9.30    2.845  0.20( 0.11) 0.55       5.9      53.00
      3       15.05    9.52    2.807  0.20( 0.11) 0.55       6.1      56.00
      4       14.62   12.60    2.390  0.20( 0.11) 0.54       6.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.05    Tc(MIN.) =     9.52
  EFFECTIVE AREA(ACRES) =       6.06   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.05
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.01
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.01
  RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       6.06
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.05

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.71

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    8.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.971
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.28
  FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
```

```
 LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.62
 RAINFALL INTENSITY(INCH/HR) =   2.97
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.48
 TOTAL STREAM AREA(ACRES) =       1.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.82    5.51    3.839  0.20( 0.11) 0.54       3.2      59.00
     1       14.99    9.79    2.763  0.20( 0.11) 0.55       5.9      53.00
     1       15.05   10.01    2.728  0.20( 0.11) 0.55       6.1      56.00
     1       14.62   13.09    2.339  0.20( 0.11) 0.54       6.9      22.00
     2        3.80    8.62    2.971  0.20( 0.12) 0.60       1.5      61.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.51    3.839  0.20( 0.11) 0.55       4.2      59.00
     2       17.92    8.62    2.971  0.20( 0.11) 0.56       6.7      61.00
     3       18.51    9.79    2.763  0.20( 0.11) 0.56       7.4      53.00
     4       18.53   10.01    2.728  0.20( 0.11) 0.56       7.5      56.00
     5       17.57   13.09    2.339  0.20( 0.11) 0.55       8.4      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.53    Tc(MIN.) =    10.01
 EFFECTIVE AREA(ACRES) =       7.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        8.4
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.96
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.53
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.02
 RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.53

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.172
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.87
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.87

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =    8.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    1.97
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.46
 RAINFALL INTENSITY(INCH/HR) =   3.00
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.74

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.53    3.832  0.20( 0.11) 0.55       4.2       59.00
     1       17.92    8.64    2.967  0.20( 0.11) 0.56       6.7       61.00
     1       18.51    9.80    2.760  0.20( 0.11) 0.56       7.4       53.00
     1       18.53   10.02    2.725  0.20( 0.11) 0.56       7.5       56.00
     1       17.57   13.10    2.337  0.20( 0.11) 0.55       8.4       22.00
     2        3.74    8.46    3.003  0.20( 0.12) 0.60       1.4       64.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.13    5.53    3.832  0.20( 0.11) 0.56       5.1       59.00
     2       21.49    8.46    3.003  0.20( 0.11) 0.56       8.0       64.00
     3       21.61    8.64    2.967  0.20( 0.11) 0.56       8.1       61.00
     4       21.93    9.80    2.760  0.20( 0.11) 0.56       8.9       53.00
     5       21.90   10.02    2.725  0.20( 0.11) 0.56       9.0       56.00
     6       20.45   13.10    2.337  0.20( 0.11) 0.56       9.9       22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      21.93    Tc(MIN.) =     9.80
 EFFECTIVE AREA(ACRES) =       8.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        9.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.93
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.12
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.12
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.87
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.93

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.023
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    75    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =    9.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.738
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   2.74
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.02
  TOTAL STREAM AREA(ACRES) =       1.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.15      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.13    5.86    3.706  0.20( 0.11) 0.56       5.1      59.00
      1       21.49    8.78    2.939  0.20( 0.11) 0.56       8.0      64.00
      1       21.61    8.96    2.906  0.20( 0.11) 0.56       8.1      61.00
      1       21.93   10.12    2.710  0.20( 0.11) 0.56       8.9      53.00
      1       21.90   10.35    2.676  0.20( 0.11) 0.56       9.0      56.00
      1       20.45   13.43    2.305  0.20( 0.11) 0.56       9.9      22.00
      2        2.41    9.94    2.738  0.20( 0.11) 0.56       1.0      67.00
      3        0.55    5.00    4.060  0.20( 0.02) 0.10       0.2      63.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.00    4.060  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.86    3.706  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.78    2.939  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    8.96    2.906  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.94    2.738  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.12    2.710  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.35    2.676  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.43    2.305  0.20( 0.11) 0.55      11.0      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.68    Tc(MIN.) =    10.12
  EFFECTIVE AREA(ACRES) =      10.04   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       11.0
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.68
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.17
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.05    4.034  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.91    3.687  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.83    2.930  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    9.01    2.896  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.99    2.730  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.17    2.702  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.40    2.669  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.48    2.300  0.20( 0.11) 0.55      11.0      22.00
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.61    5.26    3.943  0.20( 0.10) 0.49      11.6      45.00
      2       53.28    7.33    3.260  0.20( 0.10) 0.49      16.2      31.00
      3       54.44    7.71    3.168  0.20( 0.10) 0.49      17.2      38.00
      4       55.26    8.00    3.101  0.20( 0.10) 0.49      17.8       6.00
      5       55.95    8.26    3.045  0.20( 0.10) 0.50      18.5      35.00
      6       56.06    8.31    3.034  0.20( 0.10) 0.50      18.6      24.00
      7       56.23    8.39    3.018  0.20( 0.10) 0.50      18.8      46.00
      8       56.54    8.57    2.981  0.20( 0.10) 0.50      19.2      25.00
      9       57.30    9.11    2.878  0.20( 0.10) 0.50      20.3      32.00
     10       58.22    9.92    2.742  0.20( 0.10) 0.50      21.9      14.00
     11       58.56   10.25    2.691  0.20( 0.10) 0.50      22.5      43.00
     12       58.62   10.37    2.673  0.20( 0.10) 0.50      22.7      33.00
     13       58.61   10.52    2.651  0.20( 0.10) 0.50      22.9      41.00
```

```
    14       58.19   11.23    2.554  0.20( 0.10) 0.50      23.8      13.00
    15       57.84   11.70    2.494  0.20( 0.10) 0.50      24.3      19.00
    16       57.82   11.73    2.491  0.20( 0.10) 0.50      24.3      29.00
    17       56.77   12.63    2.388  0.20( 0.10) 0.50      25.0      16.00
    18       56.39   12.94    2.354  0.20( 0.10) 0.51      25.3      17.00
    19       55.58   13.56    2.292  0.20( 0.10) 0.51      25.7      10.00
    20       55.15   13.83    2.267  0.20( 0.10) 0.51      25.8       7.00
    21       53.27   14.84    2.177  0.20( 0.10) 0.51      26.1       4.00
    22       50.09   16.52    2.047  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.05    4.034  0.20( 0.10) 0.51      16.2      63.00
      2       66.25    5.26    3.943  0.20( 0.10) 0.51      16.8      45.00
      3       69.29    5.91    3.687  0.20( 0.10) 0.51      18.9      59.00
      4       75.61    7.33    3.260  0.20( 0.10) 0.51      23.7      31.00
      5       77.23    7.71    3.168  0.20( 0.10) 0.51      25.0      38.00
      6       78.41    8.00    3.101  0.20( 0.10) 0.51      26.0       6.00
      7       79.42    8.26    3.045  0.20( 0.10) 0.51      26.9      35.00
      8       79.60    8.31    3.034  0.20( 0.10) 0.51      27.1      24.00
      9       79.86    8.39    3.018  0.20( 0.10) 0.51      27.3      46.00
     10       80.39    8.57    2.981  0.20( 0.10) 0.51      27.9      25.00
     11       81.09    8.83    2.930  0.20( 0.10) 0.52      28.8      64.00
     12       81.47    9.01    2.896  0.20( 0.10) 0.52      29.3      61.00
     13       81.65    9.11    2.878  0.20( 0.10) 0.52      29.6      32.00
     14       82.85    9.92    2.742  0.20( 0.10) 0.52      31.7      14.00
     15       82.96    9.99    2.730  0.20( 0.10) 0.52      31.9      67.00
     16       83.17   10.17    2.702  0.20( 0.10) 0.52      32.4      53.00
     17       83.22   10.25    2.691  0.20( 0.10) 0.52      32.6      43.00
     18       83.24   10.37    2.673  0.20( 0.10) 0.52      32.8      33.00
     19       83.23   10.40    2.669  0.20( 0.10) 0.52      32.9      56.00
     20       83.16   10.52    2.651  0.20( 0.10) 0.52      33.1      41.00
     21       82.31   11.23    2.554  0.20( 0.10) 0.52      34.2      13.00
     22       81.68   11.70    2.494  0.20( 0.10) 0.52      34.8      19.00
     23       81.64   11.73    2.491  0.20( 0.10) 0.52      34.8      29.00
     24       80.05   12.63    2.388  0.20( 0.10) 0.52      35.8      16.00
     25       79.49   12.94    2.354  0.20( 0.10) 0.52      36.1      17.00
     26       78.45   13.48    2.300  0.20( 0.10) 0.52      36.6      22.00
     27       78.27   13.56    2.292  0.20( 0.10) 0.52      36.7      10.00
     28       77.57   13.83    2.267  0.20( 0.10) 0.52      36.8       7.00
     29       74.76   14.84    2.177  0.20( 0.10) 0.52      37.2       4.00
     30       70.22   16.52    2.047  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.24  Tc(MIN.) =   10.367
  EFFECTIVE AREA(ACRES) =     32.84  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.83
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.24
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =      32.84
  TOTAL STREAM AREA(ACRES) =      37.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.24

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    75    5.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.34
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.14    3.994  0.20( 0.10) 0.51      16.2      63.00
      1       66.25    5.35    3.905  0.20( 0.10) 0.51      16.8      45.00
      1       69.29    6.00    3.656  0.20( 0.10) 0.51      18.9      59.00
      1       75.61    7.42    3.238  0.20( 0.10) 0.51      23.7      31.00
      1       77.23    7.79    3.148  0.20( 0.10) 0.51      25.0      38.00
      1       78.41    8.09    3.081  0.20( 0.10) 0.51      26.0       6.00
      1       79.42    8.35    3.027  0.20( 0.10) 0.51      26.9      35.00
      1       79.60    8.40    3.016  0.20( 0.10) 0.51      27.1      24.00
      1       79.86    8.47    3.001  0.20( 0.10) 0.51      27.3      46.00
      1       80.39    8.66    2.964  0.20( 0.10) 0.51      27.9      25.00
      1       81.09    8.92    2.913  0.20( 0.10) 0.52      28.8      64.00
```

1	81.47	9.10	2.881	0.20(0.10)	0.52	29.3	61.00
1	81.65	9.20	2.862	0.20(0.10)	0.52	29.6	32.00
1	82.85	10.00	2.729	0.20(0.10)	0.52	31.7	14.00
1	82.96	10.08	2.717	0.20(0.10)	0.52	31.9	67.00
1	83.17	10.26	2.689	0.20(0.10)	0.52	32.4	53.00
1	83.22	10.33	2.678	0.20(0.10)	0.52	32.6	43.00
1	83.24	10.45	2.661	0.20(0.10)	0.52	32.8	33.00
1	83.23	10.48	2.656	0.20(0.10)	0.52	32.9	56.00
1	83.16	10.60	2.639	0.20(0.10)	0.52	33.1	41.00
1	82.31	11.32	2.542	0.20(0.10)	0.52	34.2	13.00
1	81.68	11.79	2.483	0.20(0.10)	0.52	34.8	19.00
1	81.64	11.82	2.480	0.20(0.10)	0.52	34.8	29.00
1	80.05	12.71	2.378	0.20(0.10)	0.52	35.8	16.00
1	79.49	13.02	2.345	0.20(0.10)	0.52	36.1	17.00
1	78.45	13.57	2.291	0.20(0.10)	0.52	36.6	22.00
1	78.27	13.64	2.284	0.20(0.10)	0.52	36.7	10.00
1	77.57	13.91	2.258	0.20(0.10)	0.52	36.8	7.00
1	74.76	14.93	2.169	0.20(0.10)	0.52	37.2	4.00
1	70.22	16.61	2.040	0.20(0.10)	0.52	37.4	1.00
2	1.34	5.27	3.938	0.20(0.02)	0.10	0.4	47.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	66.53	5.14	3.994	0.20(0.10)	0.50	16.5	63.00
2	67.20	5.27	3.938	0.20(0.10)	0.50	17.0	47.00
3	67.58	5.35	3.905	0.20(0.10)	0.50	17.2	45.00
4	70.53	6.00	3.656	0.20(0.10)	0.50	19.3	59.00
5	76.71	7.42	3.238	0.20(0.10)	0.50	24.0	31.00
6	78.30	7.79	3.148	0.20(0.10)	0.51	25.4	38.00
7	79.46	8.09	3.081	0.20(0.10)	0.51	26.4	6.00
8	80.45	8.35	3.027	0.20(0.10)	0.51	27.3	35.00
9	80.62	8.40	3.016	0.20(0.10)	0.51	27.5	24.00
10	80.88	8.47	3.001	0.20(0.10)	0.51	27.7	46.00
11	81.40	8.66	2.964	0.20(0.10)	0.51	28.3	25.00
12	82.08	8.92	2.913	0.20(0.10)	0.51	29.1	64.00
13	82.45	9.10	2.881	0.20(0.10)	0.51	29.7	61.00
14	82.62	9.20	2.862	0.20(0.10)	0.51	30.0	32.00
15	83.78	10.00	2.729	0.20(0.10)	0.51	32.1	14.00
16	83.88	10.08	2.717	0.20(0.10)	0.51	32.3	67.00
17	84.08	10.26	2.689	0.20(0.10)	0.51	32.8	53.00
18	84.13	10.33	2.678	0.20(0.10)	0.51	33.0	43.00
19	84.15	10.45	2.661	0.20(0.10)	0.51	33.2	33.00
20	84.14	10.48	2.656	0.20(0.10)	0.51	33.3	56.00
21	84.05	10.60	2.639	0.20(0.10)	0.51	33.5	41.00
22	83.17	11.32	2.542	0.20(0.10)	0.51	34.6	13.00
23	82.52	11.79	2.483	0.20(0.10)	0.51	35.2	19.00
24	82.48	11.82	2.480	0.20(0.10)	0.51	35.2	29.00
25	80.86	12.71	2.378	0.20(0.10)	0.51	36.2	16.00
26	80.28	13.02	2.345	0.20(0.10)	0.52	36.5	17.00
27	79.22	13.57	2.291	0.20(0.10)	0.52	37.0	22.00
28	79.04	13.64	2.284	0.20(0.10)	0.52	37.1	10.00
29	78.34	13.91	2.258	0.20(0.10)	0.52	37.2	7.00
30	75.49	14.93	2.169	0.20(0.10)	0.52	37.5	4.00
31	70.91	16.61	2.040	0.20(0.10)	0.52	37.8	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 84.15 Tc(MIN.) = 10.45
EFFECTIVE AREA(ACRES) = 33.22 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 71.00 = 2745.00 FEET.

****
FLOW PROCESS FROM NODE 71.00 TO NODE 86.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   450.00  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.15
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.932
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    75    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.86
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      2.86

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.57   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.670
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    2.98
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.58

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.960
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    75    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =   10.49
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.655
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.58
  EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  3.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.58   10.39    2.670  0.20( 0.12) 0.60       2.4      33.00
      2        4.15   10.49    2.655  0.20( 0.12) 0.60       1.8      73.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.71   10.39    2.670  0.20( 0.12) 0.60       4.2      33.00
      2        9.70   10.49    2.655  0.20( 0.12) 0.60       4.2      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.71    Tc(MIN.) =    10.39
  EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.71
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   11.15
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.71

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.110
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =    9.18
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.866
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.78      SUBAREA RUNOFF(CFS) =     1.93
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.18
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.26

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.251
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.49      0.20      0.500    75    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.39
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

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  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    8.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.982
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    1.98
  EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.15
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.57
  RAINFALL INTENSITY(INCH/HR) =   2.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.26
  TOTAL STREAM AREA(ACRES) =       1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.71   11.15    2.564  0.20( 0.12) 0.60       4.2      33.00
      1        9.70   11.25    2.551  0.20( 0.12) 0.60       4.2      73.00
      2        3.26    9.18    2.866  0.20( 0.12) 0.60       1.3      76.00
      3        3.25    8.57    2.982  0.20( 0.11) 0.56       1.3      78.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.17    8.57    2.982  0.20( 0.12) 0.59       5.7      78.00
      2       15.37    9.18    2.866  0.20( 0.12) 0.59       6.1      76.00
      3       15.40   11.15    2.564  0.20( 0.12) 0.59       6.8      33.00
      4       15.35   11.25    2.551  0.20( 0.12) 0.59       6.8      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.40    Tc(MIN.) =    11.15
  EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
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```
 FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.40
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   11.37
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.37
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.536
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        3.28      0.20     0.900    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =    6.95
 EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
 TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      21.77

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.73    8.79    2.939  0.20( 0.14) 0.70       9.0      78.00
     2       22.61    9.40    2.828  0.20( 0.14) 0.70       9.3      76.00
     3       21.77   11.37    2.536  0.20( 0.14) 0.69      10.1      33.00
     4       21.70   11.47    2.523  0.20( 0.14) 0.69      10.1      73.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      22.73  Tc(MIN.) =    8.79
 AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.02

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
 FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.66
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.73
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.28
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.28
 RAINFALL INTENSITY(INCH/HR) =   2.85
 AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.02
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.73

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.087
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    75    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    9.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.736
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.57      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.39
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  5.18   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.96
 RAINFALL INTENSITY(INCH/HR) =   2.74
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

****************************************************************************
 FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.470
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.58
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      1.69
 TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
 FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
 STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
 STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    7.78
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.150
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
```

```
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.76
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.78
  RAINFALL INTENSITY(INCH/HR) =   3.15
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       22.73    9.28    2.849  0.20( 0.14) 0.70       9.0      78.00
      1       22.61    9.89    2.747  0.20( 0.14) 0.70       9.3      76.00
      1       21.77   11.86    2.474  0.20( 0.14) 0.69      10.1      33.00
      1       21.70   11.96    2.462  0.20( 0.14) 0.69      10.1      73.00
      2        3.44    9.96    2.736  0.20( 0.08) 0.40       1.4      82.00
      3        5.29    7.78    3.150  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.59    7.78    3.150  0.20( 0.13) 0.65      10.6      80.00
      2       30.84    9.28    2.849  0.20( 0.13) 0.65      12.3      78.00
      3       30.62    9.89    2.747  0.20( 0.13) 0.65      12.7      76.00
      4       30.59    9.96    2.736  0.20( 0.13) 0.65      12.7      82.00
      5       28.99   11.86    2.474  0.20( 0.13) 0.65      13.5      33.00
      6       28.87   11.96    2.462  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.84    Tc(MIN.) =     9.28
  EFFECTIVE AREA(ACRES) =      12.31   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.84
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.37
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.59    7.88    3.129  0.20( 0.13) 0.65      10.6      80.00
      2       30.84    9.37    2.833  0.20( 0.13) 0.65      12.3      78.00
      3       30.62    9.98    2.733  0.20( 0.13) 0.65      12.7      76.00
      4       30.59   10.05    2.722  0.20( 0.13) 0.65      12.7      82.00
      5       28.99   11.95    2.464  0.20( 0.13) 0.65      13.5      33.00
      6       28.87   12.05    2.452  0.20( 0.13) 0.65      13.5      73.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       66.53    5.19    3.973  0.20( 0.10) 0.50      16.5      63.00
      2       67.20    5.32    3.918  0.20( 0.10) 0.50      17.0      47.00
      3       67.58    5.40    3.886  0.20( 0.10) 0.50      17.2      45.00
      4       70.53    6.05    3.640  0.20( 0.10) 0.50      19.3      59.00
      5       76.71    7.46    3.227  0.20( 0.10) 0.50      24.0      31.00
      6       78.30    7.84    3.138  0.20( 0.10) 0.51      25.4      38.00
      7       79.46    8.13    3.072  0.20( 0.10) 0.51      26.4       6.00
      8       80.45    8.39    3.018  0.20( 0.10) 0.51      27.3      35.00
      9       80.62    8.44    3.007  0.20( 0.10) 0.51      27.5      24.00
     10       80.88    8.52    2.992  0.20( 0.10) 0.51      27.7      46.00
     11       81.40    8.70    2.956  0.20( 0.10) 0.51      28.3      25.00
     12       82.08    8.97    2.905  0.20( 0.10) 0.51      29.1      64.00
     13       82.45    9.14    2.873  0.20( 0.10) 0.51      29.7      61.00
     14       82.62    9.24    2.854  0.20( 0.10) 0.51      30.0      32.00
     15       83.78   10.04    2.722  0.20( 0.10) 0.51      32.1      14.00
     16       83.88   10.12    2.710  0.20( 0.10) 0.51      32.3      67.00
     17       84.08   10.30    2.683  0.20( 0.10) 0.51      32.8      53.00
     18       84.13   10.38    2.672  0.20( 0.10) 0.51      33.0      43.00
     19       84.15   10.50    2.654  0.20( 0.10) 0.51      33.2      33.00
     20       84.14   10.52    2.650  0.20( 0.10) 0.51      33.3      56.00
     21       84.05   10.64    2.633  0.20( 0.10) 0.51      33.5      41.00
     22       83.17   11.36    2.537  0.20( 0.10) 0.51      34.6      13.00
     23       82.52   11.83    2.478  0.20( 0.10) 0.51      35.2      19.00
     24       82.48   11.86    2.475  0.20( 0.10) 0.51      35.2      29.00
     25       80.86   12.76    2.373  0.20( 0.10) 0.51      36.2      16.00
     26       80.28   13.07    2.341  0.20( 0.10) 0.52      36.5      17.00
     27       79.22   13.61    2.287  0.20( 0.10) 0.52      37.0      22.00
     28       79.04   13.69    2.280  0.20( 0.10) 0.52      37.1      10.00
     29       78.34   13.96    2.254  0.20( 0.10) 0.52      37.2       7.00
     30       75.49   14.97    2.165  0.20( 0.10) 0.52      37.5       4.00
     31       70.91   16.66    2.037  0.20( 0.10) 0.52      37.8       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       91.53    5.19    3.973  0.20( 0.11) 0.54      23.6      63.00
      2       92.44    5.32    3.918  0.20( 0.11) 0.54      24.1      47.00
      3       92.98    5.40    3.886  0.20( 0.11) 0.54      24.5      45.00
      4       97.13    6.05    3.640  0.20( 0.11) 0.55      27.5      59.00
      5      105.67    7.46    3.227  0.20( 0.11) 0.55      34.1      31.00
      6      107.84    7.84    3.138  0.20( 0.11) 0.55      35.9      38.00
      7      108.04    7.88    3.129  0.20( 0.11) 0.55      36.1      80.00
      8      109.27    8.13    3.072  0.20( 0.11) 0.55      37.3       6.00
      9      110.47    8.39    3.018  0.20( 0.11) 0.55      38.5      35.00
     10      110.69    8.44    3.007  0.20( 0.11) 0.55      38.7      24.00
     11      111.01    8.52    2.992  0.20( 0.11) 0.55      39.1      46.00
     12      111.68    8.70    2.956  0.20( 0.11) 0.55      39.9      25.00
     13      112.58    8.97    2.905  0.20( 0.11) 0.55      41.0      64.00
     14      113.10    9.14    2.873  0.20( 0.11) 0.55      41.7      61.00
```

```
    15      113.35    9.24    2.854  0.20( 0.11) 0.55      42.1      32.00
    16      113.63    9.37    2.833  0.20( 0.11) 0.55      42.6      78.00
    17      114.31    9.98    2.733  0.20( 0.11) 0.55      44.6      76.00
    18      114.37   10.04    2.722  0.20( 0.11) 0.55      44.9      14.00
    19      114.37   10.05    2.722  0.20( 0.11) 0.55      44.9      82.00
    20      114.40   10.12    2.710  0.20( 0.11) 0.55      45.1      67.00
    21      114.45   10.30    2.683  0.20( 0.11) 0.55      45.6      53.00
    22      114.44   10.38    2.672  0.20( 0.11) 0.55      45.8      43.00
    23      114.36   10.50    2.654  0.20( 0.11) 0.55      46.1      33.00
    24      114.32   10.52    2.650  0.20( 0.11) 0.55      46.2      56.00
    25      114.14   10.64    2.633  0.20( 0.11) 0.55      46.5      41.00
    26      112.66   11.36    2.537  0.20( 0.11) 0.55      47.8      13.00
    27      111.61   11.83    2.478  0.20( 0.11) 0.55      48.6      19.00
    28      111.55   11.86    2.475  0.20( 0.11) 0.55      48.7      29.00
    29      111.30   11.95    2.464  0.20( 0.11) 0.55      48.8      33.00
    30      111.00   12.05    2.452  0.20( 0.11) 0.55      48.9      73.00
    31      108.75   12.76    2.373  0.20( 0.11) 0.55      49.7      16.00
    32      107.78   13.07    2.341  0.20( 0.11) 0.55      50.0      17.00
    33      106.05   13.61    2.287  0.20( 0.11) 0.55      50.5      22.00
    34      105.78   13.69    2.280  0.20( 0.11) 0.55      50.6      10.00
    35      104.75   13.96    2.254  0.20( 0.11) 0.55      50.7       7.00
    36      100.80   14.97    2.165  0.20( 0.11) 0.55      51.0       4.00
    37       94.63   16.66    2.037  0.20( 0.11) 0.55      51.3       1.00
  TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      114.45  Tc(MIN.) =   10.302
  EFFECTIVE AREA(ACRES) =     45.63  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.28
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.45
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.41
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.45
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.68
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      45.63
  TOTAL STREAM AREA(ACRES) =      51.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     114.45

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.43      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.50
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.50

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       91.53    5.59    3.808  0.20( 0.11) 0.54      23.6      63.00
      1       92.44    5.72    3.759  0.20( 0.11) 0.54      24.1      47.00
      1       92.98    5.79    3.730  0.20( 0.11) 0.54      24.5      45.00
```

1	97.13	6.44	3.513	0.20(0.11)	0.55	27.5	59.00
1	105.67	7.85	3.136	0.20(0.11)	0.55	34.1	31.00
1	107.84	8.22	3.053	0.20(0.11)	0.55	35.9	38.00
1	108.04	8.26	3.046	0.20(0.11)	0.55	36.1	80.00
1	109.27	8.51	2.992	0.20(0.11)	0.55	37.3	6.00
1	110.47	8.77	2.942	0.20(0.11)	0.55	38.5	35.00
1	110.69	8.82	2.932	0.20(0.11)	0.55	38.7	24.00
1	111.01	8.90	2.918	0.20(0.11)	0.55	39.1	46.00
1	111.68	9.08	2.884	0.20(0.11)	0.55	39.9	25.00
1	112.58	9.34	2.837	0.20(0.11)	0.55	41.0	64.00
1	113.10	9.52	2.807	0.20(0.11)	0.55	41.7	61.00
1	113.35	9.62	2.790	0.20(0.11)	0.55	42.1	32.00
1	113.63	9.74	2.770	0.20(0.11)	0.55	42.6	78.00
1	114.31	10.36	2.675	0.20(0.11)	0.55	44.6	76.00
1	114.37	10.42	2.665	0.20(0.11)	0.55	44.9	14.00
1	114.37	10.42	2.665	0.20(0.11)	0.55	44.9	82.00
1	114.40	10.50	2.654	0.20(0.11)	0.55	45.1	67.00
1	114.45	10.68	2.628	0.20(0.11)	0.55	45.6	53.00
1	114.44	10.76	2.617	0.20(0.11)	0.55	45.8	43.00
1	114.36	10.87	2.601	0.20(0.11)	0.55	46.1	33.00
1	114.32	10.90	2.597	0.20(0.11)	0.55	46.2	56.00
1	114.14	11.02	2.581	0.20(0.11)	0.55	46.5	41.00
1	112.66	11.74	2.489	0.20(0.11)	0.55	47.8	13.00
1	111.61	12.21	2.433	0.20(0.11)	0.55	48.6	19.00
1	111.55	12.24	2.431	0.20(0.11)	0.55	48.7	29.00
1	111.30	12.33	2.420	0.20(0.11)	0.55	48.8	33.00
1	111.00	12.43	2.409	0.20(0.11)	0.55	48.9	73.00
1	108.75	13.14	2.334	0.20(0.11)	0.55	49.7	16.00
1	107.78	13.45	2.303	0.20(0.11)	0.55	50.0	17.00
1	106.05	13.99	2.251	0.20(0.11)	0.55	50.5	22.00
1	105.78	14.07	2.244	0.20(0.11)	0.55	50.6	10.00
1	104.75	14.34	2.220	0.20(0.11)	0.55	50.7	7.00
1	100.80	15.36	2.134	0.20(0.11)	0.55	51.0	4.00
1	94.63	17.06	2.010	0.20(0.11)	0.55	51.3	1.00
2	1.50	5.49	3.848	0.20(0.18)	0.90	0.4	88.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	92.35	5.49	3.848	0.20(0.11)	0.55	23.6	88.00
2	93.01	5.59	3.808	0.20(0.11)	0.55	24.0	63.00
3	93.91	5.72	3.759	0.20(0.11)	0.55	24.6	47.00
4	94.43	5.79	3.730	0.20(0.11)	0.55	24.9	45.00
5	98.50	6.44	3.513	0.20(0.11)	0.55	27.9	59.00
6	106.88	7.85	3.136	0.20(0.11)	0.55	34.6	31.00
7	109.01	8.22	3.053	0.20(0.11)	0.55	36.4	38.00
8	109.21	8.26	3.046	0.20(0.11)	0.55	36.6	80.00
9	110.42	8.51	2.992	0.20(0.11)	0.55	37.7	6.00
10	111.60	8.77	2.942	0.20(0.11)	0.55	38.9	35.00
11	111.82	8.82	2.932	0.20(0.11)	0.55	39.2	24.00
12	112.13	8.90	2.918	0.20(0.11)	0.55	39.5	46.00
13	112.79	9.08	2.884	0.20(0.11)	0.55	40.3	25.00
14	113.67	9.34	2.837	0.20(0.11)	0.56	41.4	64.00
15	114.18	9.52	2.807	0.20(0.11)	0.56	42.2	61.00
16	114.42	9.62	2.790	0.20(0.11)	0.56	42.6	32.00
17	114.69	9.74	2.770	0.20(0.11)	0.56	43.0	78.00
18	115.33	10.36	2.675	0.20(0.11)	0.56	45.1	76.00
19	115.38	10.42	2.665	0.20(0.11)	0.55	45.3	14.00
20	115.38	10.42	2.665	0.20(0.11)	0.55	45.3	82.00
21	115.42	10.50	2.654	0.20(0.11)	0.55	45.5	67.00
22	115.45	10.68	2.628	0.20(0.11)	0.55	46.1	53.00
23	115.44	10.76	2.617	0.20(0.11)	0.55	46.3	43.00
24	115.35	10.87	2.601	0.20(0.11)	0.55	46.6	33.00
25	115.31	10.90	2.597	0.20(0.11)	0.55	46.6	56.00
26	115.12	11.02	2.581	0.20(0.11)	0.55	46.9	41.00
27	113.60	11.74	2.489	0.20(0.11)	0.55	48.2	13.00
28	112.53	12.21	2.433	0.20(0.11)	0.55	49.1	19.00
29	112.47	12.24	2.431	0.20(0.11)	0.55	49.1	29.00

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    30      112.22   12.33    2.420  0.20( 0.11) 0.55      49.2      33.00
    31      111.92   12.43    2.409  0.20( 0.11) 0.55      49.4      73.00
    32      109.64   13.14    2.334  0.20( 0.11) 0.55      50.1      16.00
    33      108.64   13.45    2.303  0.20( 0.11) 0.55      50.4      17.00
    34      106.89   13.99    2.251  0.20( 0.11) 0.55      50.9      22.00
    35      106.62   14.07    2.244  0.20( 0.11) 0.55      51.0      10.00
    36      105.59   14.34    2.220  0.20( 0.11) 0.55      51.1       7.00
    37      101.60   15.36    2.134  0.20( 0.11) 0.55      51.5       4.00
    38       95.38   17.06    2.010  0.20( 0.11) 0.55      51.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     115.45    Tc(MIN.) =    10.68
  EFFECTIVE AREA(ACRES) =      46.06   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.98
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     115.45
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.81
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.547
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20      0.100    75    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
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  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.82   Tc(MIN.) =    8.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.77
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.15
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
```

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------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.092
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.24      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.07
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =    8.04
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    3.25
  EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   8.96
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.77
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.56    8.15    3.069  0.20( 0.02) 0.10       0.6      85.00
      2        4.77    8.80    2.937  0.20( 0.18) 0.90       1.8      92.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

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  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.19    8.15    3.069  0.20( 0.14) 0.70       2.3      85.00
      2        6.27    8.80    2.937  0.20( 0.14) 0.71       2.4      92.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.27    Tc(MIN.) =     8.80
  EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        2.4
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.27
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.19    8.17    3.063  0.20( 0.14) 0.70       2.3      85.00
      2        6.27    8.82    2.932  0.20( 0.14) 0.71       2.4      92.00
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       92.35    5.63    3.794  0.20( 0.11) 0.55      23.6      88.00
      2       93.01    5.73    3.756  0.20( 0.11) 0.55      24.0      63.00
      3       93.91    5.85    3.709  0.20( 0.11) 0.55      24.6      47.00
      4       94.43    5.93    3.681  0.20( 0.11) 0.55      24.9      45.00
      5       98.50    6.57    3.471  0.20( 0.11) 0.55      27.9      59.00
      6      106.88    7.98    3.105  0.20( 0.11) 0.55      34.6      31.00
      7      109.01    8.35    3.026  0.20( 0.11) 0.55      36.4      38.00
      8      109.21    8.39    3.018  0.20( 0.11) 0.55      36.6      80.00
      9      110.42    8.64    2.966  0.20( 0.11) 0.55      37.7       6.00
     10      111.60    8.90    2.917  0.20( 0.11) 0.55      38.9      35.00
     11      111.82    8.95    2.908  0.20( 0.11) 0.55      39.2      24.00
     12      112.13    9.03    2.894  0.20( 0.11) 0.55      39.5      46.00
     13      112.79    9.21    2.861  0.20( 0.11) 0.55      40.3      25.00
     14      113.67    9.47    2.815  0.20( 0.11) 0.56      41.4      64.00
     15      114.18    9.65    2.785  0.20( 0.11) 0.56      42.2      61.00
     16      114.42    9.75    2.768  0.20( 0.11) 0.56      42.6      32.00
     17      114.69    9.87    2.749  0.20( 0.11) 0.56      43.0      78.00
     18      115.33   10.48    2.656  0.20( 0.11) 0.56      45.1      76.00
     19      115.38   10.55    2.646  0.20( 0.11) 0.55      45.3      14.00
     20      115.38   10.55    2.646  0.20( 0.11) 0.55      45.3      82.00
     21      115.42   10.63    2.635  0.20( 0.11) 0.55      45.5      67.00
     22      115.45   10.81    2.610  0.20( 0.11) 0.55      46.1      53.00
     23      115.44   10.88    2.599  0.20( 0.11) 0.55      46.3      43.00
     24      115.35   11.00    2.583  0.20( 0.11) 0.55      46.6      33.00
     25      115.31   11.03    2.579  0.20( 0.11) 0.55      46.6      56.00
     26      115.12   11.15    2.564  0.20( 0.11) 0.55      46.9      41.00
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    27      113.60   11.87    2.474  0.20( 0.11) 0.55      48.2      13.00
    28      112.53   12.34    2.419  0.20( 0.11) 0.55      49.1      19.00
    29      112.47   12.37    2.416  0.20( 0.11) 0.55      49.1      29.00
    30      112.22   12.46    2.405  0.20( 0.11) 0.55      49.2      33.00
    31      111.92   12.56    2.394  0.20( 0.11) 0.55      49.4      73.00
    32      109.64   13.27    2.321  0.20( 0.11) 0.55      50.1      16.00
    33      108.64   13.58    2.290  0.20( 0.11) 0.55      50.4      17.00
    34      106.89   14.13    2.239  0.20( 0.11) 0.55      50.9      22.00
    35      106.62   14.20    2.232  0.20( 0.11) 0.55      51.0      10.00
    36      105.59   14.47    2.208  0.20( 0.11) 0.55      51.1       7.00
    37      101.60   15.49    2.124  0.20( 0.11) 0.55      51.5       4.00
    38       95.38   17.19    2.001  0.20( 0.11) 0.55      51.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       97.68    5.63    3.794  0.20( 0.11) 0.56      25.1      88.00
      2       98.38    5.73    3.756  0.20( 0.11) 0.56      25.6      63.00
      3       99.32    5.85    3.709  0.20( 0.11) 0.56      26.2      47.00
      4       99.88    5.93    3.681  0.20( 0.11) 0.56      26.6      45.00
      5      104.17    6.57    3.471  0.20( 0.11) 0.56      29.7      59.00
      6      113.02    7.98    3.105  0.20( 0.11) 0.56      36.8      31.00
      7      114.18    8.17    3.063  0.20( 0.11) 0.56      37.8      85.00
      8      115.23    8.35    3.026  0.20( 0.11) 0.56      38.7      38.00
      9      115.43    8.39    3.018  0.20( 0.11) 0.56      38.9      80.00
     10      116.66    8.64    2.966  0.20( 0.11) 0.56      40.1       6.00
     11      117.50    8.82    2.932  0.20( 0.11) 0.56      40.9      92.00
     12      117.83    8.90    2.917  0.20( 0.11) 0.56      41.3      35.00
     13      118.03    8.95    2.908  0.20( 0.11) 0.56      41.6      24.00
     14      118.31    9.03    2.894  0.20( 0.11) 0.56      41.9      46.00
     15      118.89    9.21    2.861  0.20( 0.11) 0.56      42.7      25.00
     16      119.67    9.47    2.815  0.20( 0.11) 0.56      43.8      64.00
     17      120.11    9.65    2.785  0.20( 0.11) 0.56      44.6      61.00
     18      120.32    9.75    2.768  0.20( 0.11) 0.56      44.9      32.00
     19      120.55    9.87    2.749  0.20( 0.11) 0.56      45.4      78.00
     20      120.97   10.48    2.656  0.20( 0.11) 0.56      47.5      76.00
     21      121.01   10.55    2.646  0.20( 0.11) 0.56      47.7      14.00
     22      121.01   10.55    2.646  0.20( 0.11) 0.56      47.7      82.00
     23      121.02   10.63    2.635  0.20( 0.11) 0.56      47.9      67.00
     24      120.99   10.81    2.610  0.20( 0.11) 0.56      48.5      53.00
     25      120.96   10.88    2.599  0.20( 0.11) 0.56      48.7      43.00
     26      120.83   11.00    2.583  0.20( 0.11) 0.56      49.0      33.00
     27      120.78   11.03    2.579  0.20( 0.11) 0.56      49.0      56.00
     28      120.56   11.15    2.564  0.20( 0.11) 0.56      49.3      41.00
     29      118.84   11.87    2.474  0.20( 0.11) 0.56      50.6      13.00
     30      117.64   12.34    2.419  0.20( 0.11) 0.56      51.4      19.00
     31      117.58   12.37    2.416  0.20( 0.11) 0.56      51.5      29.00
     32      117.30   12.46    2.405  0.20( 0.11) 0.56      51.6      33.00
     33      116.97   12.56    2.394  0.20( 0.11) 0.56      51.7      73.00
     34      114.53   13.27    2.321  0.20( 0.11) 0.56      52.5      16.00
     35      113.47   13.58    2.290  0.20( 0.11) 0.56      52.8      17.00
     36      111.60   14.13    2.239  0.20( 0.11) 0.56      53.3      22.00
     37      111.31   14.20    2.232  0.20( 0.11) 0.56      53.4      10.00
     38      110.23   14.47    2.208  0.20( 0.11) 0.56      53.5       7.00
     39      106.05   15.49    2.124  0.20( 0.11) 0.56      53.8       4.00
     40       99.55   17.19    2.001  0.20( 0.11) 0.56      54.1       1.00
    TOTAL AREA(ACRES) =        54.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      121.02  Tc(MIN.) =   10.629
  EFFECTIVE AREA(ACRES) =     47.92  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       54.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     121.02
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.71
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.71
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      47.92
  TOTAL STREAM AREA(ACRES) =      54.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     121.02

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.138
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.14      0.20     0.900    75    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.03
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      3.03

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.063
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        5.08      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.65
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    8.18
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   13.18
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      16.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   9.97
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.14
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.25
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.14

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.95      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.49
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      2.49

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =   11.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.538
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.69      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    3.71
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       5.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.02
  FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.35
  RAINFALL INTENSITY(INCH/HR) =   2.54
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       97.68    5.71    3.763  0.20( 0.11) 0.56      25.1      88.00
      1       98.38    5.81    3.725  0.20( 0.11) 0.56      25.6      63.00
      1       99.32    5.94    3.680  0.20( 0.11) 0.56      26.2      47.00
      1       99.88    6.01    3.652  0.20( 0.11) 0.56      26.6      45.00
      1      104.17    6.65    3.447  0.20( 0.11) 0.56      29.7      59.00
      1      113.02    8.06    3.088  0.20( 0.11) 0.56      36.8      31.00
      1      114.18    8.25    3.047  0.20( 0.11) 0.56      37.8      85.00
      1      115.23    8.43    3.010  0.20( 0.11) 0.56      38.7      38.00
      1      115.43    8.46    3.002  0.20( 0.11) 0.56      38.9      80.00
      1      116.66    8.72    2.951  0.20( 0.11) 0.56      40.1       6.00
```

1	117.50	8.90	2.918	0.20(0.11)	0.56	40.9	92.00
1	117.83	8.98	2.903	0.20(0.11)	0.56	41.3	35.00
1	118.03	9.03	2.893	0.20(0.11)	0.56	41.6	24.00
1	118.31	9.11	2.879	0.20(0.11)	0.56	41.9	46.00
1	118.89	9.29	2.847	0.20(0.11)	0.56	42.7	25.00
1	119.67	9.55	2.802	0.20(0.11)	0.56	43.8	64.00
1	120.11	9.73	2.772	0.20(0.11)	0.56	44.6	61.00
1	120.32	9.83	2.756	0.20(0.11)	0.56	44.9	32.00
1	120.55	9.95	2.736	0.20(0.11)	0.56	45.4	78.00
1	120.97	10.56	2.645	0.20(0.11)	0.56	47.5	76.00
1	121.01	10.63	2.635	0.20(0.11)	0.56	47.7	14.00
1	121.01	10.63	2.635	0.20(0.11)	0.56	47.7	82.00
1	121.02	10.71	2.624	0.20(0.11)	0.56	47.9	67.00
1	120.99	10.89	2.599	0.20(0.11)	0.56	48.5	53.00
1	120.96	10.96	2.589	0.20(0.11)	0.56	48.7	43.00
1	120.83	11.08	2.573	0.20(0.11)	0.56	49.0	33.00
1	120.78	11.11	2.569	0.20(0.11)	0.56	49.0	56.00
1	120.56	11.23	2.553	0.20(0.11)	0.56	49.3	41.00
1	118.84	11.95	2.464	0.20(0.11)	0.56	50.6	13.00
1	117.64	12.42	2.410	0.20(0.11)	0.56	51.4	19.00
1	117.58	12.45	2.407	0.20(0.11)	0.56	51.5	29.00
1	117.30	12.54	2.397	0.20(0.11)	0.56	51.6	33.00
1	116.97	12.64	2.386	0.20(0.11)	0.56	51.7	73.00
1	114.53	13.35	2.313	0.20(0.11)	0.56	52.5	16.00
1	113.47	13.66	2.282	0.20(0.11)	0.56	52.8	17.00
1	111.60	14.21	2.232	0.20(0.11)	0.56	53.3	22.00
1	111.31	14.28	2.225	0.20(0.11)	0.56	53.4	10.00
1	110.23	14.55	2.201	0.20(0.11)	0.56	53.5	7.00
1	106.05	15.57	2.117	0.20(0.11)	0.56	53.8	4.00
1	99.55	17.27	1.995	0.20(0.11)	0.56	54.1	1.00
2	16.14	8.25	3.047	0.20(0.18)	0.90	6.2	97.00
3	5.77	11.35	2.538	0.20(0.11)	0.54	2.6	100.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	116.00	5.71	3.763	0.20(0.12)	0.61	30.7	88.00
2	116.83	5.81	3.725	0.20(0.12)	0.61	31.3	63.00
3	117.93	5.94	3.680	0.20(0.12)	0.61	32.0	47.00
4	118.58	6.01	3.652	0.20(0.12)	0.61	32.5	45.00
5	123.65	6.65	3.447	0.20(0.12)	0.61	36.3	59.00
6	134.04	8.06	3.088	0.20(0.12)	0.61	44.7	31.00
7	135.39	8.25	3.047	0.20(0.12)	0.61	45.9	85.00
8	135.40	8.25	3.047	0.20(0.12)	0.61	45.9	97.00
9	136.28	8.43	3.010	0.20(0.12)	0.61	46.8	38.00
10	136.45	8.46	3.002	0.20(0.12)	0.61	47.0	80.00
11	137.46	8.72	2.951	0.20(0.12)	0.60	48.3	6.00
12	138.14	8.90	2.918	0.20(0.12)	0.60	49.2	92.00
13	138.41	8.98	2.903	0.20(0.12)	0.60	49.6	35.00
14	138.57	9.03	2.893	0.20(0.12)	0.60	49.9	24.00
15	138.79	9.11	2.879	0.20(0.12)	0.60	50.2	46.00
16	139.23	9.29	2.847	0.20(0.12)	0.60	51.1	25.00
17	139.81	9.55	2.802	0.20(0.12)	0.60	52.3	64.00
18	140.13	9.73	2.772	0.20(0.12)	0.60	53.0	61.00
19	140.27	9.83	2.756	0.20(0.12)	0.60	53.5	32.00
20	140.41	9.95	2.736	0.20(0.12)	0.60	53.9	78.00
21	140.46	10.56	2.645	0.20(0.12)	0.60	56.1	76.00
22	140.45	10.63	2.635	0.20(0.12)	0.60	56.4	14.00
23	140.45	10.63	2.635	0.20(0.12)	0.60	56.4	82.00
24	140.42	10.71	2.624	0.20(0.12)	0.60	56.6	67.00
25	140.29	10.89	2.599	0.20(0.12)	0.60	57.2	53.00
26	140.21	10.96	2.589	0.20(0.12)	0.60	57.4	43.00
27	140.02	11.08	2.573	0.20(0.12)	0.60	57.8	33.00
28	139.96	11.11	2.569	0.20(0.12)	0.60	57.8	56.00
29	139.67	11.23	2.553	0.20(0.12)	0.60	58.1	41.00
30	139.31	11.35	2.538	0.20(0.12)	0.60	58.4	100.00
31	137.30	11.95	2.464	0.20(0.12)	0.60	59.5	13.00
32	135.67	12.42	2.410	0.20(0.12)	0.60	60.3	19.00

```
    33      135.58   12.45    2.407  0.20( 0.12) 0.60      60.3      29.00
    34      135.22   12.54    2.397  0.20( 0.12) 0.59      60.5      33.00
    35      134.81   12.64    2.386  0.20( 0.12) 0.59      60.6      73.00
    36      131.78   13.35    2.313  0.20( 0.12) 0.59      61.4      16.00
    37      130.47   13.66    2.282  0.20( 0.12) 0.59      61.7      17.00
    38      128.20   14.21    2.232  0.20( 0.12) 0.59      62.2      22.00
    39      127.86   14.28    2.225  0.20( 0.12) 0.59      62.2      10.00
    40      126.58   14.55    2.201  0.20( 0.12) 0.59      62.4       7.00
    41      121.74   15.57    2.117  0.20( 0.12) 0.59      62.7       4.00
    42      114.26   17.27    1.995  0.20( 0.12) 0.59      62.9       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     140.46    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      56.14   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       62.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.66
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     140.46
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.14
  TOTAL STREAM AREA(ACRES) =      62.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     140.46

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.44      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      1.54

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.54

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      116.00    5.79    3.731  0.20( 0.12) 0.61      30.7      88.00
      1      116.83    5.89    3.695  0.20( 0.12) 0.61      31.3      63.00
      1      117.93    6.02    3.650  0.20( 0.12) 0.61      32.0      47.00
      1      118.58    6.10    3.623  0.20( 0.12) 0.61      32.5      45.00
      1      123.65    6.74    3.422  0.20( 0.12) 0.61      36.3      59.00
      1      134.04    8.14    3.070  0.20( 0.12) 0.61      44.7      31.00
      1      135.39    8.33    3.030  0.20( 0.12) 0.61      45.9      85.00
      1      135.40    8.33    3.030  0.20( 0.12) 0.61      45.9      97.00
      1      136.28    8.51    2.993  0.20( 0.12) 0.61      46.8      38.00
      1      136.45    8.55    2.986  0.20( 0.12) 0.61      47.0      80.00
      1      137.46    8.80    2.936  0.20( 0.12) 0.60      48.3       6.00
      1      138.14    8.98    2.903  0.20( 0.12) 0.60      49.2      92.00
      1      138.41    9.06    2.888  0.20( 0.12) 0.60      49.6      35.00
      1      138.57    9.11    2.879  0.20( 0.12) 0.60      49.9      24.00
      1      138.79    9.19    2.865  0.20( 0.12) 0.60      50.2      46.00
      1      139.23    9.37    2.833  0.20( 0.12) 0.60      51.1      25.00
      1      139.81    9.63    2.788  0.20( 0.12) 0.60      52.3      64.00
      1      140.13    9.81    2.759  0.20( 0.12) 0.60      53.0      61.00
      1      140.27    9.91    2.743  0.20( 0.12) 0.60      53.5      32.00
      1      140.41   10.03    2.724  0.20( 0.12) 0.60      53.9      78.00
      1      140.46   10.64    2.633  0.20( 0.12) 0.60      56.1      76.00
      1      140.45   10.71    2.624  0.20( 0.12) 0.60      56.4      14.00
      1      140.45   10.71    2.623  0.20( 0.12) 0.60      56.4      82.00
      1      140.42   10.79    2.613  0.20( 0.12) 0.60      56.6      67.00
      1      140.29   10.97    2.588  0.20( 0.12) 0.60      57.2      53.00
      1      140.21   11.04    2.578  0.20( 0.12) 0.60      57.4      43.00
      1      140.02   11.16    2.562  0.20( 0.12) 0.60      57.8      33.00
      1      139.96   11.19    2.559  0.20( 0.12) 0.60      57.8      56.00
      1      139.67   11.31    2.543  0.20( 0.12) 0.60      58.1      41.00
      1      139.31   11.43    2.527  0.20( 0.12) 0.60      58.4     100.00
      1      137.30   12.03    2.455  0.20( 0.12) 0.60      59.5      13.00
      1      135.67   12.50    2.401  0.20( 0.12) 0.60      60.3      19.00
      1      135.58   12.53    2.398  0.20( 0.12) 0.60      60.3      29.00
      1      135.22   12.62    2.388  0.20( 0.12) 0.59      60.5      33.00
      1      134.81   12.72    2.377  0.20( 0.12) 0.59      60.6      73.00
      1      131.78   13.43    2.305  0.20( 0.12) 0.59      61.4      16.00
      1      130.47   13.74    2.274  0.20( 0.12) 0.59      61.7      17.00
      1      128.20   14.29    2.224  0.20( 0.12) 0.59      62.2      22.00
```

1	127.86	14.37	2.217	0.20(0.12)	0.59	62.2	10.00
1	126.58	14.64	2.194	0.20(0.12)	0.59	62.4	7.00
1	121.74	15.66	2.111	0.20(0.12)	0.59	62.7	4.00
1	114.26	17.36	1.990	0.20(0.12)	0.59	62.9	1.00
2	1.54	5.28	3.937	0.20(0.18)	0.90	0.4	104.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	113.19	5.28	3.937	0.20(0.12)	0.61	28.4	104.00
2	117.45	5.79	3.731	0.20(0.12)	0.61	31.2	88.00
3	118.26	5.89	3.695	0.20(0.12)	0.61	31.7	63.00
4	119.35	6.02	3.650	0.20(0.12)	0.61	32.5	47.00
5	119.99	6.10	3.623	0.20(0.12)	0.61	32.9	45.00
6	124.98	6.74	3.422	0.20(0.12)	0.61	36.7	59.00
7	135.22	8.14	3.070	0.20(0.12)	0.61	45.2	31.00
8	136.56	8.33	3.030	0.20(0.12)	0.61	46.3	85.00
9	136.56	8.33	3.030	0.20(0.12)	0.61	46.3	97.00
10	137.43	8.51	2.993	0.20(0.12)	0.61	47.3	38.00
11	137.60	8.55	2.986	0.20(0.12)	0.61	47.5	80.00
12	138.58	8.80	2.936	0.20(0.12)	0.61	48.8	6.00
13	139.26	8.98	2.903	0.20(0.12)	0.61	49.7	92.00
14	139.52	9.06	2.888	0.20(0.12)	0.61	50.1	35.00
15	139.67	9.11	2.879	0.20(0.12)	0.61	50.3	24.00
16	139.88	9.19	2.865	0.20(0.12)	0.61	50.7	46.00
17	140.32	9.37	2.833	0.20(0.12)	0.61	51.5	25.00
18	140.88	9.63	2.788	0.20(0.12)	0.60	52.7	64.00
19	141.18	9.81	2.759	0.20(0.12)	0.60	53.5	61.00
20	141.32	9.91	2.743	0.20(0.12)	0.60	53.9	32.00
21	141.45	10.03	2.724	0.20(0.12)	0.60	54.4	78.00
22	141.46	10.64	2.633	0.20(0.12)	0.60	56.6	76.00
23	141.45	10.71	2.624	0.20(0.12)	0.60	56.8	14.00
24	141.45	10.71	2.623	0.20(0.12)	0.60	56.8	82.00
25	141.41	10.79	2.613	0.20(0.12)	0.60	57.1	67.00
26	141.28	10.97	2.588	0.20(0.12)	0.60	57.6	53.00
27	141.19	11.04	2.578	0.20(0.12)	0.60	57.9	43.00
28	140.99	11.16	2.562	0.20(0.12)	0.60	58.2	33.00
29	140.93	11.19	2.559	0.20(0.12)	0.60	58.3	56.00
30	140.63	11.31	2.543	0.20(0.12)	0.60	58.6	41.00
31	140.27	11.43	2.527	0.20(0.12)	0.60	58.8	100.00
32	138.23	12.03	2.455	0.20(0.12)	0.60	59.9	13.00
33	136.57	12.50	2.401	0.20(0.12)	0.60	60.7	19.00
34	136.49	12.53	2.398	0.20(0.12)	0.60	60.8	29.00
35	136.12	12.62	2.388	0.20(0.12)	0.60	60.9	33.00
36	135.70	12.72	2.377	0.20(0.12)	0.60	61.0	73.00
37	132.64	13.43	2.305	0.20(0.12)	0.60	61.8	16.00
38	131.33	13.74	2.274	0.20(0.12)	0.60	62.1	17.00
39	129.03	14.29	2.224	0.20(0.12)	0.60	62.6	22.00
40	128.69	14.37	2.217	0.20(0.12)	0.60	62.7	10.00
41	127.40	14.64	2.194	0.20(0.12)	0.60	62.8	7.00
42	122.53	15.66	2.111	0.20(0.12)	0.60	63.1	4.00
43	115.00	17.36	1.990	0.20(0.12)	0.60	63.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 141.46 Tc(MIN.) = 10.64
EFFECTIVE AREA(ACRES) = 56.58 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 63.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 106.00 = 3485.00 FEET.

****
FLOW PROCESS FROM NODE 106.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 420.30
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013

```
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.78
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     141.46
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.58
  TOTAL STREAM AREA(ACRES) =      63.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     141.46

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.771
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20      0.100    75    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =    7.10
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.322
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.35      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.04
  EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.99

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   3.32
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.67
  TOTAL STREAM AREA(ACRES) =       0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      113.19    5.60    3.805  0.20( 0.12) 0.61      28.4     104.00
      1      117.45    6.11    3.618  0.20( 0.12) 0.61      31.2      88.00
      1      118.26    6.21    3.584  0.20( 0.12) 0.61      31.7      63.00
      1      119.35    6.34    3.543  0.20( 0.12) 0.61      32.5      47.00
      1      119.99    6.42    3.519  0.20( 0.12) 0.61      32.9      45.00
      1      124.98    7.06    3.333  0.20( 0.12) 0.61      36.7      59.00
      1      135.22    8.45    3.006  0.20( 0.12) 0.61      45.2      31.00
      1      136.56    8.64    2.968  0.20( 0.12) 0.61      46.3      85.00
      1      136.56    8.64    2.967  0.20( 0.12) 0.61      46.3      97.00
      1      137.43    8.82    2.933  0.20( 0.12) 0.61      47.3      38.00
      1      137.60    8.85    2.926  0.20( 0.12) 0.61      47.5      80.00
      1      138.58    9.11    2.879  0.20( 0.12) 0.61      48.8       6.00
      1      139.26    9.29    2.847  0.20( 0.12) 0.61      49.7      92.00
      1      139.52    9.37    2.833  0.20( 0.12) 0.61      50.1      35.00
      1      139.67    9.42    2.825  0.20( 0.12) 0.61      50.3      24.00
      1      139.88    9.49    2.812  0.20( 0.12) 0.61      50.7      46.00
      1      140.32    9.67    2.781  0.20( 0.12) 0.61      51.5      25.00
      1      140.88    9.94    2.739  0.20( 0.12) 0.60      52.7      64.00
      1      141.18   10.12    2.711  0.20( 0.12) 0.60      53.5      61.00
      1      141.32   10.22    2.695  0.20( 0.12) 0.60      53.9      32.00
      1      141.45   10.34    2.677  0.20( 0.12) 0.60      54.4      78.00
      1      141.46   10.95    2.591  0.20( 0.12) 0.60      56.6      76.00
      1      141.45   11.02    2.582  0.20( 0.12) 0.60      56.8      14.00
      1      141.45   11.02    2.581  0.20( 0.12) 0.60      56.8      82.00
      1      141.41   11.09    2.571  0.20( 0.12) 0.60      57.1      67.00
      1      141.28   11.27    2.548  0.20( 0.12) 0.60      57.6      53.00
      1      141.19   11.35    2.538  0.20( 0.12) 0.60      57.9      43.00
      1      140.99   11.47    2.523  0.20( 0.12) 0.60      58.2      33.00
      1      140.93   11.50    2.519  0.20( 0.12) 0.60      58.3      56.00
      1      140.63   11.62    2.504  0.20( 0.12) 0.60      58.6      41.00
      1      140.27   11.74    2.489  0.20( 0.12) 0.60      58.8     100.00
      1      138.23   12.33    2.420  0.20( 0.12) 0.60      59.9      13.00
      1      136.57   12.81    2.368  0.20( 0.12) 0.60      60.7      19.00
      1      136.49   12.84    2.365  0.20( 0.12) 0.60      60.8      29.00
      1      136.12   12.93    2.355  0.20( 0.12) 0.60      60.9      33.00
```

1	135.70	13.03	2.345	0.20(0.12)	0.60	61.0	73.00
1	132.64	13.74	2.275	0.20(0.12)	0.60	61.8	16.00
1	131.33	14.06	2.245	0.20(0.12)	0.60	62.1	17.00
1	129.03	14.61	2.196	0.20(0.12)	0.60	62.6	22.00
1	128.69	14.68	2.190	0.20(0.12)	0.60	62.7	10.00
1	127.40	14.96	2.167	0.20(0.12)	0.60	62.8	7.00
1	122.53	15.98	2.086	0.20(0.12)	0.60	63.1	4.00
1	115.00	17.68	1.969	0.20(0.12)	0.60	63.4	1.00
2	1.99	7.10	3.322	0.20(0.02)	0.10	0.7	95.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	114.99	5.60	3.805	0.20(0.12)	0.60	29.0	104.00
2	119.32	6.11	3.618	0.20(0.12)	0.60	31.8	88.00
3	120.15	6.21	3.584	0.20(0.12)	0.60	32.3	63.00
4	121.25	6.34	3.543	0.20(0.12)	0.60	33.1	47.00
5	121.90	6.42	3.519	0.20(0.12)	0.60	33.5	45.00
6	126.96	7.06	3.333	0.20(0.12)	0.60	37.4	59.00
7	127.26	7.10	3.322	0.20(0.12)	0.60	37.7	95.00
8	137.02	8.45	3.006	0.20(0.12)	0.60	45.8	31.00
9	138.34	8.64	2.968	0.20(0.12)	0.60	47.0	85.00
10	138.34	8.64	2.967	0.20(0.12)	0.60	47.0	97.00
11	139.19	8.82	2.933	0.20(0.12)	0.60	48.0	38.00
12	139.35	8.85	2.926	0.20(0.12)	0.60	48.2	80.00
13	140.31	9.11	2.879	0.20(0.12)	0.60	49.4	6.00
14	140.96	9.29	2.847	0.20(0.12)	0.60	50.3	92.00
15	141.22	9.37	2.833	0.20(0.12)	0.60	50.7	35.00
16	141.36	9.42	2.825	0.20(0.12)	0.60	51.0	24.00
17	141.57	9.49	2.812	0.20(0.12)	0.60	51.4	46.00
18	141.98	9.67	2.781	0.20(0.12)	0.60	52.2	25.00
19	142.52	9.94	2.739	0.20(0.12)	0.60	53.4	64.00
20	142.81	10.12	2.711	0.20(0.12)	0.60	54.1	61.00
21	142.93	10.22	2.695	0.20(0.12)	0.60	54.6	32.00
22	143.06	10.34	2.677	0.20(0.12)	0.60	55.1	78.00
23	143.01	10.95	2.591	0.20(0.12)	0.60	57.3	76.00
24	143.00	11.02	2.582	0.20(0.12)	0.60	57.5	14.00
25	143.00	11.02	2.581	0.20(0.12)	0.60	57.5	82.00
26	142.95	11.09	2.571	0.20(0.12)	0.60	57.7	67.00
27	142.80	11.27	2.548	0.20(0.12)	0.59	58.3	53.00
28	142.71	11.35	2.538	0.20(0.12)	0.59	58.5	43.00
29	142.50	11.47	2.523	0.20(0.12)	0.59	58.9	33.00
30	142.44	11.50	2.519	0.20(0.12)	0.59	58.9	56.00
31	142.13	11.62	2.504	0.20(0.12)	0.59	59.2	41.00
32	141.76	11.74	2.489	0.20(0.12)	0.59	59.5	100.00
33	139.68	12.33	2.420	0.20(0.12)	0.59	60.6	13.00
34	137.99	12.81	2.368	0.20(0.12)	0.59	61.4	19.00
35	137.90	12.84	2.365	0.20(0.12)	0.59	61.5	29.00
36	137.53	12.93	2.355	0.20(0.12)	0.59	61.6	33.00
37	137.11	13.03	2.345	0.20(0.12)	0.59	61.7	73.00
38	134.00	13.74	2.275	0.20(0.12)	0.59	62.5	16.00
39	132.67	14.06	2.245	0.20(0.12)	0.59	62.8	17.00
40	130.35	14.61	2.196	0.20(0.12)	0.59	63.3	22.00
41	130.00	14.68	2.190	0.20(0.12)	0.59	63.4	10.00
42	128.70	14.96	2.167	0.20(0.12)	0.59	63.5	7.00
43	123.77	15.98	2.086	0.20(0.12)	0.59	63.8	4.00
44	116.17	17.68	1.969	0.20(0.12)	0.59	64.1	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 143.06 Tc(MIN.) = 10.34
EFFECTIVE AREA(ACRES) = 55.06 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 64.1
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 108.00 = 3830.00 FEET.

****
FLOW PROCESS FROM NODE 108.00 TO NODE 140.00 IS CODE = 31

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  42.18
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     143.06
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.133
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.93      0.20     0.900    75    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.47
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.47

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.972
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.84      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.88
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    8.62
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    2.11
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =  10.48
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.45
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    75    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

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 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    9.86
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
 STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =   10.81
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.609
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    0.99
 EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        1.0         PEAK FLOW RATE(CFS) =       2.37

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
 FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
 LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.81
 RAINFALL INTENSITY(INCH/HR) =   2.61
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.05
 TOTAL STREAM AREA(ACRES) =       1.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.37

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.45   10.45    2.661  0.20( 0.18) 0.90       1.8      97.00
     2        2.37   10.81    2.609  0.20( 0.10) 0.50       1.0     111.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        6.79   10.45    2.661  0.20( 0.15) 0.75       2.8      97.00
     2        6.73   10.81    2.609  0.20( 0.15) 0.75       2.8     111.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.79    Tc(MIN.) =    10.45
 EFFECTIVE AREA(ACRES) =       2.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.75
 TOTAL AREA(ACRES) =        2.8
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.964
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    75    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    9.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.813
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.20
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.81
  FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.09

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.279
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.09
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.09

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    9.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    8.17
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.064
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.05
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  3.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.17
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.09    9.48    2.813  0.20( 0.11) 0.56       1.3     114.00
      2        4.00    8.17    3.064  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.91    8.17    3.064  0.20( 0.11) 0.53       2.6     116.00
      2        6.75    9.48    2.813  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.91    Tc(MIN.) =     8.17
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.91
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.29
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.91    8.29    3.038  0.20( 0.11) 0.53       2.6     116.00
      2        6.75    9.61    2.793  0.20( 0.11) 0.53       2.8     114.00
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.79   10.58    2.642  0.20( 0.15) 0.75       2.8      97.00
      2        6.73   10.94    2.592  0.20( 0.15) 0.75       2.8     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.07    8.29    3.038  0.20( 0.13) 0.63       4.8     116.00
      2       13.28    9.61    2.793  0.20( 0.13) 0.64       5.3     114.00
      3       13.16   10.58    2.642  0.20( 0.13) 0.64       5.6      97.00
      4       12.97   10.94    2.592  0.20( 0.13) 0.64       5.6     111.00
    TOTAL AREA(ACRES) =         5.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       13.28  Tc(MIN.) =    9.605
  EFFECTIVE AREA(ACRES) =      5.30  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.28
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.89
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.30
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.28

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.59

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   11.16
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.68
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```
 FLOW VELOCITY(FEET/SEC.) =  2.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.16
 RAINFALL INTENSITY(INCH/HR) =   2.56
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.55
 TOTAL STREAM AREA(ACRES) =       1.55
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.07    8.58    2.979  0.20( 0.13) 0.63       4.8     116.00
     1       13.28    9.89    2.746  0.20( 0.13) 0.64       5.3     114.00
     1       13.16   10.87    2.602  0.20( 0.13) 0.64       5.6      97.00
     1       12.97   11.23    2.553  0.20( 0.13) 0.64       5.6     111.00
     2        3.43   11.16    2.562  0.20( 0.10) 0.50       1.5     120.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.16    8.58    2.979  0.20( 0.12) 0.60       6.0     116.00
     2       16.55    9.89    2.746  0.20( 0.12) 0.61       6.7     114.00
     3       16.56   10.87    2.602  0.20( 0.12) 0.61       7.1      97.00
     4       16.44   11.16    2.562  0.20( 0.12) 0.61       7.1     120.00
     5       16.39   11.23    2.553  0.20( 0.12) 0.61       7.1     111.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.56    Tc(MIN.) =    10.87
 EFFECTIVE AREA(ACRES) =       7.06   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
 TOTAL AREA(ACRES) =        7.1
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
 FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.86
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.56
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.06
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.06
```

```
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.06
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.56

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    75    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   3.77
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.28

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.992
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20      0.500    75    8.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.90
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.54
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.67
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       4.86

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.89
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       2.16
 TOTAL STREAM AREA(ACRES) =       2.16
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.86

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.16    8.77    2.942  0.20( 0.12) 0.60       6.0     116.00
     1       16.55   10.08    2.716  0.20( 0.12) 0.61       6.7     114.00
     1       16.56   11.06    2.576  0.20( 0.12) 0.61       7.1      97.00
     1       16.44   11.35    2.537  0.20( 0.12) 0.61       7.1     120.00
     1       16.39   11.42    2.529  0.20( 0.12) 0.61       7.1     111.00
     2        1.28    5.68    3.772  0.20( 0.02) 0.10       0.4     118.00
     3        4.86   10.89    2.598  0.20( 0.10) 0.50       2.2     123.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.56    5.68    3.772  0.20( 0.11) 0.55       5.4     118.00
     2       21.61    8.77    2.942  0.20( 0.11) 0.56       8.1     116.00
     3       22.18   10.08    2.716  0.20( 0.11) 0.56       9.1     114.00
     4       22.29   10.89    2.598  0.20( 0.11) 0.57       9.5     123.00
     5       22.24   11.06    2.576  0.20( 0.11) 0.57       9.6      97.00
     6       22.04   11.35    2.537  0.20( 0.11) 0.57       9.7     120.00
     7       21.97   11.42    2.529  0.20( 0.11) 0.57       9.7     111.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      22.29    Tc(MIN.) =    10.89
 EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =        9.7
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.29
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.92
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
 FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.54
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.29
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.23
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
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==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.59      0.20     0.900    75    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      1.44

******************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =   10.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.589
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.34
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.45
  FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
------------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.62

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.300
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    8.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.89      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
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```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       4.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.59
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.62   10.96    2.589  0.20( 0.12) 0.61       2.1     127.00
      2        4.17    8.39    3.018  0.20( 0.10) 0.50       1.6     129.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.32    8.39    3.018  0.20( 0.11) 0.56       3.2     129.00
      2        8.18   10.96    2.589  0.20( 0.11) 0.56       3.7     127.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.32    Tc(MIN.) =     8.39
  EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.32
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.45
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        8.32    8.45    3.006  0.20( 0.11) 0.56       3.2     129.00
    2        8.18   11.02    2.581  0.20( 0.11) 0.56       3.7     127.00
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       18.56    6.04    3.642  0.20( 0.11) 0.55       5.4     118.00
    2       21.61    9.12    2.876  0.20( 0.11) 0.56       8.1     116.00
    3       22.18   10.42    2.665  0.20( 0.11) 0.56       9.1     114.00
    4       22.29   11.23    2.553  0.20( 0.11) 0.57       9.5     123.00
    5       22.24   11.40    2.532  0.20( 0.11) 0.57       9.6      97.00
    6       22.04   11.69    2.495  0.20( 0.11) 0.57       9.7     120.00
    7       21.97   11.77    2.485  0.20( 0.11) 0.57       9.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       25.82    6.04    3.642  0.20( 0.11) 0.55       7.7     118.00
    2       29.26    8.45    3.006  0.20( 0.11) 0.56      10.7     129.00
    3       29.89    9.12    2.876  0.20( 0.11) 0.56      11.4     116.00
    4       30.39   10.42    2.665  0.20( 0.11) 0.56      12.6     114.00
    5       30.44   11.02    2.581  0.20( 0.11) 0.56      13.1     127.00
    6       30.38   11.23    2.553  0.20( 0.11) 0.57      13.2     123.00
    7       30.26   11.40    2.532  0.20( 0.11) 0.57      13.3      97.00
    8       29.93   11.69    2.495  0.20( 0.11) 0.57      13.3     120.00
    9       29.83   11.77    2.485  0.20( 0.11) 0.57      13.4     111.00
  TOTAL AREA(ACRES) =        13.4

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       30.44  Tc(MIN.) =   11.019
 EFFECTIVE AREA(ACRES) =     13.08  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       13.4
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      30.44
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.17
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.17
 RAINFALL INTENSITY(INCH/HR) =   2.56
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
```

```
  EFFECTIVE STREAM AREA(ACRES) =      13.08
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.44

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    75    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   3.52
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.82    6.20    3.589  0.20( 0.11) 0.55       7.7     118.00
      1       29.26    8.60    2.976  0.20( 0.11) 0.56      10.7     129.00
      1       29.89    9.27    2.850  0.20( 0.11) 0.56      11.4     116.00
      1       30.39   10.57    2.643  0.20( 0.11) 0.56      12.6     114.00
      1       30.44   11.17    2.562  0.20( 0.11) 0.56      13.1     127.00
      1       30.38   11.38    2.534  0.20( 0.11) 0.57      13.2     123.00
      1       30.26   11.55    2.513  0.20( 0.11) 0.57      13.3      97.00
      1       29.93   11.84    2.477  0.20( 0.11) 0.57      13.3     120.00
      1       29.83   11.92    2.467  0.20( 0.11) 0.57      13.4     111.00
      2        0.98    6.40    3.523  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.79    6.20    3.589  0.20( 0.11) 0.53       8.0     118.00
      2       27.09    6.40    3.523  0.20( 0.11) 0.53       8.2     138.00
      3       30.08    8.60    2.976  0.20( 0.11) 0.54      11.0     129.00
      4       30.68    9.27    2.850  0.20( 0.11) 0.55      11.7     116.00
      5       31.13   10.57    2.643  0.20( 0.11) 0.55      12.9     114.00
      6       31.15   11.17    2.562  0.20( 0.11) 0.55      13.4     127.00
      7       31.08   11.38    2.534  0.20( 0.11) 0.55      13.5     123.00
      8       30.95   11.55    2.513  0.20( 0.11) 0.55      13.6      97.00
      9       30.62   11.84    2.477  0.20( 0.11) 0.55      13.7     120.00
```

```
    10       30.51   11.92    2.467  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.15    Tc(MIN.) =    11.17
  EFFECTIVE AREA(ACRES) =      13.39   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.15
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.040
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"         D        0.46      0.20     0.500    75    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    9.70
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.777
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.17      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    2.80
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       3.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.91

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.267
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.08
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.08

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    8.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.041
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.28
  RAINFALL INTENSITY(INCH/HR) =   3.04
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.91    9.70    2.777  0.20( 0.11) 0.57       1.6     134.00
      2        3.79    8.28    3.041  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.45    8.28    3.041  0.20( 0.11) 0.54       2.8     136.00
      2        7.35    9.70    2.777  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.45    Tc(MIN.) =     8.28
  EFFECTIVE AREA(ACRES) =       2.82   AREA-AVERAGED Fm(INCH/HR) =  0.11
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =        3.1
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.95
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.45
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.36
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        7.45    8.36    3.025  0.20( 0.11) 0.54       2.8     136.00
     2        7.35    9.78    2.764  0.20( 0.11) 0.54       3.1     134.00
 LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       26.79    6.96    3.358  0.20( 0.11) 0.53       8.0     118.00
     2       27.09    7.17    3.303  0.20( 0.11) 0.53       8.2     138.00
     3       30.08    9.32    2.840  0.20( 0.11) 0.54      11.0     129.00
     4       30.68   10.00    2.729  0.20( 0.11) 0.55      11.7     116.00
     5       31.13   11.30    2.545  0.20( 0.11) 0.55      12.9     114.00
     6       31.15   11.89    2.471  0.20( 0.11) 0.55      13.4     127.00
     7       31.08   12.11    2.446  0.20( 0.11) 0.55      13.5     123.00
     8       30.95   12.27    2.427  0.20( 0.11) 0.55      13.6      97.00
     9       30.62   12.57    2.394  0.20( 0.11) 0.55      13.7     120.00
    10       30.51   12.65    2.385  0.20( 0.11) 0.55      13.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       33.70    6.96    3.358  0.20( 0.11) 0.53      10.3     118.00
     2       34.09    7.17    3.303  0.20( 0.11) 0.53      10.6     138.00
     3       36.19    8.36    3.025  0.20( 0.11) 0.54      12.6     136.00
     4       37.47    9.32    2.840  0.20( 0.11) 0.54      14.0     129.00
     5       37.84    9.78    2.764  0.20( 0.11) 0.54      14.5     134.00
     6       37.93   10.00    2.729  0.20( 0.11) 0.54      14.8     116.00
     7       37.87   11.30    2.545  0.20( 0.11) 0.55      16.0     114.00
     8       37.69   11.89    2.471  0.20( 0.11) 0.55      16.4     127.00
     9       37.55   12.11    2.446  0.20( 0.11) 0.55      16.6     123.00
    10       37.37   12.27    2.427  0.20( 0.11) 0.55      16.6      97.00
    11       36.94   12.57    2.394  0.20( 0.11) 0.55      16.7     120.00
    12       36.82   12.65    2.385  0.20( 0.11) 0.55      16.7     111.00
   TOTAL AREA(ACRES) =        16.7

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       37.93  Tc(MIN.) =    9.999
 EFFECTIVE AREA(ACRES) =     14.77  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       16.7
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.93
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    7.34    3.259  0.20( 0.11) 0.53      10.3     118.00
      2       34.09    7.54    3.209  0.20( 0.11) 0.53      10.6     138.00
      3       36.19    8.73    2.951  0.20( 0.11) 0.54      12.6     136.00
      4       37.47    9.69    2.778  0.20( 0.11) 0.54      14.0     129.00
      5       37.84   10.13    2.708  0.20( 0.11) 0.54      14.5     134.00
      6       37.93   10.36    2.675  0.20( 0.11) 0.54      14.8     116.00
      7       37.87   11.66    2.500  0.20( 0.11) 0.55      16.0     114.00
      8       37.69   12.25    2.429  0.20( 0.11) 0.55      16.4     127.00
      9       37.55   12.48    2.404  0.20( 0.11) 0.55      16.6     123.00
     10       37.37   12.64    2.386  0.20( 0.11) 0.55      16.6      97.00
     11       36.94   12.94    2.354  0.20( 0.11) 0.55      16.7     120.00
     12       36.82   13.02    2.346  0.20( 0.11) 0.55      16.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      114.99    5.62    3.796  0.20( 0.12) 0.60      29.0     104.00
      2      119.32    6.14    3.610  0.20( 0.12) 0.60      31.8      88.00
      3      120.15    6.24    3.577  0.20( 0.12) 0.60      32.3      63.00
      4      121.25    6.36    3.536  0.20( 0.12) 0.60      33.1      47.00
      5      121.90    6.44    3.512  0.20( 0.12) 0.60      33.5      45.00
      6      126.96    7.08    3.327  0.20( 0.12) 0.60      37.4      59.00
      7      127.26    7.12    3.316  0.20( 0.12) 0.60      37.7      95.00
      8      137.02    8.47    3.001  0.20( 0.12) 0.60      45.8      31.00
      9      138.34    8.66    2.963  0.20( 0.12) 0.60      47.0      85.00
     10      138.34    8.66    2.963  0.20( 0.12) 0.60      47.0      97.00
     11      139.19    8.84    2.929  0.20( 0.12) 0.60      48.0      38.00
     12      139.35    8.87    2.922  0.20( 0.12) 0.60      48.2      80.00
     13      140.31    9.13    2.875  0.20( 0.12) 0.60      49.4       6.00
     14      140.96    9.31    2.843  0.20( 0.12) 0.60      50.3      92.00
     15      141.22    9.39    2.830  0.20( 0.12) 0.60      50.7      35.00
     16      141.36    9.44    2.821  0.20( 0.12) 0.60      51.0      24.00
     17      141.57    9.51    2.808  0.20( 0.12) 0.60      51.4      46.00
     18      141.98    9.70    2.778  0.20( 0.12) 0.60      52.2      25.00
     19      142.52    9.96    2.735  0.20( 0.12) 0.60      53.4      64.00
     20      142.81   10.14    2.708  0.20( 0.12) 0.60      54.1      61.00
     21      142.93   10.24    2.692  0.20( 0.12) 0.60      54.6      32.00
     22      143.06   10.36    2.674  0.20( 0.12) 0.60      55.1      78.00
     23      143.01   10.97    2.588  0.20( 0.12) 0.60      57.3      76.00
```

24	143.00	11.04	2.579	0.20(0.12)	0.60	57.5	14.00
25	143.00	11.04	2.579	0.20(0.12)	0.60	57.5	82.00
26	142.95	11.11	2.569	0.20(0.12)	0.60	57.7	67.00
27	142.80	11.30	2.545	0.20(0.12)	0.59	58.3	53.00
28	142.71	11.37	2.535	0.20(0.12)	0.59	58.5	43.00
29	142.50	11.49	2.520	0.20(0.12)	0.59	58.9	33.00
30	142.44	11.52	2.517	0.20(0.12)	0.59	58.9	56.00
31	142.13	11.64	2.502	0.20(0.12)	0.59	59.2	41.00
32	141.76	11.76	2.487	0.20(0.12)	0.59	59.5	100.00
33	139.68	12.36	2.417	0.20(0.12)	0.59	60.6	13.00
34	137.99	12.83	2.366	0.20(0.12)	0.59	61.4	19.00
35	137.90	12.86	2.363	0.20(0.12)	0.59	61.5	29.00
36	137.53	12.95	2.353	0.20(0.12)	0.59	61.6	33.00
37	137.11	13.05	2.343	0.20(0.12)	0.59	61.7	73.00
38	134.00	13.76	2.273	0.20(0.12)	0.59	62.5	16.00
39	132.67	14.08	2.243	0.20(0.12)	0.59	62.8	17.00
40	130.35	14.63	2.194	0.20(0.12)	0.59	63.3	22.00
41	130.00	14.71	2.188	0.20(0.12)	0.59	63.4	10.00
42	128.70	14.98	2.165	0.20(0.12)	0.59	63.5	7.00
43	123.77	16.00	2.085	0.20(0.12)	0.59	63.8	4.00
44	116.17	17.70	1.967	0.20(0.12)	0.59	64.1	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 140.00 = 3885.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	145.22	5.62	3.796	0.20(0.12)	0.59	36.9	104.00
2	150.65	6.14	3.610	0.20(0.12)	0.59	40.4	88.00
3	151.69	6.24	3.577	0.20(0.12)	0.59	41.1	63.00
4	153.05	6.36	3.536	0.20(0.12)	0.59	42.0	47.00
5	153.86	6.44	3.512	0.20(0.12)	0.59	42.6	45.00
6	160.18	7.08	3.327	0.20(0.12)	0.59	47.3	59.00
7	160.55	7.12	3.316	0.20(0.12)	0.59	47.6	95.00
8	162.53	7.34	3.259	0.20(0.12)	0.59	49.3	118.00
9	164.38	7.54	3.209	0.20(0.12)	0.59	50.8	138.00
10	172.76	8.47	3.001	0.20(0.12)	0.59	58.0	31.00
11	174.41	8.66	2.963	0.20(0.12)	0.59	59.5	85.00
12	174.42	8.66	2.963	0.20(0.12)	0.59	59.5	97.00
13	174.84	8.73	2.951	0.20(0.12)	0.59	59.9	136.00
14	175.52	8.84	2.929	0.20(0.12)	0.59	60.7	38.00
15	175.73	8.87	2.922	0.20(0.12)	0.59	60.9	80.00
16	177.03	9.13	2.875	0.20(0.12)	0.59	62.6	6.00
17	177.92	9.31	2.843	0.20(0.12)	0.59	63.7	92.00
18	178.28	9.39	2.830	0.20(0.12)	0.59	64.3	35.00
19	178.49	9.44	2.821	0.20(0.12)	0.59	64.6	24.00
20	178.80	9.51	2.808	0.20(0.12)	0.59	65.1	46.00
21	179.45	9.69	2.778	0.20(0.12)	0.59	66.1	129.00
22	179.45	9.70	2.778	0.20(0.12)	0.59	66.2	25.00
23	180.21	9.96	2.735	0.20(0.12)	0.59	67.7	64.00
24	180.64	10.13	2.708	0.20(0.12)	0.59	68.7	134.00
25	180.64	10.14	2.708	0.20(0.12)	0.59	68.7	61.00
26	180.81	10.24	2.692	0.20(0.12)	0.59	69.2	32.00
27	180.99	10.36	2.675	0.20(0.12)	0.59	69.8	116.00
28	180.99	10.36	2.674	0.20(0.12)	0.59	69.8	78.00
29	180.91	10.97	2.588	0.20(0.12)	0.59	72.6	76.00
30	180.90	11.04	2.579	0.20(0.12)	0.59	72.9	14.00
31	180.90	11.04	2.579	0.20(0.12)	0.59	72.9	82.00
32	180.85	11.11	2.569	0.20(0.12)	0.58	73.2	67.00
33	180.69	11.30	2.545	0.20(0.12)	0.58	74.0	53.00
34	180.59	11.37	2.535	0.20(0.12)	0.58	74.3	43.00
35	180.38	11.49	2.520	0.20(0.12)	0.58	74.7	33.00
36	180.31	11.52	2.517	0.20(0.12)	0.58	74.8	56.00
37	180.00	11.64	2.502	0.20(0.12)	0.58	75.2	41.00
38	179.95	11.66	2.500	0.20(0.12)	0.58	75.2	114.00
39	179.60	11.76	2.487	0.20(0.12)	0.58	75.5	100.00
40	177.74	12.25	2.429	0.20(0.12)	0.58	76.8	127.00
41	177.30	12.36	2.417	0.20(0.12)	0.58	77.1	13.00
42	176.80	12.48	2.404	0.20(0.12)	0.58	77.4	123.00
43	176.03	12.64	2.386	0.20(0.12)	0.58	77.7	97.00
44	175.09	12.83	2.366	0.20(0.12)	0.58	78.1	19.00
45	174.96	12.86	2.363	0.20(0.12)	0.58	78.1	29.00

```
     46      174.53   12.94    2.354  0.20( 0.12) 0.58      78.3     120.00
     47      174.45   12.95    2.353  0.20( 0.12) 0.58      78.3      33.00
     48      174.06   13.02    2.346  0.20( 0.12) 0.58      78.4     111.00
     49      173.87   13.05    2.343  0.20( 0.12) 0.58      78.4      73.00
     50      169.62   13.76    2.273  0.20( 0.12) 0.58      79.2      16.00
     51      167.79   14.08    2.243  0.20( 0.12) 0.58      79.5      17.00
     52      164.66   14.63    2.194  0.20( 0.12) 0.58      80.0      22.00
     53      164.21   14.71    2.188  0.20( 0.12) 0.58      80.1      10.00
     54      162.53   14.98    2.165  0.20( 0.12) 0.58      80.2       7.00
     55      156.29   16.00    2.085  0.20( 0.12) 0.58      80.5       4.00
     56      146.75   17.70    1.967  0.20( 0.12) 0.58      80.8       1.00
    TOTAL AREA(ACRES) =        80.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      180.99  Tc(MIN.) =   10.360
  EFFECTIVE AREA(ACRES) =     69.83  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       80.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.19
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     180.99
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.53
  RAINFALL INTENSITY(INCH/HR) =   2.65
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =      69.83
  TOTAL STREAM AREA(ACRES) =      80.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     180.99

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.12      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.44

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    75    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    8.20
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       3.80

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      145.22    5.80    3.727  0.20( 0.12) 0.59      36.9     104.00
      1      150.65    6.31    3.551  0.20( 0.12) 0.59      40.4      88.00
      1      151.69    6.41    3.520  0.20( 0.12) 0.59      41.1      63.00
      1      153.05    6.54    3.480  0.20( 0.12) 0.59      42.0      47.00
      1      153.86    6.62    3.457  0.20( 0.12) 0.59      42.6      45.00
      1      160.18    7.25    3.280  0.20( 0.12) 0.59      47.3      59.00
      1      160.55    7.29    3.269  0.20( 0.12) 0.59      47.6      95.00
      1      162.53    7.51    3.215  0.20( 0.12) 0.59      49.3     118.00
      1      164.38    7.71    3.166  0.20( 0.12) 0.59      50.8     138.00
      1      172.76    8.64    2.967  0.20( 0.12) 0.59      58.0      31.00
      1      174.41    8.83    2.930  0.20( 0.12) 0.59      59.5      85.00
      1      174.42    8.83    2.930  0.20( 0.12) 0.59      59.5      97.00
      1      174.84    8.90    2.918  0.20( 0.12) 0.59      59.9     136.00
      1      175.52    9.01    2.897  0.20( 0.12) 0.59      60.7      38.00
```

1	175.73	9.05	2.890	0.20(0.12)	0.59	60.9	80.00
1	177.03	9.30	2.844	0.20(0.12)	0.59	62.6	6.00
1	177.92	9.48	2.814	0.20(0.12)	0.59	63.7	92.00
1	178.28	9.56	2.800	0.20(0.12)	0.59	64.3	35.00
1	178.49	9.61	2.792	0.20(0.12)	0.59	64.6	24.00
1	178.80	9.69	2.779	0.20(0.12)	0.59	65.1	46.00
1	179.45	9.87	2.750	0.20(0.12)	0.59	66.1	129.00
1	179.45	9.87	2.750	0.20(0.12)	0.59	66.2	25.00
1	180.21	10.13	2.709	0.20(0.12)	0.59	67.7	64.00
1	180.64	10.31	2.682	0.20(0.12)	0.59	68.7	134.00
1	180.64	10.31	2.682	0.20(0.12)	0.59	68.7	61.00
1	180.81	10.41	2.667	0.20(0.12)	0.59	69.2	32.00
1	180.99	10.53	2.650	0.20(0.12)	0.59	69.8	116.00
1	180.99	10.53	2.649	0.20(0.12)	0.59	69.8	78.00
1	180.91	11.14	2.565	0.20(0.12)	0.59	72.6	76.00
1	180.90	11.21	2.556	0.20(0.12)	0.59	72.9	14.00
1	180.90	11.21	2.556	0.20(0.12)	0.59	72.9	82.00
1	180.85	11.29	2.546	0.20(0.12)	0.58	73.2	67.00
1	180.69	11.47	2.523	0.20(0.12)	0.58	74.0	53.00
1	180.59	11.54	2.514	0.20(0.12)	0.58	74.3	43.00
1	180.38	11.66	2.499	0.20(0.12)	0.58	74.7	33.00
1	180.31	11.69	2.495	0.20(0.12)	0.58	74.8	56.00
1	180.00	11.81	2.481	0.20(0.12)	0.58	75.2	41.00
1	179.95	11.83	2.479	0.20(0.12)	0.58	75.2	114.00
1	179.60	11.93	2.466	0.20(0.12)	0.58	75.5	100.00
1	177.74	12.42	2.410	0.20(0.12)	0.58	76.8	127.00
1	177.30	12.53	2.398	0.20(0.12)	0.58	77.1	13.00
1	176.80	12.65	2.385	0.20(0.12)	0.58	77.4	123.00
1	176.03	12.81	2.367	0.20(0.12)	0.58	77.7	97.00
1	175.09	13.00	2.348	0.20(0.12)	0.58	78.1	19.00
1	174.96	13.03	2.345	0.20(0.12)	0.58	78.1	29.00
1	174.53	13.11	2.337	0.20(0.12)	0.58	78.3	120.00
1	174.45	13.12	2.335	0.20(0.12)	0.58	78.3	33.00
1	174.06	13.19	2.328	0.20(0.12)	0.58	78.4	111.00
1	173.87	13.23	2.325	0.20(0.12)	0.58	78.4	73.00
1	169.62	13.94	2.256	0.20(0.12)	0.58	79.2	16.00
1	167.79	14.26	2.227	0.20(0.12)	0.58	79.5	17.00
1	164.66	14.81	2.179	0.20(0.12)	0.58	80.0	22.00
1	164.21	14.88	2.173	0.20(0.12)	0.58	80.1	10.00
1	162.53	15.15	2.150	0.20(0.12)	0.58	80.2	7.00
1	156.29	16.18	2.072	0.20(0.12)	0.58	80.5	4.00
1	146.75	17.88	1.956	0.20(0.12)	0.58	80.8	1.00
2	0.44	5.00	4.060	0.20(0.02)	0.10	0.1	140.00
3	3.80	8.20	3.058	0.20(0.04)	0.20	1.4	141.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.15	5.00	4.060	0.20(0.12)	0.58	32.7	140.00
2	148.91	5.80	3.727	0.20(0.12)	0.58	38.0	104.00
3	154.44	6.31	3.551	0.20(0.12)	0.58	41.6	88.00
4	155.50	6.41	3.520	0.20(0.12)	0.58	42.3	63.00
5	156.88	6.54	3.480	0.20(0.12)	0.58	43.3	47.00
6	157.71	6.62	3.457	0.20(0.12)	0.58	43.8	45.00
7	164.14	7.25	3.280	0.20(0.12)	0.58	48.7	59.00
8	164.53	7.29	3.269	0.20(0.12)	0.58	49.0	95.00
9	166.55	7.51	3.215	0.20(0.12)	0.58	50.7	118.00
10	168.43	7.71	3.166	0.20(0.12)	0.58	52.3	138.00
11	172.85	8.20	3.058	0.20(0.12)	0.58	56.0	141.00
12	176.76	8.64	2.967	0.20(0.12)	0.58	59.5	31.00
13	178.37	8.83	2.930	0.20(0.12)	0.58	61.0	85.00
14	178.37	8.83	2.930	0.20(0.12)	0.58	61.0	97.00
15	178.78	8.90	2.918	0.20(0.12)	0.58	61.4	136.00
16	179.43	9.01	2.897	0.20(0.12)	0.58	62.2	38.00
17	179.64	9.05	2.890	0.20(0.12)	0.58	62.4	80.00
18	180.87	9.30	2.844	0.20(0.12)	0.58	64.1	6.00
19	181.72	9.48	2.814	0.20(0.12)	0.58	65.3	92.00
20	182.06	9.56	2.800	0.20(0.12)	0.58	65.8	35.00

```
    21      182.26    9.61    2.792  0.20( 0.12) 0.58      66.1      24.00
    22      182.55    9.69    2.779  0.20( 0.12) 0.58      66.6      46.00
    23      183.15    9.87    2.750  0.20( 0.12) 0.58      67.7     129.00
    24      183.16    9.87    2.750  0.20( 0.12) 0.58      67.7      25.00
    25      183.86   10.13    2.709  0.20( 0.12) 0.58      69.2      64.00
    26      184.25   10.31    2.682  0.20( 0.12) 0.58      70.2     134.00
    27      184.26   10.31    2.682  0.20( 0.12) 0.58      70.2      61.00
    28      184.41   10.41    2.667  0.20( 0.12) 0.58      70.7      32.00
    29      184.56   10.53    2.650  0.20( 0.12) 0.58      71.3     116.00
    30      184.56   10.53    2.649  0.20( 0.12) 0.58      71.3      78.00
    31      184.37   11.14    2.565  0.20( 0.12) 0.58      74.1      76.00
    32      184.34   11.21    2.556  0.20( 0.12) 0.58      74.4      14.00
    33      184.34   11.21    2.556  0.20( 0.12) 0.58      74.4      82.00
    34      184.28   11.29    2.546  0.20( 0.12) 0.58      74.7      67.00
    35      184.09   11.47    2.523  0.20( 0.12) 0.58      75.5      53.00
    36      183.98   11.54    2.514  0.20( 0.12) 0.58      75.8      43.00
    37      183.75   11.66    2.499  0.20( 0.12) 0.58      76.2      33.00
    38      183.67   11.69    2.495  0.20( 0.12) 0.58      76.3      56.00
    39      183.34   11.81    2.481  0.20( 0.12) 0.58      76.7      41.00
    40      183.29   11.83    2.479  0.20( 0.12) 0.58      76.8     114.00
    41      182.92   11.93    2.466  0.20( 0.12) 0.58      77.1     100.00
    42      180.98   12.42    2.410  0.20( 0.12) 0.58      78.4     127.00
    43      180.53   12.53    2.398  0.20( 0.12) 0.58      78.6      13.00
    44      180.01   12.65    2.385  0.20( 0.12) 0.58      78.9     123.00
    45      179.22   12.81    2.367  0.20( 0.12) 0.58      79.2      97.00
    46      178.25   13.00    2.348  0.20( 0.12) 0.58      79.6      19.00
    47      178.12   13.03    2.345  0.20( 0.12) 0.58      79.7      29.00
    48      177.67   13.11    2.337  0.20( 0.12) 0.58      79.8     120.00
    49      177.59   13.12    2.335  0.20( 0.12) 0.58      79.8      33.00
    50      177.19   13.19    2.328  0.20( 0.12) 0.58      79.9     111.00
    51      176.99   13.23    2.325  0.20( 0.12) 0.58      80.0      73.00
    52      172.65   13.94    2.256  0.20( 0.12) 0.58      80.7      16.00
    53      170.78   14.26    2.227  0.20( 0.12) 0.58      81.0      17.00
    54      167.59   14.81    2.179  0.20( 0.12) 0.58      81.5      22.00
    55      167.13   14.88    2.173  0.20( 0.12) 0.58      81.6      10.00
    56      165.42   15.15    2.150  0.20( 0.12) 0.58      81.7       7.00
    57      159.07   16.18    2.072  0.20( 0.12) 0.58      82.1       4.00
    58      149.37   17.88    1.956  0.20( 0.12) 0.58      82.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     184.56    Tc(MIN.) =    10.53
  EFFECTIVE AREA(ACRES) =      71.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       82.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.65
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     184.56
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.475
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.96      0.20     0.600    75   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      2.03

********************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =   13.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.313
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.82      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.67
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.49
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.40
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.461
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    75   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.56
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =   13.15
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   3.80
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.05
  PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   15.09
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.09
  RAINFALL INTENSITY(INCH/HR) =   2.16
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.54
  TOTAL STREAM AREA(ACRES) =       0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.05

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.915
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    8.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   2.92
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.05   15.09    2.156  0.20( 0.18) 0.90       0.5     147.00
      2        1.56    8.91    2.915  0.20( 0.12) 0.60       0.6      10.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.42    8.91    2.915  0.20( 0.14) 0.70       0.9      10.00
      2        2.18   15.09    2.156  0.20( 0.15) 0.74       1.2     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.42    Tc(MIN.) =     8.91
  EFFECTIVE AREA(ACRES) =       0.94   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.42    9.16    2.870  0.20( 0.14) 0.70       0.9      10.00
      2        2.18   15.34    2.136  0.20( 0.15) 0.74       1.2     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.49   13.40    2.307  0.20( 0.12) 0.60       2.8     144.00
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
      2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
      3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
    TOTAL AREA(ACRES) =         3.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        7.74  Tc(MIN.) =   13.403
  EFFECTIVE AREA(ACRES) =      3.87  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
------------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.08      0.20     0.500    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.22

******************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.03
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.22

******************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.799
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20      0.500    75    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.677
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   2.68
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.22   10.03    2.725  0.20( 0.10) 0.50       0.1     147.00
      2        1.86   10.34    2.677  0.20( 0.09) 0.44       0.8     152.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.06   10.03    2.725  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.34    2.677  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.08    Tc(MIN.) =    10.34
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.08
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.39
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.06   10.08    2.716  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.39    2.669  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
      2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
      3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.11    9.16    2.870  0.20( 0.12) 0.59       3.6      10.00
      2        9.32   10.08    2.716  0.20( 0.12) 0.59       3.9     147.00
      3        9.39   10.39    2.669  0.20( 0.12) 0.59       4.0     152.00
      4        9.53   13.40    2.307  0.20( 0.12) 0.60       4.8     144.00
      5        8.89   15.34    2.136  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        9.53  Tc(MIN.) =   13.403
  EFFECTIVE AREA(ACRES) =      4.75  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.53
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.85
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.85
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.75
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.53

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.051
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    75    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.23
  TOTAL STREAM AREA(ACRES) =       0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.11    9.61    2.792  0.20( 0.12) 0.59       3.6      10.00
      1        9.32   10.53    2.649  0.20( 0.12) 0.59       3.9     147.00
      1        9.39   10.84    2.606  0.20( 0.12) 0.59       4.0     152.00
      1        9.53   13.85    2.265  0.20( 0.12) 0.60       4.8     144.00
      1        8.89   15.79    2.100  0.20( 0.12) 0.61       4.8     147.00
      2        0.83    5.02    4.051  0.20( 0.04) 0.20       0.2     150.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.02    4.051  0.20( 0.11) 0.55       2.1     150.00
      2        9.68    9.61    2.792  0.20( 0.11) 0.57       3.8      10.00
      3        9.86   10.53    2.649  0.20( 0.11) 0.57       4.1     147.00
      4        9.92   10.84    2.606  0.20( 0.11) 0.57       4.2     152.00
      5        9.99   13.85    2.265  0.20( 0.12) 0.58       5.0     144.00
      6        9.32   15.79    2.100  0.20( 0.12) 0.59       5.1     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.99    Tc(MIN.) =    13.85
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.99
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   13.88
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.88
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.98
```

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  TOTAL STREAM AREA(ACRES) =       5.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.99

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.30      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.06    4.033  0.20( 0.11) 0.55       2.1     150.00
      1        9.68    9.64    2.786  0.20( 0.11) 0.57       3.8      10.00
      1        9.86   10.57    2.644  0.20( 0.11) 0.57       4.1     147.00
      1        9.92   10.88    2.600  0.20( 0.11) 0.57       4.2     152.00
      1        9.99   13.88    2.261  0.20( 0.12) 0.58       5.0     144.00
      1        9.32   15.83    2.098  0.20( 0.12) 0.59       5.1     147.00
      2        1.02    5.58    3.814  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.06    4.033  0.20( 0.10) 0.51       2.4     150.00
      2        9.06    5.58    3.814  0.20( 0.10) 0.51       2.6      14.00
      3       10.42    9.64    2.786  0.20( 0.11) 0.54       4.1      10.00
      4       10.57   10.57    2.644  0.20( 0.11) 0.55       4.4     147.00
      5       10.61   10.88    2.600  0.20( 0.11) 0.55       4.5     152.00
      6       10.59   13.88    2.261  0.20( 0.11) 0.56       5.3     144.00
      7        9.87   15.83    2.098  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.61    Tc(MIN.) =    10.88
  EFFECTIVE AREA(ACRES) =       4.55   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
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  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   11.18
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.18
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       4.55
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.61

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.823
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    75    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    6.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.462
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.26      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.58
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.60
  RAINFALL INTENSITY(INCH/HR) =   3.46
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       0.52
  TOTAL STREAM AREA(ACRES) =       0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.37    3.895  0.20( 0.10) 0.51       2.4     150.00
      1        9.06    5.89    3.696  0.20( 0.10) 0.51       2.6      14.00
      1       10.42    9.95    2.737  0.20( 0.11) 0.54       4.1      10.00
      1       10.57   10.87    2.602  0.20( 0.11) 0.55       4.4     147.00
      1       10.61   11.18    2.560  0.20( 0.11) 0.55       4.5     152.00
      1       10.59   14.19    2.233  0.20( 0.11) 0.56       5.3     144.00
      1        9.87   16.14    2.075  0.20( 0.11) 0.57       5.4     147.00
      2        1.61    6.60    3.462  0.20( 0.03) 0.15       0.5     154.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.28    5.37    3.895  0.20( 0.09) 0.46       2.8     150.00
      2       10.59    5.89    3.696  0.20( 0.09) 0.46       3.1      14.00
      3       10.90    6.60    3.462  0.20( 0.09) 0.46       3.4     154.00
      4       11.69    9.95    2.737  0.20( 0.10) 0.50       4.7      10.00
      5       11.77   10.87    2.602  0.20( 0.10) 0.51       5.0     147.00
      6       11.79   11.18    2.560  0.20( 0.10) 0.51       5.1     152.00
      7       11.62   14.19    2.233  0.20( 0.10) 0.52       5.8     144.00
```

```
      8       10.83   16.14    2.075  0.20( 0.11) 0.53       5.9     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.79    Tc(MIN.) =    11.18
  EFFECTIVE AREA(ACRES) =       5.07   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.26
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.897
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"         D        1.24      0.20     0.600    75    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.10
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      3.10

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.10

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.903
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.70

********************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.10    9.01    2.897  0.20( 0.12) 0.60       1.2     159.00
      2        1.70    8.98    2.903  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    8.98    2.903  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.01    2.897  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.80    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.80
```

```
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.21
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    9.18    2.866  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.21    2.861  0.20( 0.12) 0.60       1.9     159.00
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.28    5.46    3.861  0.20( 0.09) 0.46       2.8     150.00
      2       10.59    5.97    3.667  0.20( 0.09) 0.46       3.1      14.00
      3       10.90    6.68    3.438  0.20( 0.09) 0.46       3.4     154.00
      4       11.69   10.03    2.725  0.20( 0.10) 0.50       4.7      10.00
      5       11.77   10.95    2.591  0.20( 0.10) 0.51       5.0     147.00
      6       11.79   11.26    2.549  0.20( 0.10) 0.51       5.1     152.00
      7       11.62   14.27    2.226  0.20( 0.10) 0.52       5.8     144.00
      8       10.83   16.22    2.069  0.20( 0.11) 0.53       5.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.46    3.861  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    5.97    3.667  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.68    3.438  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.18    2.866  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.21    2.861  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.03    2.725  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   10.95    2.591  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.26    2.549  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.27    2.226  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.22    2.069  0.20( 0.11) 0.55       7.8     147.00
    TOTAL AREA(ACRES) =         7.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       16.30  Tc(MIN.) =    9.211
  EFFECTIVE AREA(ACRES) =      6.28  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.30
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    9.45
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.921
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.28      0.20      0.600    75    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.23
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      3.23

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.23
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.23

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.109
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.28
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      3.28

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   3.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.23    9.41    2.825  0.20( 0.12) 0.60       1.3      17.00
      2        3.28    7.97    3.109  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.29    7.97    3.109  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.41    2.825  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.29    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.29
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.29    8.02    3.097  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.47    2.816  0.20( 0.11) 0.55       2.5      17.00
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.70    3.767  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    6.21    3.585  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.92    3.370  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.41    2.825  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.45    2.820  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.26    2.689  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   11.19    2.559  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.50    2.519  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.51    2.205  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.46    2.051  0.20( 0.11) 0.55       7.8     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.64    5.70    3.767  0.20( 0.10) 0.51       5.6     150.00
      2       20.29    6.21    3.585  0.20( 0.10) 0.51       6.1      14.00
      3       21.05    6.92    3.370  0.20( 0.10) 0.52       6.8     154.00
      4       21.93    8.02    3.097  0.20( 0.10) 0.52       7.7      16.00
      5       22.48    9.41    2.825  0.20( 0.11) 0.53       8.7     160.00
      6       22.49    9.45    2.820  0.20( 0.11) 0.53       8.8     159.00
      7       22.49    9.47    2.816  0.20( 0.11) 0.53       8.8      17.00
      8       22.15   10.26    2.689  0.20( 0.11) 0.54       9.1      10.00
      9       21.70   11.19    2.559  0.20( 0.11) 0.54       9.4     147.00
     10       21.56   11.50    2.519  0.20( 0.11) 0.54       9.5     152.00
     11       20.11   14.51    2.205  0.20( 0.11) 0.55      10.2     144.00
     12       18.68   16.46    2.051  0.20( 0.11) 0.55      10.3     147.00
    TOTAL AREA(ACRES) =        10.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.49  Tc(MIN.) =    9.445
  EFFECTIVE AREA(ACRES) =      8.76  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       8.76
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.49

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.622
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    75    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =    7.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.166
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.44      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.60   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.06

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.039
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20      0.100    75    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.12

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.64    5.76    3.745  0.20( 0.10) 0.51       5.6     150.00
      1       20.29    6.27    3.566  0.20( 0.10) 0.51       6.1      14.00
      1       21.05    6.98    3.353  0.20( 0.10) 0.52       6.8     154.00
      1       21.93    8.07    3.085  0.20( 0.10) 0.52       7.7      16.00
      1       22.48    9.47    2.816  0.20( 0.11) 0.53       8.7     160.00
      1       22.49    9.50    2.810  0.20( 0.11) 0.53       8.8     159.00
```

```
     1       22.49    9.52    2.807  0.20( 0.11) 0.53       8.8      17.00
     1       22.15   10.32    2.680  0.20( 0.11) 0.54       9.1      10.00
     1       21.70   11.24    2.552  0.20( 0.11) 0.54       9.4     147.00
     1       21.56   11.55    2.512  0.20( 0.11) 0.54       9.5     152.00
     1       20.11   14.56    2.200  0.20( 0.11) 0.55      10.2     144.00
     1       18.68   16.52    2.047  0.20( 0.11) 0.55      10.3     147.00
     2        2.06    7.72    3.166  0.20( 0.03) 0.16       0.7      19.00
     3        1.12    5.04    4.039  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.44    5.04    4.039  0.20( 0.09) 0.46       5.7     161.00
     2       22.50    5.76    3.745  0.20( 0.09) 0.46       6.4     150.00
     3       23.17    6.27    3.566  0.20( 0.09) 0.46       7.0      14.00
     4       23.96    6.98    3.353  0.20( 0.09) 0.47       7.7     154.00
     5       24.58    7.72    3.166  0.20( 0.09) 0.47       8.5      19.00
     6       24.79    8.07    3.085  0.20( 0.10) 0.48       8.8      16.00
     7       25.09    9.47    2.816  0.20( 0.10) 0.49       9.8     160.00
     8       25.09    9.50    2.810  0.20( 0.10) 0.49       9.8     159.00
     9       25.09    9.52    2.807  0.20( 0.10) 0.49       9.8      17.00
    10       24.63   10.32    2.680  0.20( 0.10) 0.49      10.1      10.00
    11       24.06   11.24    2.552  0.20( 0.10) 0.50      10.4     147.00
    12       23.89   11.55    2.512  0.20( 0.10) 0.50      10.5     152.00
    13       22.14   14.56    2.200  0.20( 0.10) 0.51      11.3     144.00
    14       20.57   16.52    2.047  0.20( 0.10) 0.51      11.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.09    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       9.80   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.09
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.089
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.85      0.20      0.600    75    8.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.066
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.99      0.20      0.600    75    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.27    8.05    3.089  0.20( 0.12) 0.60       0.9     168.00
      2        2.62    8.16    3.066  0.20( 0.12) 0.60       1.0     169.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.88    8.05    3.089  0.20( 0.12) 0.60       1.8     168.00
      2        4.88    8.16    3.066  0.20( 0.12) 0.60       1.8     169.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.88    Tc(MIN.) =     8.05
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.88
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.88    8.21    3.056  0.20( 0.12) 0.60       1.8     168.00
      2        4.88    8.32    3.033  0.20( 0.12) 0.60       1.8     169.00
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    5.11    4.008  0.20( 0.09) 0.46       5.7     161.00
      2       22.50    5.82    3.720  0.20( 0.09) 0.46       6.4     150.00
      3       23.17    6.34    3.544  0.20( 0.09) 0.46       7.0      14.00
      4       23.96    7.04    3.335  0.20( 0.09) 0.47       7.7     154.00
      5       24.58    7.78    3.151  0.20( 0.09) 0.47       8.5      19.00
      6       24.79    8.14    3.070  0.20( 0.10) 0.48       8.8      16.00
      7       25.09    9.53    2.805  0.20( 0.10) 0.49       9.8     160.00
      8       25.09    9.57    2.799  0.20( 0.10) 0.49       9.8     159.00
      9       25.09    9.59    2.796  0.20( 0.10) 0.49       9.8      17.00
     10       24.63   10.39    2.670  0.20( 0.10) 0.49      10.1      10.00
     11       24.06   11.31    2.543  0.20( 0.10) 0.50      10.4     147.00
     12       23.89   11.62    2.504  0.20( 0.10) 0.50      10.5     152.00
     13       22.14   14.63    2.194  0.20( 0.10) 0.51      11.3     144.00
     14       20.57   16.59    2.042  0.20( 0.10) 0.51      11.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.47    5.11    4.008  0.20( 0.10) 0.48       6.8     161.00
      2       26.75    5.82    3.720  0.20( 0.10) 0.49       7.7     150.00
      3       27.56    6.34    3.544  0.20( 0.10) 0.49       8.4      14.00
      4       28.54    7.04    3.335  0.20( 0.10) 0.49       9.3     154.00
      5       29.36    7.78    3.151  0.20( 0.10) 0.50      10.2      19.00
```

```
      6       29.66    8.14    3.070  0.20( 0.10) 0.50      10.6      16.00
      7       29.69    8.21    3.056  0.20( 0.10) 0.50      10.6     168.00
      8       29.71    8.32    3.033  0.20( 0.10) 0.50      10.7     169.00
      9       29.59    9.53    2.805  0.20( 0.10) 0.51      11.6     160.00
     10       29.58    9.57    2.799  0.20( 0.10) 0.51      11.6     159.00
     11       29.57    9.59    2.796  0.20( 0.10) 0.51      11.7      17.00
     12       28.90   10.39    2.670  0.20( 0.10) 0.51      12.0      10.00
     13       28.12   11.31    2.543  0.20( 0.10) 0.51      12.3     147.00
     14       27.88   11.62    2.504  0.20( 0.10) 0.51      12.4     152.00
     15       25.61   14.63    2.194  0.20( 0.10) 0.52      13.1     144.00
     16       23.79   16.59    2.042  0.20( 0.10) 0.52      13.2     147.00
    TOTAL AREA(ACRES) =        13.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       29.71  Tc(MIN.) =    8.316
  EFFECTIVE AREA(ACRES) =     10.74  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   472.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.89
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.71
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.55
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.55
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      10.74
  TOTAL STREAM AREA(ACRES) =      13.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.71

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.28      0.20      0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.47    5.35    3.906  0.20( 0.10) 0.48       6.8     161.00
      1       26.75    6.06    3.638  0.20( 0.10) 0.49       7.7     150.00
      1       27.56    6.57    3.472  0.20( 0.10) 0.49       8.4      14.00
      1       28.54    7.28    3.275  0.20( 0.10) 0.49       9.3     154.00
      1       29.36    8.01    3.099  0.20( 0.10) 0.50      10.2      19.00
      1       29.66    8.37    3.022  0.20( 0.10) 0.50      10.6      16.00
      1       29.69    8.44    3.008  0.20( 0.10) 0.50      10.6     168.00
      1       29.71    8.55    2.986  0.20( 0.10) 0.50      10.7     169.00
      1       29.59    9.76    2.767  0.20( 0.10) 0.51      11.6     160.00
      1       29.58    9.80    2.761  0.20( 0.10) 0.51      11.6     159.00
      1       29.57    9.82    2.758  0.20( 0.10) 0.51      11.7      17.00
      1       28.90   10.62    2.637  0.20( 0.10) 0.51      12.0      10.00
      1       28.12   11.54    2.514  0.20( 0.10) 0.51      12.3     147.00
      1       27.88   11.85    2.476  0.20( 0.10) 0.51      12.4     152.00
      1       25.61   14.87    2.174  0.20( 0.10) 0.52      13.1     144.00
      1       23.79   16.82    2.025  0.20( 0.10) 0.52      13.2     147.00
      2        1.02    5.00    4.060  0.20( 0.02) 0.10       0.3     170.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.79    5.00    4.060  0.20( 0.09) 0.47       6.7     170.00
      2       26.45    5.35    3.906  0.20( 0.09) 0.47       7.1     161.00
      3       27.66    6.06    3.638  0.20( 0.09) 0.47       8.0     150.00
      4       28.43    6.57    3.472  0.20( 0.10) 0.48       8.7      14.00
      5       29.37    7.28    3.275  0.20( 0.10) 0.48       9.6     154.00
      6       30.13    8.01    3.099  0.20( 0.10) 0.48      10.5      19.00
      7       30.41    8.37    3.022  0.20( 0.10) 0.49      10.9      16.00
      8       30.44    8.44    3.008  0.20( 0.10) 0.49      10.9     168.00
      9       30.45    8.55    2.986  0.20( 0.10) 0.49      11.0     169.00
     10       30.28    9.76    2.767  0.20( 0.10) 0.50      11.9     160.00
     11       30.27    9.80    2.761  0.20( 0.10) 0.50      11.9     159.00
     12       30.26    9.82    2.758  0.20( 0.10) 0.50      11.9      17.00
     13       29.56   10.62    2.637  0.20( 0.10) 0.50      12.2      10.00
     14       28.75   11.54    2.514  0.20( 0.10) 0.50      12.5     147.00
     15       28.50   11.85    2.476  0.20( 0.10) 0.50      12.6     152.00
     16       26.15   14.87    2.174  0.20( 0.10) 0.51      13.4     144.00
     17       24.30   16.82    2.025  0.20( 0.10) 0.51      13.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.45    Tc(MIN.) =     8.55
```

```
  EFFECTIVE AREA(ACRES) =      11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.45
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.61
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.677
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.81      0.20     0.200    75    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.65

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   3.68
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.813
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.65    5.94    3.677  0.20( 0.04) 0.20       0.8     173.00
      2        1.74    5.58    3.813  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.32    5.58    3.813  0.20( 0.03) 0.16       1.3     174.00
      2        4.33    5.94    3.677  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.33    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.33
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.10
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
```

```
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.32    5.74    3.752  0.20( 0.03) 0.16       1.3     174.00
      2        4.33    6.10    3.621  0.20( 0.03) 0.16       1.3     173.00
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.79    5.07    4.026  0.20( 0.09) 0.47       6.7     170.00
      2       26.45    5.42    3.877  0.20( 0.09) 0.47       7.1     161.00
      3       27.66    6.13    3.614  0.20( 0.09) 0.47       8.0     150.00
      4       28.43    6.64    3.451  0.20( 0.10) 0.48       8.7      14.00
      5       29.37    7.35    3.257  0.20( 0.10) 0.48       9.6     154.00
      6       30.13    8.08    3.083  0.20( 0.10) 0.48      10.5      19.00
      7       30.41    8.44    3.008  0.20( 0.10) 0.49      10.9      16.00
      8       30.44    8.51    2.994  0.20( 0.10) 0.49      10.9     168.00
      9       30.45    8.61    2.972  0.20( 0.10) 0.49      11.0     169.00
     10       30.28    9.83    2.755  0.20( 0.10) 0.50      11.9     160.00
     11       30.27    9.87    2.750  0.20( 0.10) 0.50      11.9     159.00
     12       30.26    9.89    2.747  0.20( 0.10) 0.50      11.9      17.00
     13       29.56   10.69    2.627  0.20( 0.10) 0.50      12.2      10.00
     14       28.75   11.61    2.505  0.20( 0.10) 0.50      12.5     147.00
     15       28.50   11.92    2.468  0.20( 0.10) 0.50      12.6     152.00
     16       26.15   14.94    2.168  0.20( 0.10) 0.51      13.4     144.00
     17       24.30   16.90    2.020  0.20( 0.10) 0.51      13.4     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.90    5.07    4.026  0.20( 0.08) 0.42       7.8     170.00
      2       30.67    5.42    3.877  0.20( 0.08) 0.42       8.3     161.00
      3       31.32    5.74    3.752  0.20( 0.09) 0.43       8.8     174.00
      4       31.95    6.10    3.621  0.20( 0.09) 0.43       9.3     173.00
      5       31.98    6.13    3.614  0.20( 0.09) 0.43       9.3     150.00
      6       32.56    6.64    3.451  0.20( 0.09) 0.43      10.0      14.00
      7       33.26    7.35    3.257  0.20( 0.09) 0.44      10.9     154.00
      8       33.81    8.08    3.083  0.20( 0.09) 0.45      11.8      19.00
      9       34.00    8.44    3.008  0.20( 0.09) 0.45      12.2      16.00
     10       34.01    8.51    2.994  0.20( 0.09) 0.45      12.2     168.00
     11       34.00    8.61    2.972  0.20( 0.09) 0.45      12.3     169.00
     12       33.57    9.83    2.755  0.20( 0.09) 0.46      13.2     160.00
     13       33.55    9.87    2.750  0.20( 0.09) 0.46      13.2     159.00
     14       33.53    9.89    2.747  0.20( 0.09) 0.46      13.3      17.00
     15       32.69   10.69    2.627  0.20( 0.09) 0.47      13.6      10.00
     16       31.73   11.61    2.505  0.20( 0.09) 0.47      13.9     147.00
     17       31.44   11.92    2.468  0.20( 0.09) 0.47      14.0     152.00
     18       28.73   14.94    2.168  0.20( 0.10) 0.48      14.7     144.00
     19       26.69   16.90    2.020  0.20( 0.10) 0.48      14.8     147.00
    TOTAL AREA(ACRES) =        14.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.01  Tc(MIN.) =    8.507
  EFFECTIVE AREA(ACRES) =     12.25  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =       14.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.01
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    8.90
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.90
  RAINFALL INTENSITY(INCH/HR) =   2.92
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.45
  EFFECTIVE STREAM AREA(ACRES) =      12.25
  TOTAL STREAM AREA(ACRES) =      14.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.01

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.764
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20      0.100    75    5.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.70
  RAINFALL INTENSITY(INCH/HR) =   3.76
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.45

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.812
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

********************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    7.51
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.217
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.32
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.87
  FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.51
```

RAINFALL INTENSITY(INCH/HR) = 3.22
AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.20
EFFECTIVE STREAM AREA(ACRES) = 0.80
TOTAL STREAM AREA(ACRES) = 0.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.29

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	29.90	5.47	3.857	0.20(0.08)	0.42	7.8	170.00
1	30.67	5.81	3.724	0.20(0.08)	0.42	8.3	161.00
1	31.32	6.13	3.612	0.20(0.09)	0.43	8.8	174.00
1	31.95	6.50	3.494	0.20(0.09)	0.43	9.3	173.00
1	31.98	6.52	3.487	0.20(0.09)	0.43	9.3	150.00
1	32.56	7.03	3.340	0.20(0.09)	0.43	10.0	14.00
1	33.26	7.73	3.162	0.20(0.09)	0.44	10.9	154.00
1	33.81	8.47	3.001	0.20(0.09)	0.45	11.8	19.00
1	34.00	8.83	2.931	0.20(0.09)	0.45	12.2	16.00
1	34.01	8.90	2.918	0.20(0.09)	0.45	12.2	168.00
1	34.00	9.00	2.898	0.20(0.09)	0.45	12.3	169.00
1	33.57	10.22	2.695	0.20(0.09)	0.46	13.2	160.00
1	33.55	10.25	2.690	0.20(0.09)	0.46	13.2	159.00
1	33.53	10.28	2.687	0.20(0.09)	0.46	13.3	17.00
1	32.69	11.08	2.574	0.20(0.09)	0.47	13.6	10.00
1	31.73	12.00	2.458	0.20(0.09)	0.47	13.9	147.00
1	31.44	12.31	2.422	0.20(0.09)	0.47	14.0	152.00
1	28.73	15.34	2.136	0.20(0.10)	0.48	14.7	144.00
1	26.69	17.30	1.993	0.20(0.10)	0.48	14.8	147.00
2	1.45	5.70	3.764	0.20(0.02)	0.10	0.4	175.00
3	2.29	7.51	3.217	0.20(0.04)	0.20	0.8	167.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	33.32	5.47	3.857	0.20(0.08)	0.39	8.8	170.00
2	33.91	5.70	3.764	0.20(0.08)	0.39	9.2	175.00
3	34.16	5.81	3.724	0.20(0.08)	0.39	9.3	161.00
4	34.81	6.13	3.612	0.20(0.08)	0.40	9.9	174.00
5	35.45	6.50	3.494	0.20(0.08)	0.40	10.4	173.00
6	35.48	6.52	3.487	0.20(0.08)	0.40	10.5	150.00
7	36.07	7.03	3.340	0.20(0.08)	0.41	11.2	14.00
8	36.55	7.51	3.217	0.20(0.08)	0.41	11.9	167.00
9	36.72	7.73	3.162	0.20(0.08)	0.41	12.1	154.00
10	37.10	8.47	3.001	0.20(0.08)	0.42	13.0	19.00
11	37.21	8.83	2.931	0.20(0.09)	0.43	13.4	16.00
12	37.21	8.90	2.918	0.20(0.09)	0.43	13.5	168.00
13	37.17	9.00	2.898	0.20(0.09)	0.43	13.6	169.00
14	36.51	10.22	2.695	0.20(0.09)	0.44	14.5	160.00
15	36.49	10.25	2.690	0.20(0.09)	0.44	14.5	159.00
16	36.47	10.28	2.687	0.20(0.09)	0.44	14.5	17.00
17	35.51	11.08	2.574	0.20(0.09)	0.44	14.8	10.00
18	34.42	12.00	2.458	0.20(0.09)	0.45	15.1	147.00
19	34.08	12.31	2.422	0.20(0.09)	0.45	15.2	152.00
20	31.06	15.34	2.136	0.20(0.09)	0.46	15.9	144.00
21	28.86	17.30	1.993	0.20(0.09)	0.46	16.0	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 37.21 Tc(MIN.) = 8.83
EFFECTIVE AREA(ACRES) = 13.42 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 16.0
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 178.00 = 2300.00 FEET.

****
FLOW PROCESS FROM NODE 178.00 TO NODE 193.00 IS CODE = 31

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   458.40  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.38
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.21
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    75    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    9.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       1.17
  TOTAL STREAM AREA(ACRES) =       1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.84

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.13
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  3.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.06
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.14
  TOTAL STREAM AREA(ACRES) =       2.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.84    9.50    2.810  0.20( 0.11) 0.54       1.2     179.00
      2        5.01   10.06    2.720  0.20( 0.12) 0.60       2.1     181.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.74    9.50    2.810  0.20( 0.12) 0.58       3.2     179.00
      2        7.76   10.06    2.720  0.20( 0.12) 0.58       3.3     181.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.76    Tc(MIN.) =    10.06
  EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.76
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.20
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.74    9.65    2.785  0.20( 0.12) 0.58       3.2     179.00
     2        7.76   10.20    2.698  0.20( 0.12) 0.58       3.3     181.00
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.32    5.53    3.830  0.20( 0.08) 0.39       8.8     170.00
     2       33.91    5.77    3.739  0.20( 0.08) 0.39       9.2     175.00
     3       34.16    5.88    3.700  0.20( 0.08) 0.39       9.3     161.00
     4       34.81    6.20    3.590  0.20( 0.08) 0.40       9.9     174.00
     5       35.45    6.56    3.474  0.20( 0.08) 0.40      10.4     173.00
     6       35.48    6.58    3.467  0.20( 0.08) 0.40      10.5     150.00
     7       36.07    7.09    3.322  0.20( 0.08) 0.41      11.2      14.00
     8       36.55    7.57    3.201  0.20( 0.08) 0.41      11.9     167.00
     9       36.72    7.80    3.146  0.20( 0.08) 0.41      12.1     154.00
    10       37.10    8.54    2.988  0.20( 0.08) 0.42      13.0      19.00
    11       37.21    8.89    2.919  0.20( 0.09) 0.43      13.4      16.00
    12       37.21    8.96    2.906  0.20( 0.09) 0.43      13.5     168.00
    13       37.17    9.07    2.886  0.20( 0.09) 0.43      13.6     169.00
    14       36.51   10.29    2.685  0.20( 0.09) 0.44      14.5     160.00
    15       36.49   10.32    2.680  0.20( 0.09) 0.44      14.5     159.00
    16       36.47   10.34    2.677  0.20( 0.09) 0.44      14.5      17.00
    17       35.51   11.14    2.565  0.20( 0.09) 0.44      14.8      10.00
    18       34.42   12.07    2.450  0.20( 0.09) 0.45      15.1     147.00
    19       34.08   12.38    2.415  0.20( 0.09) 0.45      15.2     152.00
    20       31.06   15.41    2.130  0.20( 0.09) 0.46      15.9     144.00
    21       28.86   17.37    1.989  0.20( 0.09) 0.46      16.0     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
     2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
     3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
     4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
     5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
     6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
     7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
     8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
     9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
    10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
    11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
    12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
    13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
    14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
    15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
    16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
```

```
     23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
    TOTAL AREA(ACRES) =        19.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       44.72  Tc(MIN.) =    9.069
  EFFECTIVE AREA(ACRES) =     16.57  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.763
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    75    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   11.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.566
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    2.51
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.39
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.29
  RAINFALL INTENSITY(INCH/HR) =   2.55
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.845
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.52
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   10.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.697
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   2.70
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.39   11.29    2.546  0.20( 0.12) 0.60       2.4     184.00
      2        3.14   10.21    2.697  0.20( 0.11) 0.55       1.4     187.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1         8.33   10.21    2.697  0.20( 0.12) 0.58       3.6     187.00
      2         8.35   11.29    2.546  0.20( 0.12) 0.58       3.8     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.35    Tc(MIN.) =    11.29
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.35
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.78
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.35

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.337
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   0.98   Tc(MIN.) =    8.02
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.097
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.06
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  3.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.02
  RAINFALL INTENSITY(INCH/HR) =   3.10
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    75    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    7.68
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.18
  EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.46
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.00
  TOTAL STREAM AREA(ACRES) =       1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.33   10.70    2.625  0.20( 0.12) 0.58       3.6     187.00
```

```
     1        8.35   11.78    2.485  0.20( 0.12) 0.58       3.8     184.00
     2        3.51    8.02    3.097  0.20( 0.12) 0.60       1.3     190.00
     3        2.75    7.68    3.175  0.20( 0.12) 0.60       1.0     191.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.68    3.175  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.02    3.097  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.70    2.625  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.78    2.485  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.60    Tc(MIN.) =     8.02
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.73    3.162  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.07    3.085  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.76    2.617  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.83    2.478  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
      2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
      3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
      4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
      5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
      6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
      7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
      8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
      9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
     10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
     11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
     12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
     13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
     14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
     15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
     16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
```

```
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
    23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.26    5.53    3.830  0.20( 0.09) 0.47      14.0     170.00
      2       52.17    5.77    3.739  0.20( 0.09) 0.47      14.7     175.00
      3       52.55    5.88    3.700  0.20( 0.09) 0.47      15.0     161.00
      4       53.60    6.20    3.590  0.20( 0.09) 0.47      15.8     174.00
      5       54.68    6.56    3.474  0.20( 0.09) 0.47      16.7     173.00
      6       54.73    6.58    3.467  0.20( 0.09) 0.47      16.7     150.00
      7       55.92    7.09    3.322  0.20( 0.09) 0.47      18.0      14.00
      8       56.94    7.57    3.201  0.20( 0.10) 0.48      19.1     167.00
      9       57.23    7.73    3.162  0.20( 0.10) 0.48      19.4     191.10
     10       57.33    7.80    3.146  0.20( 0.10) 0.48      19.6     154.00
     11       57.66    8.07    3.085  0.20( 0.10) 0.48      20.1     190.00
     12       58.06    8.54    2.988  0.20( 0.10) 0.48      21.0      19.00
     13       58.28    8.89    2.919  0.20( 0.10) 0.49      21.6      16.00
     14       58.30    8.96    2.906  0.20( 0.10) 0.49      21.7     168.00
     15       58.30    9.07    2.886  0.20( 0.10) 0.49      21.9     169.00
     16       58.16    9.65    2.785  0.20( 0.10) 0.49      22.7     179.00
     17       57.86   10.20    2.698  0.20( 0.10) 0.49      23.4     181.00
     18       57.78   10.29    2.685  0.20( 0.10) 0.50      23.5     160.00
     19       57.74   10.32    2.680  0.20( 0.10) 0.50      23.5     159.00
     20       57.71   10.34    2.677  0.20( 0.10) 0.50      23.5      17.00
     21       57.02   10.76    2.617  0.20( 0.10) 0.50      23.8     187.00
     22       56.31   11.14    2.565  0.20( 0.10) 0.50      24.1      10.00
     23       55.07   11.83    2.478  0.20( 0.10) 0.50      24.4     184.00
     24       54.55   12.07    2.450  0.20( 0.10) 0.50      24.5     147.00
     25       53.90   12.38    2.415  0.20( 0.10) 0.50      24.6     152.00
     26       48.43   15.41    2.130  0.20( 0.10) 0.50      25.3     144.00
     27       45.01   17.37    1.989  0.20( 0.10) 0.51      25.4     147.00
    TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.30  Tc(MIN.) =    8.961
  EFFECTIVE AREA(ACRES) =     21.72  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.30
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.12
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.30
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.06
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.06
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      21.72
  TOTAL STREAM AREA(ACRES) =      25.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.30

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.22
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      4.22

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.22
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.31
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 5.31
RAINFALL INTENSITY(INCH/HR) = 3.92
AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.90
EFFECTIVE STREAM AREA(ACRES) = 1.21
TOTAL STREAM AREA(ACRES) = 1.21
PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.22

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.26	5.63	3.792	0.20(0.09)	0.47	14.0	170.00
1	52.17	5.87	3.703	0.20(0.09)	0.47	14.7	175.00
1	52.55	5.98	3.665	0.20(0.09)	0.47	15.0	161.00
1	53.60	6.29	3.558	0.20(0.09)	0.47	15.8	174.00
1	54.68	6.66	3.445	0.20(0.09)	0.47	16.7	173.00
1	54.73	6.68	3.439	0.20(0.09)	0.47	16.7	150.00
1	55.92	7.19	3.296	0.20(0.09)	0.47	18.0	14.00
1	56.94	7.67	3.178	0.20(0.10)	0.48	19.1	167.00
1	57.23	7.83	3.139	0.20(0.10)	0.48	19.4	191.10
1	57.33	7.90	3.124	0.20(0.10)	0.48	19.6	154.00
1	57.66	8.17	3.064	0.20(0.10)	0.48	20.1	190.00
1	58.06	8.63	2.969	0.20(0.10)	0.48	21.0	19.00
1	58.28	8.99	2.901	0.20(0.10)	0.49	21.6	16.00
1	58.30	9.06	2.888	0.20(0.10)	0.49	21.7	168.00
1	58.30	9.16	2.869	0.20(0.10)	0.49	21.9	169.00
1	58.16	9.74	2.770	0.20(0.10)	0.49	22.7	179.00
1	57.86	10.30	2.683	0.20(0.10)	0.49	23.4	181.00
1	57.78	10.38	2.671	0.20(0.10)	0.50	23.5	160.00
1	57.74	10.42	2.666	0.20(0.10)	0.50	23.5	159.00
1	57.71	10.44	2.663	0.20(0.10)	0.50	23.5	17.00
1	57.02	10.85	2.604	0.20(0.10)	0.50	23.8	187.00
1	56.31	11.24	2.552	0.20(0.10)	0.50	24.1	10.00
1	55.07	11.93	2.467	0.20(0.10)	0.50	24.4	184.00
1	54.55	12.17	2.439	0.20(0.10)	0.50	24.5	147.00
1	53.90	12.48	2.404	0.20(0.10)	0.50	24.6	152.00
1	48.43	15.50	2.123	0.20(0.10)	0.50	25.3	144.00
1	45.01	17.47	1.982	0.20(0.10)	0.51	25.4	147.00
2	4.22	5.31	3.923	0.20(0.18)	0.90	1.2	195.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.25	5.31	3.923	0.20(0.10)	0.50	14.4	195.00
2	55.34	5.63	3.792	0.20(0.10)	0.50	15.3	170.00
3	56.14	5.87	3.703	0.20(0.10)	0.50	15.9	175.00
4	56.48	5.98	3.665	0.20(0.10)	0.50	16.2	161.00
5	57.41	6.29	3.558	0.20(0.10)	0.50	17.0	174.00
6	58.36	6.66	3.445	0.20(0.10)	0.50	17.9	173.00
7	58.41	6.68	3.439	0.20(0.10)	0.50	17.9	150.00
8	59.44	7.19	3.296	0.20(0.10)	0.50	19.2	14.00
9	60.32	7.67	3.178	0.20(0.10)	0.50	20.3	167.00
10	60.57	7.83	3.139	0.20(0.10)	0.50	20.6	191.10
11	60.65	7.90	3.124	0.20(0.10)	0.50	20.8	154.00
12	60.92	8.17	3.064	0.20(0.10)	0.50	21.3	190.00
13	61.20	8.63	2.969	0.20(0.10)	0.51	22.2	19.00
14	61.35	8.99	2.901	0.20(0.10)	0.51	22.8	16.00
15	61.35	9.06	2.888	0.20(0.10)	0.51	22.9	168.00
16	61.33	9.16	2.869	0.20(0.10)	0.51	23.1	169.00
17	61.08	9.74	2.770	0.20(0.10)	0.51	23.9	179.00
18	60.69	10.30	2.683	0.20(0.10)	0.51	24.6	181.00
19	60.59	10.38	2.671	0.20(0.10)	0.51	24.7	160.00
20	60.55	10.42	2.666	0.20(0.10)	0.52	24.7	159.00
21	60.51	10.44	2.663	0.20(0.10)	0.52	24.7	17.00
22	59.76	10.85	2.604	0.20(0.10)	0.52	25.0	187.00
23	58.98	11.24	2.552	0.20(0.10)	0.52	25.3	10.00

```
     24       57.65   11.93    2.467  0.20( 0.10) 0.52      25.6     184.00
     25       57.10   12.17    2.439  0.20( 0.10) 0.52      25.7     147.00
     26       56.41   12.48    2.404  0.20( 0.10) 0.52      25.8     152.00
     27       50.62   15.50    2.123  0.20( 0.10) 0.52      26.6     144.00
     28       47.04   17.47    1.982  0.20( 0.10) 0.52      26.6     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.35    Tc(MIN.) =     9.06
  EFFECTIVE AREA(ACRES) =      22.93   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       26.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.95
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.35
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    9.39
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.39
  RAINFALL INTENSITY(INCH/HR) =   2.83
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.93
  TOTAL STREAM AREA(ACRES) =      26.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.35

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.912
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    75    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 5.33
RAINFALL INTENSITY(INCH/HR) = 3.91
AREA-AVERAGED Fm(INCH/HR) = 0.02
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.10
EFFECTIVE STREAM AREA(ACRES) = 0.33
TOTAL STREAM AREA(ACRES) = 0.33
PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.16

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.25	5.66	3.782	0.20(0.10)	0.50	14.4	195.00
1	55.34	5.98	3.663	0.20(0.10)	0.50	15.3	170.00
1	56.14	6.21	3.586	0.20(0.10)	0.50	15.9	175.00
1	56.48	6.32	3.550	0.20(0.10)	0.50	16.2	161.00
1	57.41	6.63	3.453	0.20(0.10)	0.50	17.0	174.00
1	58.36	7.00	3.349	0.20(0.10)	0.50	17.9	173.00
1	58.41	7.02	3.343	0.20(0.10)	0.50	17.9	150.00
1	59.44	7.53	3.211	0.20(0.10)	0.50	19.2	14.00
1	60.32	8.00	3.100	0.20(0.10)	0.50	20.3	167.00
1	60.57	8.17	3.065	0.20(0.10)	0.50	20.6	191.10
1	60.65	8.23	3.051	0.20(0.10)	0.50	20.8	154.00
1	60.92	8.50	2.994	0.20(0.10)	0.50	21.3	190.00
1	61.20	8.97	2.905	0.20(0.10)	0.51	22.2	19.00
1	61.35	9.32	2.840	0.20(0.10)	0.51	22.8	16.00
1	61.35	9.39	2.829	0.20(0.10)	0.51	22.9	168.00
1	61.33	9.50	2.810	0.20(0.10)	0.51	23.1	169.00
1	61.08	10.08	2.716	0.20(0.10)	0.51	23.9	179.00
1	60.69	10.63	2.634	0.20(0.10)	0.51	24.6	181.00
1	60.59	10.72	2.622	0.20(0.10)	0.51	24.7	160.00
1	60.55	10.75	2.618	0.20(0.10)	0.52	24.7	159.00
1	60.51	10.77	2.615	0.20(0.10)	0.52	24.7	17.00
1	59.76	11.19	2.559	0.20(0.10)	0.52	25.0	187.00
1	58.98	11.58	2.509	0.20(0.10)	0.52	25.3	10.00
1	57.65	12.27	2.427	0.20(0.10)	0.52	25.6	184.00
1	57.10	12.51	2.401	0.20(0.10)	0.52	25.7	147.00
1	56.41	12.82	2.367	0.20(0.10)	0.52	25.8	152.00
1	50.62	15.86	2.095	0.20(0.10)	0.52	26.6	144.00
1	47.04	17.83	1.959	0.20(0.10)	0.52	26.6	147.00
2	1.16	5.33	3.912	0.20(0.02)	0.10	0.3	183.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.10	5.33	3.912	0.20(0.10)	0.49	13.9	183.00
2	55.36	5.66	3.782	0.20(0.10)	0.49	14.8	195.00
3	56.42	5.98	3.663	0.20(0.10)	0.49	15.6	170.00
4	57.20	6.21	3.586	0.20(0.10)	0.49	16.2	175.00
5	57.53	6.32	3.550	0.20(0.10)	0.49	16.5	161.00
6	58.43	6.63	3.453	0.20(0.10)	0.49	17.3	174.00
7	59.35	7.00	3.349	0.20(0.10)	0.49	18.2	173.00
8	59.40	7.02	3.343	0.20(0.10)	0.49	18.3	150.00
9	60.39	7.53	3.211	0.20(0.10)	0.49	19.5	14.00
10	61.24	8.00	3.100	0.20(0.10)	0.50	20.6	167.00
11	61.48	8.17	3.065	0.20(0.10)	0.50	21.0	191.10
12	61.55	8.23	3.051	0.20(0.10)	0.50	21.1	154.00
13	61.80	8.50	2.994	0.20(0.10)	0.50	21.7	190.00
14	62.06	8.97	2.905	0.20(0.10)	0.50	22.5	19.00
15	62.19	9.32	2.840	0.20(0.10)	0.50	23.2	16.00
16	62.19	9.39	2.829	0.20(0.10)	0.50	23.3	168.00
17	62.16	9.50	2.810	0.20(0.10)	0.50	23.4	169.00
18	61.88	10.08	2.716	0.20(0.10)	0.51	24.2	179.00
19	61.47	10.63	2.634	0.20(0.10)	0.51	24.9	181.00
20	61.36	10.72	2.622	0.20(0.10)	0.51	25.0	160.00
21	61.32	10.75	2.618	0.20(0.10)	0.51	25.1	159.00

```
    22       61.28   10.77    2.615  0.20( 0.10) 0.51      25.1      17.00
    23       60.51   11.19    2.559  0.20( 0.10) 0.51      25.4     187.00
    24       59.72   11.58    2.509  0.20( 0.10) 0.51      25.6      10.00
    25       58.36   12.27    2.427  0.20( 0.10) 0.51      26.0     184.00
    26       57.80   12.51    2.401  0.20( 0.10) 0.51      26.0     147.00
    27       57.11   12.82    2.367  0.20( 0.10) 0.51      26.1     152.00
    28       51.24   15.86    2.095  0.20( 0.10) 0.52      26.9     144.00
    29       47.62   17.83    1.959  0.20( 0.10) 0.52      26.9     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.19    Tc(MIN.) =     9.39
  EFFECTIVE AREA(ACRES) =      23.26   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       26.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  33.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.19
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.49
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.123
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.12      0.20     0.500    75    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.05
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      3.05

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   3.12
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
```

```
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.05

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.989
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.07
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.07

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.05    7.90    3.123  0.20( 0.10) 0.50       1.1     199.00
      2        2.07    8.53    2.989  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.05    7.90    3.123  0.20( 0.11) 0.54       1.9     199.00
      2        4.98    8.53    2.989  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.05    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.05
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.05    7.99    3.102  0.20( 0.11) 0.54       1.9     199.00
      2        4.98    8.62    2.971  0.20( 0.11) 0.54       1.9     200.00
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.10    5.44    3.870  0.20( 0.10) 0.49      13.9     183.00
      2       55.36    5.76    3.744  0.20( 0.10) 0.49      14.8     195.00
      3       56.42    6.08    3.628  0.20( 0.10) 0.49      15.6     170.00
      4       57.20    6.31    3.553  0.20( 0.10) 0.49      16.2     175.00
      5       57.53    6.42    3.519  0.20( 0.10) 0.49      16.5     161.00
      6       58.43    6.73    3.423  0.20( 0.10) 0.49      17.3     174.00
      7       59.35    7.10    3.322  0.20( 0.10) 0.49      18.2     173.00
      8       59.40    7.12    3.316  0.20( 0.10) 0.49      18.3     150.00
      9       60.39    7.63    3.187  0.20( 0.10) 0.49      19.5      14.00
     10       61.24    8.10    3.078  0.20( 0.10) 0.50      20.6     167.00
     11       61.48    8.27    3.043  0.20( 0.10) 0.50      21.0     191.10
     12       61.55    8.33    3.030  0.20( 0.10) 0.50      21.1     154.00
     13       61.80    8.60    2.974  0.20( 0.10) 0.50      21.7     190.00
     14       62.06    9.07    2.887  0.20( 0.10) 0.50      22.5      19.00
     15       62.19    9.42    2.823  0.20( 0.10) 0.50      23.2      16.00
     16       62.19    9.49    2.812  0.20( 0.10) 0.50      23.3     168.00
     17       62.16    9.60    2.794  0.20( 0.10) 0.50      23.4     169.00
     18       61.88   10.18    2.701  0.20( 0.10) 0.51      24.2     179.00
     19       61.47   10.73    2.620  0.20( 0.10) 0.51      24.9     181.00
     20       61.36   10.82    2.609  0.20( 0.10) 0.51      25.0     160.00
     21       61.32   10.85    2.604  0.20( 0.10) 0.51      25.1     159.00
     22       61.28   10.87    2.601  0.20( 0.10) 0.51      25.1      17.00
     23       60.51   11.29    2.546  0.20( 0.10) 0.51      25.4     187.00
     24       59.72   11.68    2.497  0.20( 0.10) 0.51      25.6      10.00
     25       58.36   12.37    2.416  0.20( 0.10) 0.51      26.0     184.00
     26       57.80   12.61    2.390  0.20( 0.10) 0.51      26.0     147.00
     27       57.11   12.92    2.357  0.20( 0.10) 0.51      26.1     152.00
     28       51.24   15.96    2.087  0.20( 0.10) 0.52      26.9     144.00
     29       47.62   17.93    1.953  0.20( 0.10) 0.52      26.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       58.41    5.44    3.870  0.20( 0.10) 0.50      15.2     183.00
      2       59.78    5.76    3.744  0.20( 0.10) 0.50      16.1     195.00
      3       60.94    6.08    3.628  0.20( 0.10) 0.50      17.0     170.00
      4       61.79    6.31    3.553  0.20( 0.10) 0.49      17.7     175.00
      5       62.15    6.42    3.519  0.20( 0.10) 0.49      18.0     161.00
      6       63.14    6.73    3.423  0.20( 0.10) 0.49      18.9     174.00
      7       64.16    7.10    3.322  0.20( 0.10) 0.50      19.9     173.00
      8       64.22    7.12    3.316  0.20( 0.10) 0.50      19.9     150.00
      9       65.34    7.63    3.187  0.20( 0.10) 0.50      21.3      14.00
     10       66.09    7.99    3.102  0.20( 0.10) 0.50      22.2     199.00
     11       66.27    8.10    3.078  0.20( 0.10) 0.50      22.5     167.00
```

```
    12       66.50    8.27    3.043  0.20( 0.10) 0.50      22.9     191.10
    13       66.56    8.33    3.030  0.20( 0.10) 0.50      23.0     154.00
    14       66.78    8.60    2.974  0.20( 0.10) 0.50      23.6     190.00
    15       66.79    8.62    2.971  0.20( 0.10) 0.50      23.6     200.00
    16       66.89    9.07    2.887  0.20( 0.10) 0.50      24.4      19.00
    17       66.91    9.42    2.823  0.20( 0.10) 0.51      25.1      16.00
    18       66.89    9.49    2.812  0.20( 0.10) 0.51      25.2     168.00
    19       66.83    9.60    2.794  0.20( 0.10) 0.51      25.3     169.00
    20       66.39   10.18    2.701  0.20( 0.10) 0.51      26.1     179.00
    21       65.83   10.73    2.620  0.20( 0.10) 0.51      26.9     181.00
    22       65.71   10.82    2.609  0.20( 0.10) 0.51      26.9     160.00
    23       65.66   10.85    2.604  0.20( 0.10) 0.51      27.0     159.00
    24       65.62   10.87    2.601  0.20( 0.10) 0.51      27.0      17.00
    25       64.75   11.29    2.546  0.20( 0.10) 0.51      27.3     187.00
    26       63.88   11.68    2.497  0.20( 0.10) 0.51      27.5      10.00
    27       62.38   12.37    2.416  0.20( 0.10) 0.51      27.9     184.00
    28       61.77   12.61    2.390  0.20( 0.10) 0.52      28.0     147.00
    29       61.02   12.92    2.357  0.20( 0.10) 0.52      28.1     152.00
    30       54.68   15.96    2.087  0.20( 0.10) 0.52      28.8     144.00
    31       50.83   17.93    1.953  0.20( 0.10) 0.52      28.9     147.00
   TOTAL AREA(ACRES) =        28.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       66.91  Tc(MIN.) =    9.424
  EFFECTIVE AREA(ACRES) =     25.07  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       28.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.80
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.91
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.77
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.77
  RAINFALL INTENSITY(INCH/HR) =   2.76
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      25.07
  TOTAL STREAM AREA(ACRES) =      28.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.91

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.708
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.39      0.20     0.200    75    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.29

******************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    7.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.238
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.42      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  3.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.42
  RAINFALL INTENSITY(INCH/HR) =   3.24
```

AREA-AVERAGED Fm(INCH/HR) = 0.04
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.20
EFFECTIVE STREAM AREA(ACRES) = 0.81
TOTAL STREAM AREA(ACRES) = 0.81
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.33

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	58.41	5.79	3.731	0.20(0.10)	0.50	15.2	183.00
1	59.78	6.12	3.617	0.20(0.10)	0.50	16.1	195.00
1	60.94	6.44	3.512	0.20(0.10)	0.50	17.0	170.00
1	61.79	6.66	3.444	0.20(0.10)	0.49	17.7	175.00
1	62.15	6.77	3.412	0.20(0.10)	0.49	18.0	161.00
1	63.14	7.09	3.324	0.20(0.10)	0.49	18.9	174.00
1	64.16	7.45	3.231	0.20(0.10)	0.50	19.9	173.00
1	64.22	7.47	3.225	0.20(0.10)	0.50	19.9	150.00
1	65.34	7.98	3.106	0.20(0.10)	0.50	21.3	14.00
1	66.09	8.35	3.027	0.20(0.10)	0.50	22.2	199.00
1	66.27	8.45	3.005	0.20(0.10)	0.50	22.5	167.00
1	66.50	8.62	2.972	0.20(0.10)	0.50	22.9	191.10
1	66.56	8.68	2.959	0.20(0.10)	0.50	23.0	154.00
1	66.78	8.95	2.907	0.20(0.10)	0.50	23.6	190.00
1	66.79	8.97	2.904	0.20(0.10)	0.50	23.6	200.00
1	66.89	9.42	2.824	0.20(0.10)	0.50	24.4	19.00
1	66.91	9.77	2.765	0.20(0.10)	0.51	25.1	16.00
1	66.89	9.84	2.754	0.20(0.10)	0.51	25.2	168.00
1	66.83	9.95	2.737	0.20(0.10)	0.51	25.3	169.00
1	66.39	10.53	2.649	0.20(0.10)	0.51	26.1	179.00
1	65.83	11.09	2.572	0.20(0.10)	0.51	26.9	181.00
1	65.71	11.17	2.561	0.20(0.10)	0.51	26.9	160.00
1	65.66	11.20	2.557	0.20(0.10)	0.51	27.0	159.00
1	65.62	11.22	2.554	0.20(0.10)	0.51	27.0	17.00
1	64.75	11.64	2.501	0.20(0.10)	0.51	27.3	187.00
1	63.88	12.03	2.455	0.20(0.10)	0.51	27.5	10.00
1	62.38	12.72	2.377	0.20(0.10)	0.51	27.9	184.00
1	61.77	12.96	2.352	0.20(0.10)	0.52	28.0	147.00
1	61.02	13.27	2.320	0.20(0.10)	0.52	28.1	152.00
1	54.68	16.33	2.060	0.20(0.10)	0.52	28.8	144.00
1	50.83	18.31	1.930	0.20(0.10)	0.52	28.9	147.00
2	2.33	7.42	3.238	0.20(0.04)	0.20	0.8	192.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	60.52	5.79	3.731	0.20(0.10)	0.48	15.8	183.00
2	61.93	6.12	3.617	0.20(0.10)	0.48	16.8	195.00
3	63.14	6.44	3.512	0.20(0.10)	0.48	17.7	170.00
4	64.02	6.66	3.444	0.20(0.10)	0.48	18.4	175.00
5	64.39	6.77	3.412	0.20(0.10)	0.48	18.7	161.00
6	65.42	7.09	3.324	0.20(0.10)	0.48	19.6	174.00
7	66.41	7.42	3.238	0.20(0.10)	0.48	20.6	192.00
8	66.49	7.45	3.231	0.20(0.10)	0.48	20.7	173.00
9	66.54	7.47	3.225	0.20(0.10)	0.48	20.7	150.00
10	67.58	7.98	3.106	0.20(0.10)	0.49	22.1	14.00
11	68.27	8.35	3.027	0.20(0.10)	0.49	23.0	199.00
12	68.43	8.45	3.005	0.20(0.10)	0.49	23.3	167.00
13	68.63	8.62	2.972	0.20(0.10)	0.49	23.7	191.10
14	68.69	8.68	2.959	0.20(0.10)	0.49	23.8	154.00
15	68.87	8.95	2.907	0.20(0.10)	0.49	24.4	190.00
16	68.88	8.97	2.904	0.20(0.10)	0.49	24.4	200.00
17	68.92	9.42	2.824	0.20(0.10)	0.49	25.3	19.00
18	68.90	9.77	2.765	0.20(0.10)	0.50	25.9	16.00
19	68.87	9.84	2.754	0.20(0.10)	0.50	26.0	168.00
20	68.80	9.95	2.737	0.20(0.10)	0.50	26.2	169.00
21	68.29	10.53	2.649	0.20(0.10)	0.50	27.0	179.00
22	67.68	11.09	2.572	0.20(0.10)	0.50	27.7	181.00

```
    23       67.55   11.17    2.561  0.20( 0.10) 0.50      27.8     160.00
    24       67.49   11.20    2.557  0.20( 0.10) 0.50      27.8     159.00
    25       67.45   11.22    2.554  0.20( 0.10) 0.50      27.8      17.00
    26       66.55   11.64    2.501  0.20( 0.10) 0.50      28.1     187.00
    27       65.64   12.03    2.455  0.20( 0.10) 0.50      28.3      10.00
    28       64.08   12.72    2.377  0.20( 0.10) 0.51      28.7     184.00
    29       63.46   12.96    2.352  0.20( 0.10) 0.51      28.8     147.00
    30       62.68   13.27    2.320  0.20( 0.10) 0.51      28.9     152.00
    31       56.15   16.33    2.060  0.20( 0.10) 0.51      29.6     144.00
    32       52.20   18.31    1.930  0.20( 0.10) 0.51      29.7     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      68.92    Tc(MIN.) =     9.42
  EFFECTIVE AREA(ACRES) =      25.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.7
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.92
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.46
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.97

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   10.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.638
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    4.76
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       6.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.57

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.833
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   3.83
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.57   10.61    2.638  0.20( 0.12) 0.60       2.9     184.00
      2        0.58    5.53    3.833  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.63    5.53    3.833  0.20( 0.11) 0.55       1.7      59.00
      2        6.97   10.61    2.638  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.97    Tc(MIN.) =    10.61
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.81      0.20     0.600    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.22
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.22

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.63    5.93    3.680  0.20( 0.11) 0.55       1.7      59.00
      1        6.97   11.00    2.584  0.20( 0.11) 0.57       3.1     184.00
      2        2.22    7.72    3.165  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.93    3.680  0.20( 0.11) 0.56       2.3      59.00
      2        8.32    7.72    3.165  0.20( 0.11) 0.57       3.0      64.00
      3        8.77   11.00    2.584  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.77    Tc(MIN.) =    11.00
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
```

```
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.77
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.03
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.77

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.48      0.20     0.600    75    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
```

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  STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =   11.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.563
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    4.13
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.92
  FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.97    3.667  0.20( 0.11) 0.56       2.3      59.00
      1        8.32    7.76    3.156  0.20( 0.11) 0.57       3.0      64.00
      1        8.77   11.03    2.579  0.20( 0.12) 0.58       3.9     184.00
      2        5.19   11.15    2.563  0.20( 0.12) 0.60       2.4     208.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.66    5.97    3.667  0.20( 0.12) 0.58       3.6      59.00
      2       12.81    7.76    3.156  0.20( 0.12) 0.58       4.6      64.00
      3       13.93   11.03    2.579  0.20( 0.12) 0.59       6.2     184.00
      4       13.90   11.15    2.563  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.93    Tc(MIN.) =    11.03
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.93
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   11.92
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.92
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.93

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   10.95
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.591
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        2.04      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     2.04      SUBAREA RUNOFF(CFS) =     4.54
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  5.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.17

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.036
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.45      0.20      0.500    75    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.19

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.25
   HALFSTREET FLOOD WIDTH(FEET) =    6.82
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.67
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
 STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =    9.32
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.841
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    2.44
 EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.55

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
 FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
 LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.32
 RAINFALL INTENSITY(INCH/HR) =   2.84
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.55

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.66    6.90    3.375  0.20( 0.12) 0.58       3.6      59.00
     1       12.81    8.67    2.962  0.20( 0.12) 0.58       4.6      64.00
     1       13.93   11.92    2.467  0.20( 0.12) 0.59       6.2     184.00
     1       13.90   12.05    2.453  0.20( 0.12) 0.59       6.2     208.00
     2        6.17   10.95    2.591  0.20( 0.11) 0.57       2.8     211.00
     3        3.55    9.32    2.841  0.20( 0.10) 0.50       1.4     213.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.93    6.90    3.375  0.20( 0.11) 0.56       6.4      59.00
     2       21.88    8.67    2.962  0.20( 0.11) 0.57       8.2      64.00
     3       22.36    9.32    2.841  0.20( 0.11) 0.57       8.7     213.00
     4       23.00   10.95    2.591  0.20( 0.11) 0.57       9.9     211.00
     5       22.87   11.92    2.467  0.20( 0.11) 0.57      10.4     184.00
     6       22.78   12.05    2.453  0.20( 0.11) 0.57      10.5     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.00    Tc(MIN.) =    10.95
 EFFECTIVE AREA(ACRES) =       9.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.5
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.11
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.00
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.20
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.20
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       9.95
  TOTAL STREAM AREA(ACRES) =      10.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.00

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.18      0.20      0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.65

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.93    7.17    3.302  0.20( 0.11) 0.56       6.4      59.00
     1       21.88    8.93    2.911  0.20( 0.11) 0.57       8.2      64.00
     1       22.36    9.58    2.796  0.20( 0.11) 0.57       8.7     213.00
     1       23.00   11.20    2.557  0.20( 0.11) 0.57       9.9     211.00
     1       22.87   12.18    2.437  0.20( 0.11) 0.57      10.4     184.00
     1       22.78   12.30    2.423  0.20( 0.11) 0.57      10.5     208.00
     2        0.65    5.00    4.060  0.20( 0.02) 0.10       0.2     215.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.85    5.00    4.060  0.20( 0.11) 0.54       4.6     215.00
     2       20.46    7.17    3.302  0.20( 0.11) 0.55       6.6      59.00
     3       22.34    8.93    2.911  0.20( 0.11) 0.56       8.3      64.00
     4       22.81    9.58    2.796  0.20( 0.11) 0.56       8.9     213.00
     5       23.41   11.20    2.557  0.20( 0.11) 0.56      10.1     211.00
     6       23.26   12.18    2.437  0.20( 0.11) 0.56      10.6     184.00
     7       23.17   12.30    2.423  0.20( 0.11) 0.56      10.6     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.41    Tc(MIN.) =    11.20
 EFFECTIVE AREA(ACRES) =      10.13   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       10.6
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.41
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.26
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.85    5.06    4.031  0.20( 0.11) 0.54       4.6     215.00
     2       20.46    7.23    3.287  0.20( 0.11) 0.55       6.6      59.00
     3       22.34    8.99    2.901  0.20( 0.11) 0.56       8.3      64.00
     4       22.81    9.64    2.786  0.20( 0.11) 0.56       8.9     213.00
     5       23.41   11.26    2.549  0.20( 0.11) 0.56      10.1     211.00
     6       23.26   12.24    2.431  0.20( 0.11) 0.56      10.6     184.00
     7       23.17   12.36    2.417  0.20( 0.11) 0.56      10.6     208.00
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       60.52    5.84    3.715  0.20( 0.10) 0.48      15.8     183.00
```

2	61.93	6.16	3.602	0.20(0.10)	0.48	16.8	195.00
3	63.14	6.48	3.498	0.20(0.10)	0.48	17.7	170.00
4	64.02	6.71	3.430	0.20(0.10)	0.48	18.4	175.00
5	64.39	6.82	3.399	0.20(0.10)	0.48	18.7	161.00
6	65.42	7.13	3.313	0.20(0.10)	0.48	19.6	174.00
7	66.41	7.46	3.227	0.20(0.10)	0.48	20.6	192.00
8	66.49	7.49	3.220	0.20(0.10)	0.48	20.7	173.00
9	66.54	7.51	3.214	0.20(0.10)	0.48	20.7	150.00
10	67.58	8.02	3.096	0.20(0.10)	0.49	22.1	14.00
11	68.27	8.39	3.018	0.20(0.10)	0.49	23.0	199.00
12	68.43	8.50	2.996	0.20(0.10)	0.49	23.3	167.00
13	68.63	8.66	2.963	0.20(0.10)	0.49	23.7	191.10
14	68.69	8.73	2.950	0.20(0.10)	0.49	23.8	154.00
15	68.87	9.00	2.899	0.20(0.10)	0.49	24.4	190.00
16	68.88	9.02	2.896	0.20(0.10)	0.49	24.4	200.00
17	68.92	9.46	2.817	0.20(0.10)	0.49	25.3	19.00
18	68.90	9.82	2.758	0.20(0.10)	0.50	25.9	16.00
19	68.87	9.89	2.747	0.20(0.10)	0.50	26.0	168.00
20	68.80	9.99	2.730	0.20(0.10)	0.50	26.2	169.00
21	68.29	10.57	2.643	0.20(0.10)	0.50	27.0	179.00
22	67.68	11.13	2.567	0.20(0.10)	0.50	27.7	181.00
23	67.55	11.21	2.556	0.20(0.10)	0.50	27.8	160.00
24	67.49	11.25	2.551	0.20(0.10)	0.50	27.8	159.00
25	67.45	11.27	2.548	0.20(0.10)	0.50	27.8	17.00
26	66.55	11.69	2.496	0.20(0.10)	0.50	28.1	187.00
27	65.64	12.07	2.450	0.20(0.10)	0.50	28.3	10.00
28	64.08	12.77	2.373	0.20(0.10)	0.51	28.7	184.00
29	63.46	13.00	2.348	0.20(0.10)	0.51	28.8	147.00
30	62.68	13.32	2.316	0.20(0.10)	0.51	28.9	152.00
31	56.15	16.38	2.057	0.20(0.10)	0.51	29.6	144.00
32	52.20	18.36	1.927	0.20(0.10)	0.51	29.7	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 217.00 = 3025.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	74.92	5.06	4.031	0.20(0.10)	0.50	18.4	215.00
2	79.30	5.84	3.715	0.20(0.10)	0.50	21.2	183.00
3	81.10	6.16	3.602	0.20(0.10)	0.50	22.4	195.00
4	82.70	6.48	3.498	0.20(0.10)	0.50	23.6	170.00
5	83.85	6.71	3.430	0.20(0.10)	0.50	24.5	175.00
6	84.35	6.82	3.399	0.20(0.10)	0.50	24.9	161.00
7	85.76	7.13	3.313	0.20(0.10)	0.50	26.1	174.00
8	86.17	7.23	3.287	0.20(0.10)	0.50	26.5	59.00
9	87.12	7.46	3.227	0.20(0.10)	0.50	27.4	192.00
10	87.23	7.49	3.220	0.20(0.10)	0.50	27.5	173.00
11	87.30	7.51	3.214	0.20(0.10)	0.50	27.6	150.00
12	88.89	8.02	3.096	0.20(0.10)	0.50	29.4	14.00
13	89.97	8.39	3.018	0.20(0.10)	0.50	30.8	199.00
14	90.25	8.50	2.996	0.20(0.10)	0.51	31.1	167.00
15	90.62	8.66	2.963	0.20(0.10)	0.51	31.7	191.10
16	90.75	8.73	2.950	0.20(0.10)	0.51	31.9	154.00
17	91.21	8.99	2.901	0.20(0.10)	0.51	32.7	64.00
18	91.22	9.00	2.899	0.20(0.10)	0.51	32.7	190.00
19	91.24	9.02	2.896	0.20(0.10)	0.51	32.8	200.00
20	91.60	9.46	2.817	0.20(0.10)	0.51	34.0	19.00
21	91.72	9.64	2.786	0.20(0.10)	0.51	34.5	213.00
22	91.77	9.82	2.758	0.20(0.10)	0.51	34.9	16.00
23	91.77	9.89	2.747	0.20(0.10)	0.51	35.1	168.00
24	91.74	9.99	2.730	0.20(0.10)	0.51	35.3	169.00
25	91.45	10.57	2.643	0.20(0.10)	0.52	36.6	179.00
26	91.04	11.13	2.567	0.20(0.10)	0.52	37.7	181.00
27	90.94	11.21	2.556	0.20(0.10)	0.52	37.8	160.00
28	90.90	11.25	2.551	0.20(0.10)	0.52	37.9	159.00
29	90.88	11.26	2.549	0.20(0.10)	0.52	37.9	211.00
30	90.86	11.27	2.548	0.20(0.10)	0.52	37.9	17.00
31	89.89	11.69	2.496	0.20(0.10)	0.52	38.4	187.00
32	88.92	12.07	2.450	0.20(0.10)	0.52	38.8	10.00
33	88.52	12.24	2.431	0.20(0.10)	0.52	39.0	184.00
34	88.16	12.36	2.417	0.20(0.10)	0.52	39.1	208.00
35	86.80	12.77	2.373	0.20(0.10)	0.52	39.3	184.00

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     36       85.93   13.00    2.348  0.20( 0.10) 0.52      39.4     147.00
     37       84.83   13.32    2.316  0.20( 0.10) 0.52      39.5     152.00
     38       75.70   16.38    2.057  0.20( 0.10) 0.52      40.2     144.00
     39       70.44   18.36    1.927  0.20( 0.10) 0.52      40.3     147.00
    TOTAL AREA(ACRES) =        40.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       91.77  Tc(MIN.) =    9.818
  EFFECTIVE AREA(ACRES) =     34.93  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       40.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.98
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.77
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   10.17
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.17
  RAINFALL INTENSITY(INCH/HR) =   2.70
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      34.93
  TOTAL STREAM AREA(ACRES) =      40.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      91.77

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    75    7.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      2.50
```

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****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.93
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    9.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.850
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    3.42
  EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.27
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.30
  TOTAL STREAM AREA(ACRES) =       2.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.92    5.43    3.870  0.20( 0.10) 0.50      18.4     215.00
      1       79.30    6.21    3.587  0.20( 0.10) 0.50      21.2     183.00
      1       81.10    6.53    3.485  0.20( 0.10) 0.50      22.4     195.00
      1       82.70    6.85    3.390  0.20( 0.10) 0.50      23.6     170.00
      1       83.85    7.07    3.328  0.20( 0.10) 0.50      24.5     175.00
      1       84.35    7.18    3.299  0.20( 0.10) 0.50      24.9     161.00
```

1	85.76	7.49	3.219	0.20(0.10)	0.50	26.1	174.00
1	86.17	7.59	3.195	0.20(0.10)	0.50	26.5	59.00
1	87.12	7.83	3.140	0.20(0.10)	0.50	27.4	192.00
1	87.23	7.86	3.133	0.20(0.10)	0.50	27.5	173.00
1	87.30	7.88	3.128	0.20(0.10)	0.50	27.6	150.00
1	88.89	8.39	3.018	0.20(0.10)	0.50	29.4	14.00
1	89.97	8.75	2.945	0.20(0.10)	0.50	30.8	199.00
1	90.25	8.86	2.925	0.20(0.10)	0.51	31.1	167.00
1	90.62	9.02	2.894	0.20(0.10)	0.51	31.7	191.10
1	90.75	9.08	2.884	0.20(0.10)	0.51	31.9	154.00
1	91.21	9.34	2.837	0.20(0.10)	0.51	32.7	64.00
1	91.22	9.35	2.836	0.20(0.10)	0.51	32.7	190.00
1	91.24	9.37	2.833	0.20(0.10)	0.51	32.8	200.00
1	91.60	9.81	2.758	0.20(0.10)	0.51	34.0	19.00
1	91.72	10.00	2.730	0.20(0.10)	0.51	34.5	213.00
1	91.77	10.17	2.703	0.20(0.10)	0.51	34.9	16.00
1	91.77	10.24	2.692	0.20(0.10)	0.51	35.1	168.00
1	91.74	10.35	2.676	0.20(0.10)	0.51	35.3	169.00
1	91.45	10.93	2.594	0.20(0.10)	0.52	36.6	179.00
1	91.04	11.48	2.521	0.20(0.10)	0.52	37.7	181.00
1	90.94	11.57	2.511	0.20(0.10)	0.52	37.8	160.00
1	90.90	11.60	2.506	0.20(0.10)	0.52	37.9	159.00
1	90.88	11.61	2.505	0.20(0.10)	0.52	37.9	211.00
1	90.86	11.62	2.504	0.20(0.10)	0.52	37.9	17.00
1	89.89	12.05	2.452	0.20(0.10)	0.52	38.4	187.00
1	88.92	12.44	2.408	0.20(0.10)	0.52	38.8	10.00
1	88.52	12.60	2.390	0.20(0.10)	0.52	39.0	184.00
1	88.16	12.72	2.377	0.20(0.10)	0.52	39.1	208.00
1	86.80	13.13	2.335	0.20(0.10)	0.52	39.3	184.00
1	85.93	13.37	2.311	0.20(0.10)	0.52	39.4	147.00
1	84.83	13.68	2.280	0.20(0.10)	0.52	39.5	152.00
1	75.70	16.75	2.031	0.20(0.10)	0.52	40.2	144.00
1	70.44	18.73	1.905	0.20(0.10)	0.52	40.3	147.00
2	5.65	9.27	2.850	0.20(0.12)	0.60	2.3	201.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.47	5.43	3.870	0.20(0.10)	0.51	19.7	215.00
2	84.10	6.21	3.587	0.20(0.10)	0.51	22.7	183.00
3	86.01	6.53	3.485	0.20(0.10)	0.51	24.0	195.00
4	87.70	6.85	3.390	0.20(0.10)	0.51	25.3	170.00
5	88.91	7.07	3.328	0.20(0.10)	0.51	26.3	175.00
6	89.45	7.18	3.299	0.20(0.10)	0.51	26.7	161.00
7	90.95	7.49	3.219	0.20(0.10)	0.51	28.0	174.00
8	91.39	7.59	3.195	0.20(0.10)	0.51	28.4	59.00
9	92.40	7.83	3.140	0.20(0.10)	0.51	29.3	192.00
10	92.52	7.86	3.133	0.20(0.10)	0.51	29.5	173.00
11	92.60	7.88	3.128	0.20(0.10)	0.51	29.5	150.00
12	94.31	8.39	3.018	0.20(0.10)	0.51	31.5	14.00
13	95.49	8.75	2.945	0.20(0.10)	0.51	32.9	199.00
14	95.80	8.86	2.925	0.20(0.10)	0.51	33.3	167.00
15	96.22	9.02	2.894	0.20(0.10)	0.51	33.9	191.10
16	96.36	9.08	2.884	0.20(0.10)	0.51	34.1	154.00
17	96.73	9.27	2.850	0.20(0.10)	0.51	34.8	201.00
18	96.83	9.34	2.837	0.20(0.10)	0.51	35.0	64.00
19	96.84	9.35	2.836	0.20(0.10)	0.51	35.0	190.00
20	96.85	9.37	2.833	0.20(0.10)	0.51	35.1	200.00
21	97.07	9.81	2.758	0.20(0.10)	0.52	36.3	19.00
22	97.12	10.00	2.730	0.20(0.10)	0.52	36.8	213.00
23	97.12	10.17	2.703	0.20(0.10)	0.52	37.2	16.00
24	97.10	10.24	2.692	0.20(0.10)	0.52	37.4	168.00
25	97.03	10.35	2.676	0.20(0.10)	0.52	37.6	169.00
26	96.57	10.93	2.594	0.20(0.10)	0.52	38.9	179.00
27	96.01	11.48	2.521	0.20(0.10)	0.52	40.0	181.00
28	95.89	11.57	2.511	0.20(0.10)	0.52	40.1	160.00
29	95.84	11.60	2.506	0.20(0.10)	0.52	40.2	159.00
30	95.81	11.61	2.505	0.20(0.10)	0.52	40.2	211.00

```
    31       95.79   11.62    2.504  0.20( 0.10) 0.52      40.2      17.00
    32       94.72   12.05    2.452  0.20( 0.10) 0.52      40.7     187.00
    33       93.66   12.44    2.408  0.20( 0.10) 0.52      41.1      10.00
    34       93.22   12.60    2.390  0.20( 0.11) 0.53      41.3     184.00
    35       92.83   12.72    2.377  0.20( 0.11) 0.53      41.4     208.00
    36       91.39   13.13    2.335  0.20( 0.11) 0.53      41.6     184.00
    37       90.46   13.37    2.311  0.20( 0.11) 0.53      41.7     147.00
    38       89.31   13.68    2.280  0.20( 0.11) 0.53      41.8     152.00
    39       79.65   16.75    2.031  0.20( 0.11) 0.53      42.5     144.00
    40       74.14   18.73    1.905  0.20( 0.11) 0.53      42.6     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      97.12    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =      36.79   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       42.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.31
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.12
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =    9.07
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    3.24
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.15
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.15

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.205
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    75    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   0.79   Tc(MIN.) =    8.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   3.03
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.15    9.16    2.869  0.20( 0.12) 0.60       2.1     220.00
      2        4.98    8.34    3.028  0.20( 0.10) 0.50       1.9     223.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.94    8.34    3.028  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.16    2.869  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.94    Tc(MIN.) =     8.34
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.94    8.68    2.959  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.51    2.809  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.47    5.46    3.859  0.20( 0.10) 0.51      19.7     215.00
      2       84.10    6.23    3.577  0.20( 0.10) 0.51      22.7     183.00
      3       86.01    6.56    3.476  0.20( 0.10) 0.51      24.0     195.00
      4       87.70    6.88    3.382  0.20( 0.10) 0.51      25.3     170.00
      5       88.91    7.10    3.320  0.20( 0.10) 0.51      26.3     175.00
      6       89.45    7.21    3.292  0.20( 0.10) 0.51      26.7     161.00
      7       90.95    7.52    3.212  0.20( 0.10) 0.51      28.0     174.00
      8       91.39    7.62    3.188  0.20( 0.10) 0.51      28.4      59.00
      9       92.40    7.85    3.134  0.20( 0.10) 0.51      29.3     192.00
     10       92.52    7.88    3.127  0.20( 0.10) 0.51      29.5     173.00
```

11	92.60	7.91	3.122	0.20(0.10)	0.51	29.5	150.00
12	94.31	8.41	3.013	0.20(0.10)	0.51	31.5	14.00
13	95.49	8.78	2.940	0.20(0.10)	0.51	32.9	199.00
14	95.80	8.89	2.919	0.20(0.10)	0.51	33.3	167.00
15	96.22	9.05	2.889	0.20(0.10)	0.51	33.9	191.10
16	96.36	9.11	2.879	0.20(0.10)	0.51	34.1	154.00
17	96.73	9.30	2.845	0.20(0.10)	0.51	34.8	201.00
18	96.83	9.37	2.833	0.20(0.10)	0.51	35.0	64.00
19	96.84	9.38	2.831	0.20(0.10)	0.51	35.0	190.00
20	96.85	9.40	2.828	0.20(0.10)	0.51	35.1	200.00
21	97.07	9.84	2.754	0.20(0.10)	0.52	36.3	19.00
22	97.12	10.02	2.725	0.20(0.10)	0.52	36.8	213.00
23	97.12	10.20	2.698	0.20(0.10)	0.52	37.2	16.00
24	97.10	10.27	2.688	0.20(0.10)	0.52	37.4	168.00
25	97.03	10.37	2.672	0.20(0.10)	0.52	37.6	169.00
26	96.57	10.95	2.590	0.20(0.10)	0.52	38.9	179.00
27	96.01	11.51	2.518	0.20(0.10)	0.52	40.0	181.00
28	95.89	11.59	2.507	0.20(0.10)	0.52	40.1	160.00
29	95.84	11.63	2.503	0.20(0.10)	0.52	40.2	159.00
30	95.81	11.64	2.501	0.20(0.10)	0.52	40.2	211.00
31	95.79	11.65	2.500	0.20(0.10)	0.52	40.2	17.00
32	94.72	12.08	2.449	0.20(0.10)	0.52	40.7	187.00
33	93.66	12.46	2.405	0.20(0.10)	0.52	41.1	10.00
34	93.22	12.63	2.387	0.20(0.11)	0.53	41.3	184.00
35	92.83	12.75	2.374	0.20(0.11)	0.53	41.4	208.00
36	91.39	13.16	2.332	0.20(0.11)	0.53	41.6	184.00
37	90.46	13.40	2.308	0.20(0.11)	0.53	41.7	147.00
38	89.31	13.71	2.277	0.20(0.11)	0.53	41.8	152.00
39	79.65	16.78	2.029	0.20(0.11)	0.53	42.5	144.00
40	74.14	18.76	1.903	0.20(0.11)	0.53	42.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 226.00 = 3435.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.70	5.46	3.859	0.20(0.10)	0.51	22.1	215.00
2	92.79	6.23	3.577	0.20(0.10)	0.51	25.4	183.00
3	94.87	6.56	3.476	0.20(0.10)	0.51	26.9	195.00
4	96.74	6.88	3.382	0.20(0.10)	0.51	28.3	170.00
5	98.07	7.10	3.320	0.20(0.10)	0.51	29.3	175.00
6	98.67	7.21	3.292	0.20(0.10)	0.51	29.8	161.00
7	100.33	7.52	3.212	0.20(0.10)	0.51	31.3	174.00
8	100.82	7.62	3.188	0.20(0.10)	0.51	31.7	59.00
9	101.95	7.85	3.134	0.20(0.10)	0.51	32.8	192.00
10	102.08	7.88	3.127	0.20(0.10)	0.51	32.9	173.00
11	102.17	7.91	3.122	0.20(0.10)	0.51	33.0	150.00
12	104.13	8.41	3.013	0.20(0.10)	0.51	35.2	14.00
13	105.11	8.68	2.959	0.20(0.10)	0.51	36.3	223.00
14	105.42	8.78	2.940	0.20(0.10)	0.51	36.7	199.00
15	105.72	8.89	2.919	0.20(0.10)	0.52	37.1	167.00
16	106.12	9.05	2.889	0.20(0.10)	0.52	37.8	191.10
17	106.26	9.11	2.879	0.20(0.10)	0.52	38.0	154.00
18	106.61	9.30	2.845	0.20(0.10)	0.52	38.7	201.00
19	106.71	9.37	2.833	0.20(0.10)	0.52	38.9	64.00
20	106.72	9.38	2.831	0.20(0.10)	0.52	39.0	190.00
21	106.73	9.40	2.828	0.20(0.10)	0.52	39.0	200.00
22	106.77	9.51	2.809	0.20(0.10)	0.52	39.3	220.00
23	106.73	9.84	2.754	0.20(0.10)	0.52	40.3	19.00
24	106.68	10.02	2.725	0.20(0.10)	0.52	40.8	213.00
25	106.58	10.20	2.698	0.20(0.10)	0.52	41.2	16.00
26	106.52	10.27	2.688	0.20(0.10)	0.52	41.4	168.00
27	106.39	10.37	2.672	0.20(0.10)	0.52	41.6	169.00
28	105.63	10.95	2.590	0.20(0.10)	0.52	42.8	179.00
29	104.81	11.51	2.518	0.20(0.11)	0.53	44.0	181.00
30	104.65	11.59	2.507	0.20(0.11)	0.53	44.1	160.00
31	104.58	11.63	2.503	0.20(0.11)	0.53	44.2	159.00
32	104.55	11.64	2.501	0.20(0.11)	0.53	44.2	211.00
33	104.53	11.65	2.500	0.20(0.11)	0.53	44.2	17.00
34	103.26	12.08	2.449	0.20(0.11)	0.53	44.7	187.00
35	102.04	12.46	2.405	0.20(0.11)	0.53	45.1	10.00
36	101.54	12.63	2.387	0.20(0.11)	0.53	45.3	184.00

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     37      101.10   12.75    2.374  0.20( 0.11) 0.53      45.4     208.00
     38       99.50   13.16    2.332  0.20( 0.11) 0.53      45.6     184.00
     39       98.49   13.40    2.308  0.20( 0.11) 0.53      45.7     147.00
     40       97.22   13.71    2.277  0.20( 0.11) 0.53      45.8     152.00
     41       86.66   16.78    2.029  0.20( 0.11) 0.53      46.5     144.00
     42       80.69   18.76    1.903  0.20( 0.11) 0.53      46.6     147.00
    TOTAL AREA(ACRES) =        46.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      106.77  Tc(MIN.) =    9.507
  EFFECTIVE AREA(ACRES) =     39.35  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       46.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  53.43
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.77
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       87.70    5.47    3.856  0.20( 0.10) 0.51      22.1     215.00
      2       92.79    6.24    3.575  0.20( 0.10) 0.51      25.4     183.00
      3       94.87    6.56    3.474  0.20( 0.10) 0.51      26.9     195.00
      4       96.74    6.88    3.380  0.20( 0.10) 0.51      28.3     170.00
      5       98.07    7.11    3.318  0.20( 0.10) 0.51      29.3     175.00
      6       98.67    7.22    3.290  0.20( 0.10) 0.51      29.8     161.00
      7      100.33    7.53    3.211  0.20( 0.10) 0.51      31.3     174.00
      8      100.82    7.63    3.187  0.20( 0.10) 0.51      31.7      59.00
      9      101.95    7.86    3.132  0.20( 0.10) 0.51      32.8     192.00
     10      102.08    7.89    3.126  0.20( 0.10) 0.51      32.9     173.00
     11      102.17    7.91    3.121  0.20( 0.10) 0.51      33.0     150.00
     12      104.13    8.42    3.011  0.20( 0.10) 0.51      35.2      14.00
     13      105.11    8.69    2.958  0.20( 0.10) 0.51      36.3     223.00
     14      105.42    8.79    2.939  0.20( 0.10) 0.51      36.7     199.00
     15      105.72    8.90    2.918  0.20( 0.10) 0.52      37.1     167.00
     16      106.12    9.06    2.888  0.20( 0.10) 0.52      37.8     191.10
     17      106.26    9.11    2.878  0.20( 0.10) 0.52      38.0     154.00
     18      106.61    9.30    2.844  0.20( 0.10) 0.52      38.7     201.00
     19      106.71    9.38    2.831  0.20( 0.10) 0.52      38.9      64.00
     20      106.72    9.39    2.830  0.20( 0.10) 0.52      39.0     190.00
     21      106.73    9.40    2.827  0.20( 0.10) 0.52      39.0     200.00
     22      106.77    9.51    2.808  0.20( 0.10) 0.52      39.3     220.00
     23      106.73    9.85    2.753  0.20( 0.10) 0.52      40.3      19.00
     24      106.68   10.03    2.724  0.20( 0.10) 0.52      40.8     213.00
     25      106.58   10.20    2.697  0.20( 0.10) 0.52      41.2      16.00
     26      106.52   10.27    2.687  0.20( 0.10) 0.52      41.4     168.00
```

27	106.39	10.38	2.671	0.20(0.10)	0.52	41.6	169.00
28	105.63	10.96	2.589	0.20(0.10)	0.52	42.8	179.00
29	104.81	11.52	2.517	0.20(0.11)	0.53	44.0	181.00
30	104.65	11.60	2.506	0.20(0.11)	0.53	44.1	160.00
31	104.58	11.63	2.502	0.20(0.11)	0.53	44.2	159.00
32	104.55	11.65	2.501	0.20(0.11)	0.53	44.2	211.00
33	104.53	11.65	2.500	0.20(0.11)	0.53	44.2	17.00
34	103.26	12.08	2.448	0.20(0.11)	0.53	44.7	187.00
35	102.04	12.47	2.405	0.20(0.11)	0.53	45.1	10.00
36	101.54	12.64	2.386	0.20(0.11)	0.53	45.3	184.00
37	101.10	12.76	2.373	0.20(0.11)	0.53	45.4	208.00
38	99.50	13.16	2.331	0.20(0.11)	0.53	45.6	184.00
39	98.49	13.40	2.307	0.20(0.11)	0.53	45.7	147.00
40	97.22	13.72	2.277	0.20(0.11)	0.53	45.8	152.00
41	86.66	16.78	2.028	0.20(0.11)	0.53	46.5	144.00
42	80.69	18.77	1.902	0.20(0.11)	0.53	46.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 230.00 = 3455.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	140.15	5.07	4.028	0.20(0.12)	0.58	32.7	140.00
2	148.91	5.87	3.702	0.20(0.12)	0.58	38.0	104.00
3	154.44	6.38	3.530	0.20(0.12)	0.58	41.6	88.00
4	155.50	6.48	3.499	0.20(0.12)	0.58	42.3	63.00
5	156.88	6.61	3.460	0.20(0.12)	0.58	43.3	47.00
6	157.71	6.68	3.437	0.20(0.12)	0.58	43.8	45.00
7	164.14	7.32	3.263	0.20(0.12)	0.58	48.7	59.00
8	164.53	7.36	3.253	0.20(0.12)	0.58	49.0	95.00
9	166.55	7.58	3.199	0.20(0.12)	0.58	50.7	118.00
10	168.43	7.78	3.151	0.20(0.12)	0.58	52.3	138.00
11	172.85	8.26	3.044	0.20(0.12)	0.58	56.0	141.00
12	176.76	8.71	2.954	0.20(0.12)	0.58	59.5	31.00
13	178.37	8.90	2.918	0.20(0.12)	0.58	61.0	85.00
14	178.37	8.90	2.918	0.20(0.12)	0.58	61.0	97.00
15	178.78	8.96	2.906	0.20(0.12)	0.58	61.4	136.00
16	179.43	9.07	2.885	0.20(0.12)	0.58	62.2	38.00
17	179.64	9.11	2.878	0.20(0.12)	0.58	62.4	80.00
18	180.87	9.37	2.833	0.20(0.12)	0.58	64.1	6.00
19	181.72	9.54	2.803	0.20(0.12)	0.58	65.3	92.00
20	182.06	9.62	2.790	0.20(0.12)	0.58	65.8	35.00
21	182.26	9.67	2.781	0.20(0.12)	0.58	66.1	24.00
22	182.55	9.75	2.769	0.20(0.12)	0.58	66.6	46.00
23	183.15	9.93	2.740	0.20(0.12)	0.58	67.7	129.00
24	183.16	9.93	2.740	0.20(0.12)	0.58	67.7	25.00
25	183.86	10.20	2.699	0.20(0.12)	0.58	69.2	64.00
26	184.25	10.37	2.673	0.20(0.12)	0.58	70.2	134.00
27	184.26	10.37	2.672	0.20(0.12)	0.58	70.2	61.00
28	184.41	10.48	2.657	0.20(0.12)	0.58	70.7	32.00
29	184.56	10.59	2.640	0.20(0.12)	0.58	71.3	116.00
30	184.56	10.60	2.640	0.20(0.12)	0.58	71.3	78.00
31	184.37	11.21	2.556	0.20(0.12)	0.58	74.1	76.00
32	184.34	11.27	2.548	0.20(0.12)	0.58	74.4	14.00
33	184.34	11.28	2.547	0.20(0.12)	0.58	74.4	82.00
34	184.28	11.35	2.538	0.20(0.12)	0.58	74.7	67.00
35	184.09	11.53	2.515	0.20(0.12)	0.58	75.5	53.00
36	183.98	11.61	2.506	0.20(0.12)	0.58	75.8	43.00
37	183.75	11.73	2.491	0.20(0.12)	0.58	76.2	33.00
38	183.67	11.75	2.487	0.20(0.12)	0.58	76.3	56.00
39	183.34	11.87	2.473	0.20(0.12)	0.58	76.7	41.00
40	183.29	11.89	2.471	0.20(0.12)	0.58	76.8	114.00
41	182.92	12.00	2.458	0.20(0.12)	0.58	77.1	100.00
42	180.98	12.49	2.403	0.20(0.12)	0.58	78.4	127.00
43	180.53	12.59	2.391	0.20(0.12)	0.58	78.6	13.00
44	180.01	12.71	2.378	0.20(0.12)	0.58	78.9	123.00
45	179.22	12.88	2.361	0.20(0.12)	0.58	79.2	97.00
46	178.25	13.07	2.341	0.20(0.12)	0.58	79.6	19.00
47	178.12	13.09	2.338	0.20(0.12)	0.58	79.7	29.00
48	177.67	13.18	2.330	0.20(0.12)	0.58	79.8	120.00
49	177.59	13.19	2.329	0.20(0.12)	0.58	79.8	33.00
50	177.19	13.26	2.322	0.20(0.12)	0.58	79.9	111.00

51	176.99	13.29	2.319	0.20(0.12)	0.58	80.0	73.00
52	172.65	14.00	2.250	0.20(0.12)	0.58	80.7	16.00
53	170.78	14.33	2.221	0.20(0.12)	0.58	81.0	17.00
54	167.59	14.87	2.174	0.20(0.12)	0.58	81.5	22.00
55	167.13	14.95	2.167	0.20(0.12)	0.58	81.6	10.00
56	165.42	15.22	2.145	0.20(0.12)	0.58	81.7	7.00
57	159.07	16.24	2.067	0.20(0.12)	0.58	82.1	4.00
58	149.37	17.95	1.951	0.20(0.12)	0.58	82.3	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 230.00 = 4035.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	225.15	5.07	4.028	0.20(0.11)	0.55	53.2	140.00
2	232.22	5.47	3.856	0.20(0.11)	0.55	57.4	215.00
3	239.27	5.87	3.702	0.20(0.11)	0.55	61.8	104.00
4	245.70	6.24	3.575	0.20(0.11)	0.55	66.0	183.00
5	248.15	6.38	3.530	0.20(0.11)	0.55	67.6	88.00
6	249.84	6.48	3.499	0.20(0.11)	0.55	68.8	63.00
7	251.26	6.56	3.474	0.20(0.11)	0.55	69.8	195.00
8	252.02	6.61	3.460	0.20(0.11)	0.55	70.3	47.00
9	253.29	6.68	3.437	0.20(0.11)	0.55	71.2	45.00
10	256.46	6.88	3.380	0.20(0.11)	0.55	73.7	170.00
11	260.07	7.11	3.318	0.20(0.11)	0.55	76.4	175.00
12	261.74	7.22	3.290	0.20(0.11)	0.55	77.7	161.00
13	263.37	7.32	3.263	0.20(0.11)	0.55	79.0	59.00
14	263.97	7.36	3.253	0.20(0.11)	0.55	79.5	95.00
15	266.42	7.53	3.211	0.20(0.11)	0.55	81.5	174.00
16	267.12	7.58	3.199	0.20(0.11)	0.55	82.1	118.00
17	267.83	7.63	3.187	0.20(0.11)	0.55	82.8	59.00
18	269.99	7.78	3.151	0.20(0.11)	0.55	84.7	138.00
19	271.11	7.86	3.132	0.20(0.11)	0.55	85.6	192.00
20	271.51	7.89	3.126	0.20(0.11)	0.55	86.0	173.00
21	271.80	7.91	3.121	0.20(0.11)	0.55	86.3	150.00
22	276.36	8.26	3.044	0.20(0.11)	0.55	90.5	141.00
23	278.37	8.42	3.011	0.20(0.11)	0.55	92.5	14.00
24	281.68	8.69	2.958	0.20(0.11)	0.55	95.6	223.00
25	281.94	8.71	2.954	0.20(0.11)	0.55	95.9	31.00
26	282.85	8.79	2.939	0.20(0.11)	0.55	96.8	199.00
27	284.07	8.90	2.918	0.20(0.11)	0.55	98.1	167.00
28	284.09	8.90	2.918	0.20(0.11)	0.55	98.1	85.00
29	284.10	8.90	2.918	0.20(0.11)	0.55	98.1	97.00
30	284.66	8.96	2.906	0.20(0.11)	0.55	98.8	136.00
31	285.46	9.06	2.888	0.20(0.11)	0.55	99.9	191.10
32	285.60	9.07	2.885	0.20(0.11)	0.55	100.0	38.00
33	285.89	9.11	2.878	0.20(0.11)	0.55	100.4	80.00
34	285.90	9.11	2.878	0.20(0.11)	0.55	100.5	154.00
35	287.17	9.30	2.844	0.20(0.11)	0.56	102.4	201.00
36	287.57	9.37	2.833	0.20(0.11)	0.56	103.0	6.00
37	287.62	9.38	2.831	0.20(0.11)	0.56	103.1	64.00
38	287.67	9.39	2.830	0.20(0.11)	0.56	103.2	190.00
39	287.76	9.40	2.827	0.20(0.11)	0.56	103.3	200.00
40	288.34	9.51	2.808	0.20(0.11)	0.56	104.4	220.00
41	288.48	9.54	2.803	0.20(0.11)	0.56	104.7	92.00
42	288.81	9.62	2.790	0.20(0.11)	0.56	105.4	35.00
43	289.00	9.67	2.781	0.20(0.11)	0.56	105.9	24.00
44	289.28	9.75	2.769	0.20(0.11)	0.56	106.6	46.00
45	289.60	9.85	2.753	0.20(0.11)	0.56	107.4	19.00
46	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	129.00
47	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	25.00
48	290.10	10.03	2.724	0.20(0.11)	0.56	109.0	213.00
49	290.44	10.20	2.699	0.20(0.11)	0.56	110.4	64.00
50	290.46	10.20	2.697	0.20(0.11)	0.56	110.4	16.00
51	290.55	10.27	2.687	0.20(0.11)	0.56	111.0	168.00
52	290.65	10.37	2.673	0.20(0.11)	0.56	111.8	134.00
53	290.66	10.37	2.672	0.20(0.11)	0.56	111.8	61.00
54	290.66	10.38	2.671	0.20(0.11)	0.56	111.8	169.00
55	290.67	10.48	2.657	0.20(0.11)	0.56	112.5	32.00
56	290.67	10.59	2.640	0.20(0.11)	0.56	113.4	116.00
57	290.67	10.60	2.640	0.20(0.11)	0.56	113.4	78.00
58	290.08	10.96	2.589	0.20(0.11)	0.56	115.8	179.00

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    59      289.64   11.21    2.556  0.20( 0.11) 0.56     117.4      76.00
    60      289.51   11.27    2.548  0.20( 0.11) 0.56     117.9      14.00
    61      289.50   11.28    2.547  0.20( 0.11) 0.56     117.9      82.00
    62      289.33   11.35    2.538  0.20( 0.11) 0.56     118.4      67.00
    63      288.91   11.52    2.517  0.20( 0.11) 0.56     119.4     181.00
    64      288.86   11.53    2.515  0.20( 0.11) 0.56     119.5      53.00
    65      288.64   11.60    2.506  0.20( 0.11) 0.56     119.8     160.00
    66      288.61   11.61    2.506  0.20( 0.11) 0.56     119.9      43.00
    67      288.51   11.63    2.502  0.20( 0.11) 0.56     120.0     159.00
    68      288.45   11.65    2.501  0.20( 0.11) 0.56     120.1     211.00
    69      288.41   11.65    2.500  0.20( 0.11) 0.56     120.1      17.00
    70      288.07   11.73    2.491  0.20( 0.11) 0.56     120.5      33.00
    71      287.91   11.75    2.487  0.20( 0.11) 0.56     120.6      56.00
    72      287.22   11.87    2.473  0.20( 0.11) 0.56     121.2      41.00
    73      287.11   11.89    2.471  0.20( 0.11) 0.56     121.2     114.00
    74      286.44   12.00    2.458  0.20( 0.11) 0.56     121.7     100.00
    75      285.84   12.08    2.448  0.20( 0.11) 0.56     122.0     187.00
    76      283.09   12.47    2.405  0.20( 0.11) 0.56     123.4      10.00
    77      282.97   12.49    2.403  0.20( 0.11) 0.56     123.5     127.00
    78      282.20   12.59    2.391  0.20( 0.11) 0.56     123.9      13.00
    79      281.88   12.64    2.386  0.20( 0.11) 0.56     124.0     184.00
    80      281.27   12.71    2.378  0.20( 0.11) 0.56     124.2     123.00
    81      280.89   12.76    2.373  0.20( 0.11) 0.56     124.4     208.00
    82      279.85   12.88    2.361  0.20( 0.11) 0.56     124.7      97.00
    83      278.13   13.07    2.341  0.20( 0.11) 0.56     125.2      19.00
    84      277.90   13.09    2.338  0.20( 0.11) 0.56     125.2      29.00
    85      277.23   13.16    2.331  0.20( 0.11) 0.56     125.4     184.00
    86      277.13   13.18    2.330  0.20( 0.11) 0.56     125.4     120.00
    87      276.99   13.19    2.329  0.20( 0.11) 0.56     125.4      33.00
    88      276.31   13.26    2.322  0.20( 0.11) 0.56     125.5     111.00
    89      275.97   13.29    2.319  0.20( 0.11) 0.56     125.6      73.00
    90      274.79   13.40    2.307  0.20( 0.11) 0.56     125.8     147.00
    91      271.62   13.72    2.277  0.20( 0.11) 0.56     126.2     152.00
    92      268.89   14.00    2.250  0.20( 0.11) 0.56     126.6      16.00
    93      265.91   14.33    2.221  0.20( 0.11) 0.56     127.0      17.00
    94      260.83   14.87    2.174  0.20( 0.11) 0.56     127.6      22.00
    95      260.11   14.95    2.167  0.20( 0.11) 0.56     127.7      10.00
    96      257.47   15.22    2.145  0.20( 0.11) 0.56     127.9       7.00
    97      247.60   16.24    2.067  0.20( 0.11) 0.56     128.4       4.00
    98      242.66   16.78    2.028  0.20( 0.11) 0.56     128.6     144.00
    99      232.51   17.95    1.951  0.20( 0.11) 0.56     128.8       1.00
    **      226.08   18.77    1.902  0.20( 0.11) 0.56     128.9     147.00
  TOTAL AREA(ACRES) =       128.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      290.67  Tc(MIN.) =   10.475
  EFFECTIVE AREA(ACRES) =    112.52  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      128.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      128.9  TC(MIN.) =     10.48
  EFFECTIVE AREA(ACRES) =    112.52  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.557
  PEAK FLOW RATE(CFS)   =     290.67

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      225.15    5.07    4.028  0.20( 0.11) 0.55      53.2     140.00
      2      232.22    5.47    3.856  0.20( 0.11) 0.55      57.4     215.00
      3      239.27    5.87    3.702  0.20( 0.11) 0.55      61.8     104.00
      4      245.70    6.24    3.575  0.20( 0.11) 0.55      66.0     183.00
      5      248.15    6.38    3.530  0.20( 0.11) 0.55      67.6      88.00
```

6	249.84	6.48	3.499	0.20(0.11)	0.55	68.8	63.00
7	251.26	6.56	3.474	0.20(0.11)	0.55	69.8	195.00
8	252.02	6.61	3.460	0.20(0.11)	0.55	70.3	47.00
9	253.29	6.68	3.437	0.20(0.11)	0.55	71.2	45.00
10	256.46	6.88	3.380	0.20(0.11)	0.55	73.7	170.00
11	260.07	7.11	3.318	0.20(0.11)	0.55	76.4	175.00
12	261.74	7.22	3.290	0.20(0.11)	0.55	77.7	161.00
13	263.37	7.32	3.263	0.20(0.11)	0.55	79.0	59.00
14	263.97	7.36	3.253	0.20(0.11)	0.55	79.5	95.00
15	266.42	7.53	3.211	0.20(0.11)	0.55	81.5	174.00
16	267.12	7.58	3.199	0.20(0.11)	0.55	82.1	118.00
17	267.83	7.63	3.187	0.20(0.11)	0.55	82.8	59.00
18	269.99	7.78	3.151	0.20(0.11)	0.55	84.7	138.00
19	271.11	7.86	3.132	0.20(0.11)	0.55	85.6	192.00
20	271.51	7.89	3.126	0.20(0.11)	0.55	86.0	173.00
21	271.80	7.91	3.121	0.20(0.11)	0.55	86.3	150.00
22	276.36	8.26	3.044	0.20(0.11)	0.55	90.5	141.00
23	278.37	8.42	3.011	0.20(0.11)	0.55	92.5	14.00
24	281.68	8.69	2.958	0.20(0.11)	0.55	95.6	223.00
25	281.94	8.71	2.954	0.20(0.11)	0.55	95.9	31.00
26	282.85	8.79	2.939	0.20(0.11)	0.55	96.8	199.00
27	284.07	8.90	2.918	0.20(0.11)	0.55	98.1	167.00
28	284.09	8.90	2.918	0.20(0.11)	0.55	98.1	85.00
29	284.10	8.90	2.918	0.20(0.11)	0.55	98.1	97.00
30	284.66	8.96	2.906	0.20(0.11)	0.55	98.8	136.00
31	285.46	9.06	2.888	0.20(0.11)	0.55	99.9	191.10
32	285.60	9.07	2.885	0.20(0.11)	0.55	100.0	38.00
33	285.89	9.11	2.878	0.20(0.11)	0.55	100.4	80.00
34	285.90	9.11	2.878	0.20(0.11)	0.55	100.5	154.00
35	287.17	9.30	2.844	0.20(0.11)	0.56	102.4	201.00
36	287.57	9.37	2.833	0.20(0.11)	0.56	103.0	6.00
37	287.62	9.38	2.831	0.20(0.11)	0.56	103.1	64.00
38	287.67	9.39	2.830	0.20(0.11)	0.56	103.2	190.00
39	287.76	9.40	2.827	0.20(0.11)	0.56	103.3	200.00
40	288.34	9.51	2.808	0.20(0.11)	0.56	104.4	220.00
41	288.48	9.54	2.803	0.20(0.11)	0.56	104.7	92.00
42	288.81	9.62	2.790	0.20(0.11)	0.56	105.4	35.00
43	289.00	9.67	2.781	0.20(0.11)	0.56	105.9	24.00
44	289.28	9.75	2.769	0.20(0.11)	0.56	106.6	46.00
45	289.60	9.85	2.753	0.20(0.11)	0.56	107.4	19.00
46	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	129.00
47	289.86	9.93	2.740	0.20(0.11)	0.56	108.2	25.00
48	290.10	10.03	2.724	0.20(0.11)	0.56	109.0	213.00
49	290.44	10.20	2.699	0.20(0.11)	0.56	110.4	64.00
50	290.46	10.20	2.697	0.20(0.11)	0.56	110.4	16.00
51	290.55	10.27	2.687	0.20(0.11)	0.56	111.0	168.00
52	290.65	10.37	2.673	0.20(0.11)	0.56	111.8	134.00
53	290.66	10.37	2.672	0.20(0.11)	0.56	111.8	61.00
54	290.66	10.38	2.671	0.20(0.11)	0.56	111.8	169.00
55	290.67	10.48	2.657	0.20(0.11)	0.56	112.5	32.00
56	290.67	10.59	2.640	0.20(0.11)	0.56	113.4	116.00
57	290.67	10.60	2.640	0.20(0.11)	0.56	113.4	78.00
58	290.08	10.96	2.589	0.20(0.11)	0.56	115.8	179.00
59	289.64	11.21	2.556	0.20(0.11)	0.56	117.4	76.00
60	289.51	11.27	2.548	0.20(0.11)	0.56	117.9	14.00
61	289.50	11.28	2.547	0.20(0.11)	0.56	117.9	82.00
62	289.33	11.35	2.538	0.20(0.11)	0.56	118.4	67.00
63	288.91	11.52	2.517	0.20(0.11)	0.56	119.4	181.00
64	288.86	11.53	2.515	0.20(0.11)	0.56	119.5	53.00
65	288.64	11.60	2.506	0.20(0.11)	0.56	119.8	160.00
66	288.61	11.61	2.506	0.20(0.11)	0.56	119.9	43.00
67	288.51	11.63	2.502	0.20(0.11)	0.56	120.0	159.00
68	288.45	11.65	2.501	0.20(0.11)	0.56	120.1	211.00
69	288.41	11.65	2.500	0.20(0.11)	0.56	120.1	17.00
70	288.07	11.73	2.491	0.20(0.11)	0.56	120.5	33.00
71	287.91	11.75	2.487	0.20(0.11)	0.56	120.6	56.00
72	287.22	11.87	2.473	0.20(0.11)	0.56	121.2	41.00
73	287.11	11.89	2.471	0.20(0.11)	0.56	121.2	114.00
74	286.44	12.00	2.458	0.20(0.11)	0.56	121.7	100.00
75	285.84	12.08	2.448	0.20(0.11)	0.56	122.0	187.00
76	283.09	12.47	2.405	0.20(0.11)	0.56	123.4	10.00

77	282.97	12.49	2.403	0.20(0.11)	0.56	123.5	127.00
78	282.20	12.59	2.391	0.20(0.11)	0.56	123.9	13.00
79	281.88	12.64	2.386	0.20(0.11)	0.56	124.0	184.00
80	281.27	12.71	2.378	0.20(0.11)	0.56	124.2	123.00
81	280.89	12.76	2.373	0.20(0.11)	0.56	124.4	208.00
82	279.85	12.88	2.361	0.20(0.11)	0.56	124.7	97.00
83	278.13	13.07	2.341	0.20(0.11)	0.56	125.2	19.00
84	277.90	13.09	2.338	0.20(0.11)	0.56	125.2	29.00
85	277.23	13.16	2.331	0.20(0.11)	0.56	125.4	184.00
86	277.13	13.18	2.330	0.20(0.11)	0.56	125.4	120.00
87	276.99	13.19	2.329	0.20(0.11)	0.56	125.4	33.00
88	276.31	13.26	2.322	0.20(0.11)	0.56	125.5	111.00
89	275.97	13.29	2.319	0.20(0.11)	0.56	125.6	73.00
90	274.79	13.40	2.307	0.20(0.11)	0.56	125.8	147.00
91	271.62	13.72	2.277	0.20(0.11)	0.56	126.2	152.00
92	268.89	14.00	2.250	0.20(0.11)	0.56	126.6	16.00
93	265.91	14.33	2.221	0.20(0.11)	0.56	127.0	17.00
94	260.83	14.87	2.174	0.20(0.11)	0.56	127.6	22.00
95	260.11	14.95	2.167	0.20(0.11)	0.56	127.7	10.00
96	257.47	15.22	2.145	0.20(0.11)	0.56	127.9	7.00
97	247.60	16.24	2.067	0.20(0.11)	0.56	128.4	4.00
98	242.66	16.78	2.028	0.20(0.11)	0.56	128.6	144.00
99	232.51	17.95	1.951	0.20(0.11)	0.56	128.8	1.00
**	226.08	18.77	1.902	0.20(0.11)	0.56	128.9	147.00

END OF RATIONAL METHOD ANALYSIS

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - EAST - AREA 'A' (CONTINUE)                                 *
 ************************************************************************

  FILE NAME: EAST-2.DAT
  TIME/DATE OF STUDY: 13:14 01/05/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.48   RAINFALL INTENSITY(INCH/HR) =  2.66
  EFFECTIVE AREA(ACRES) =   112.52
  TOTAL AREA(ACRES) =   128.90        PEAK FLOW RATE(CFS) =    290.70
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.56
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  57.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.57
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     290.70
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.75
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.60      0.20     0.900    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.58
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.58

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.92      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.79
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.03
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    2.25
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       3.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   4.09
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.72
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.72

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.854
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    75    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   10.63
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.635
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.63
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.72   10.46    2.660  0.20( 0.18) 0.90       1.5     231.00
      2        2.21   10.63    2.635  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.46    2.660  0.20( 0.15) 0.76       2.5     231.00
      2        5.89   10.63    2.635  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.91    Tc(MIN.) =    10.46
  EFFECTIVE AREA(ACRES) =       2.47   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.47
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.403
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.76    2.616  0.20( 0.15) 0.76       2.5     231.00
      1        5.89   10.93    2.593  0.20( 0.15) 0.76       2.5     234.00
      2        1.65    6.80    3.403  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.58    6.80    3.403  0.20( 0.14) 0.72       2.1     237.00
     2        7.17   10.76    2.616  0.20( 0.15) 0.73       3.0     231.00
     3        7.14   10.93    2.593  0.20( 0.15) 0.73       3.0     234.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.17    Tc(MIN.) =    10.76
 EFFECTIVE AREA(ACRES) =       3.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
 TOTAL AREA(ACRES) =        3.0
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.17
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.78
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.78
 RAINFALL INTENSITY(INCH/HR) =   2.61
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.73
 EFFECTIVE STREAM AREA(ACRES) =       3.03
 TOTAL STREAM AREA(ACRES) =       3.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.17

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
 ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.77
 TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.58    6.82    3.397  0.20( 0.14) 0.72       2.1     237.00
      1        7.17   10.78    2.614  0.20( 0.15) 0.73       3.0     231.00
      1        7.14   10.95    2.590  0.20( 0.15) 0.73       3.0     234.00
      2        1.77    5.00    4.060  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.00    4.060  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.82    3.397  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.78    2.614  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   10.95    2.590  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.31    Tc(MIN.) =    10.78
  EFFECTIVE AREA(ACRES) =       3.52   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.31
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.05    4.038  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.87    3.384  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.83    2.607  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   11.00    2.584  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      290.70   10.75    2.619  0.20( 0.11) 0.56     112.5     230.00
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      221.39    5.05    4.038  0.20( 0.11) 0.56      54.9     219.00
      2      250.62    6.87    3.384  0.20( 0.11) 0.56      74.5     237.00
      3      299.00   10.75    2.619  0.20( 0.11) 0.56     116.0     230.00
      4      297.70   10.83    2.607  0.20( 0.11) 0.56     116.0     231.00
      5      294.98   11.00    2.584  0.20( 0.11) 0.56     116.1     234.00
    TOTAL AREA(ACRES) =       132.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      299.00  Tc(MIN.) =   10.747
  EFFECTIVE AREA(ACRES) =    116.03  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      132.4
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  58.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.74
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     299.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =     116.03
  TOTAL STREAM AREA(ACRES) =     132.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     299.00

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.573
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        0.51      0.20     0.400    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA RUNOFF(CFS) =      1.60
 TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.60

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.25
 RAINFALL INTENSITY(INCH/HR) =   3.57
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       0.51
 TOTAL STREAM AREA(ACRES) =       0.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.60

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      221.39    5.08    4.024  0.20( 0.11) 0.56      54.9     219.00
     1      250.62    6.90    3.376  0.20( 0.11) 0.56      74.5     237.00
     1      299.00   10.77    2.615  0.20( 0.11) 0.56     116.0     230.00
     1      297.70   10.86    2.603  0.20( 0.11) 0.56     116.0     231.00
     1      294.98   11.03    2.580  0.20( 0.11) 0.56     116.1     234.00
     2        1.60    6.25    3.573  0.20( 0.08) 0.40       0.5     241.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      222.86    5.08    4.024  0.20( 0.11) 0.56      55.3     219.00
     2      241.78    6.25    3.573  0.20( 0.11) 0.56      68.0     241.00
     3      252.13    6.90    3.376  0.20( 0.11) 0.56      75.1     237.00
     4      300.16   10.77    2.615  0.20( 0.11) 0.56     116.5     230.00
     5      298.86   10.86    2.603  0.20( 0.11) 0.56     116.6     231.00
     6      296.13   11.03    2.580  0.20( 0.11) 0.56     116.6     234.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     300.16    Tc(MIN.) =    10.77
 EFFECTIVE AREA(ACRES) =     116.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =      132.9
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.194
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    75    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   8.83   Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        3.25      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    5.71
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =       6.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.19      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.32
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       6.74
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.8  TC(MIN.) =     16.43
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =       6.74
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                            *
* 10-YR STUDY                                                            *
* PROPOSED - EAST - AREA 'A' - WITH 2 FLOW-BY DETENTION BASINS           *
 **************************************************************************

  FILE NAME: EASTB10.DAT
  TIME/DATE OF STUDY: 16:23 01/10/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.585
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.77      0.20      0.600    75   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      1.71
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.28
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.86   Tc(MIN.) =   12.85
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    2.38
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       3.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   13.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.19
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.12
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.95
  TOTAL STREAM AREA(ACRES) =       1.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.94

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.747
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    75    9.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.40
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =   11.58
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.508
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.85
  FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.94   13.19    2.328  0.20( 0.12) 0.60       1.9       1.00
      2        4.45   11.58    2.508  0.20( 0.12) 0.60       2.1       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.19   11.58    2.508  0.20( 0.12) 0.60       3.8       4.00
      2        8.05   13.19    2.328  0.20( 0.12) 0.60       4.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.19    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =       3.78   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.19
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.63
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       4.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.19
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =   10.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.634
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    2.87
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       4.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19   11.63    2.502  0.20( 0.12) 0.60       3.8       4.00
      1        8.05   13.24    2.323  0.20( 0.12) 0.60       4.0       1.00
      2        4.49   10.64    2.634  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.64    2.634  0.20( 0.11) 0.56       5.4       7.00
      2       12.45   11.63    2.502  0.20( 0.11) 0.57       5.8       4.00
      3       11.99   13.24    2.323  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.45    Tc(MIN.) =    11.63
  EFFECTIVE AREA(ACRES) =       5.75   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.45
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.66
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.75
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.45

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.858
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    75    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.71

********************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.81
  STREET FLOW TRAVEL TIME(MIN.) =   1.17   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.669
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    1.72
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.39   10.66    2.631  0.20( 0.11) 0.56       5.4       7.00
      1       12.45   11.66    2.499  0.20( 0.11) 0.57       5.8       4.00
      1       11.99   13.26    2.321  0.20( 0.11) 0.57       6.0       1.00
      2        3.32   10.39    2.669  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.39    2.669  0.20( 0.11) 0.56       6.7      10.00
      2       15.66   10.66    2.631  0.20( 0.11) 0.56       6.9       7.00
      3       15.54   11.66    2.499  0.20( 0.11) 0.56       7.2       4.00
      4       14.86   13.26    2.321  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.66    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.66
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   10.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.94
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.66

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.62
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.62

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.20      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.73
  EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       1.35

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.58   10.68    2.629  0.20( 0.11) 0.56       6.7       10.00
      1       15.66   10.94    2.592  0.20( 0.11) 0.56       6.9        7.00
      1       15.54   11.94    2.465  0.20( 0.11) 0.56       7.2        4.00
      1       14.86   13.55    2.293  0.20( 0.11) 0.56       7.4        1.00
      2        1.35    5.00    4.060  0.20( 0.02) 0.10       0.4        6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.80    5.00    4.060  0.20( 0.10) 0.51       3.5        6.00
      2       16.45   10.68    2.629  0.20( 0.11) 0.54       7.1       10.00
      3       16.52   10.94    2.592  0.20( 0.11) 0.54       7.2        7.00
      4       16.36   11.94    2.465  0.20( 0.11) 0.54       7.6        4.00
      5       15.62   13.55    2.293  0.20( 0.11) 0.54       7.8        1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    10.94
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.97
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.351
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.17

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   3.35
  AREA-AVERAGED Fm(INCH/HR) =  0.02
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.39
  TOTAL STREAM AREA(ACRES) =       0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.80    5.03    4.044  0.20( 0.10) 0.51       3.5       6.00
      1       16.45   10.71    2.624  0.20( 0.11) 0.54       7.1      10.00
      1       16.52   10.97    2.587  0.20( 0.11) 0.54       7.2       7.00
      1       16.36   11.97    2.461  0.20( 0.11) 0.54       7.6       4.00
      1       15.62   13.58    2.290  0.20( 0.11) 0.54       7.8       1.00
      2        1.17    6.99    3.351  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.81    5.03    4.044  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    6.99    3.351  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.71    2.624  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   10.97    2.587  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   11.97    2.461  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.58    2.290  0.20( 0.10) 0.52       8.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.42    Tc(MIN.) =    10.97
  EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.42
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.893
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    75    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.76    9.03    2.893  0.20( 0.10) 0.50       0.7      16.00
      2        2.27    9.34    2.837  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.00    9.03    2.893  0.20( 0.11) 0.56       1.6      16.00
      2        4.00    9.34    2.837  0.20( 0.11) 0.56       1.6      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.00    Tc(MIN.) =     9.03
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.00
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.35
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.190
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.22      0.20     0.100    75    7.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.06
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    8.41
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.64
  FLOW VELOCITY(FEET/SEC.) =  2.47   DEPTH*VELOCITY(FT*FT/SEC.) =   0.56
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   3.01
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.97

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.00    9.35    2.837  0.20( 0.11) 0.56       1.6      16.00
      1        4.00    9.66    2.784  0.20( 0.11) 0.56       1.6      17.00
      2        0.97    8.41    3.013  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.81    8.41    3.013  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.35    2.837  0.20( 0.09) 0.47       2.0      16.00
```

```
     3        4.89    9.66    2.784  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.92    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.92
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.81    8.88    2.920  0.20( 0.09) 0.46       1.8      19.00
      2        4.92    9.82    2.758  0.20( 0.09) 0.47       2.0      16.00
      3        4.89   10.13    2.709  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.81    5.08    4.025  0.20( 0.10) 0.48       3.8       6.00
      2       15.22    7.03    3.340  0.20( 0.10) 0.49       5.1      14.00
      3       17.37   10.75    2.619  0.20( 0.10) 0.51       7.5      10.00
      4       17.42   11.01    2.582  0.20( 0.10) 0.52       7.6       7.00
      5       17.22   12.01    2.457  0.20( 0.10) 0.52       8.0       4.00
      6       16.41   13.62    2.286  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    5.08    4.025  0.20( 0.10) 0.48       4.8       6.00
      2       19.59    7.03    3.340  0.20( 0.10) 0.48       6.6      14.00
      3       21.10    8.88    2.920  0.20( 0.10) 0.49       8.1      19.00
      4       21.75    9.82    2.758  0.20( 0.10) 0.50       8.9      16.00
      5       21.90   10.13    2.709  0.20( 0.10) 0.50       9.1      17.00
      6       22.09   10.75    2.619  0.20( 0.10) 0.51       9.5      10.00
      7       22.07   11.01    2.582  0.20( 0.10) 0.51       9.6       7.00
      8       21.64   12.01    2.457  0.20( 0.10) 0.51       9.9       4.00
      9       20.51   13.62    2.286  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.09  Tc(MIN.) =   10.746
  EFFECTIVE AREA(ACRES) =      9.48  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.29
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.09
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =   11.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.94
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.48
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.09

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.101
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    75    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.96
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.61   Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    0.79
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.791
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.00
  EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       2.78

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.63    6.34    3.542  0.20( 0.10) 0.48       4.8       6.00
      1       19.59    8.28    3.041  0.20( 0.10) 0.48       6.6      14.00
```

```
     1       21.10   10.09    2.715  0.20( 0.10) 0.49       8.1      19.00
     1       21.75   11.01    2.582  0.20( 0.10) 0.50       8.9      16.00
     1       21.90   11.32    2.541  0.20( 0.10) 0.50       9.1      17.00
     1       22.09   11.94    2.465  0.20( 0.10) 0.51       9.5      10.00
     1       22.07   12.21    2.434  0.20( 0.10) 0.51       9.6       7.00
     1       21.64   13.21    2.327  0.20( 0.10) 0.51       9.9       4.00
     1       20.51   14.87    2.174  0.20( 0.10) 0.51      10.2       1.00
     2        2.78    9.61    2.791  0.20( 0.03) 0.16       1.1      13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.97    6.34    3.542  0.20( 0.09) 0.44       5.6       6.00
      2       22.20    8.28    3.041  0.20( 0.09) 0.44       7.5      14.00
      3       23.48    9.61    2.791  0.20( 0.09) 0.45       8.8      13.00
      4       23.80   10.09    2.715  0.20( 0.09) 0.45       9.2      19.00
      5       24.32   11.01    2.582  0.20( 0.09) 0.46      10.0      16.00
      6       24.43   11.32    2.541  0.20( 0.09) 0.47      10.2      17.00
      7       24.54   11.94    2.465  0.20( 0.09) 0.47      10.6      10.00
      8       24.49   12.21    2.434  0.20( 0.09) 0.47      10.7       7.00
      9       23.95   13.21    2.327  0.20( 0.09) 0.47      11.1       4.00
     10       22.67   14.87    2.174  0.20( 0.10) 0.48      11.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.54    Tc(MIN.) =    11.94
  EFFECTIVE AREA(ACRES) =      10.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   12.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.08
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.60
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.54

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.14      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.64      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.52
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.25
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =    5.92
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    2.02
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   3.65
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =    7.07
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.07
  RAINFALL INTENSITY(INCH/HR) =   3.33
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.76
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.97    6.49    3.495  0.20( 0.09) 0.44       5.6       6.00
     1       22.20    8.42    3.011  0.20( 0.09) 0.44       7.5      14.00
     1       23.48    9.75    2.768  0.20( 0.09) 0.45       8.8      13.00
     1       23.80   10.23    2.694  0.20( 0.09) 0.45       9.2      19.00
     1       24.32   11.15    2.564  0.20( 0.09) 0.46      10.0      16.00
     1       24.43   11.46    2.523  0.20( 0.09) 0.47      10.2      17.00
     1       24.54   12.08    2.449  0.20( 0.09) 0.47      10.6      10.00
     1       24.49   12.35    2.418  0.20( 0.09) 0.47      10.7       7.00
     1       23.95   13.35    2.312  0.20( 0.09) 0.47      11.1       4.00
     1       22.67   15.01    2.162  0.20( 0.10) 0.48      11.3       1.00
     2        2.48    7.07    3.330  0.20( 0.15) 0.76       0.8      25.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       22.36    6.49    3.495  0.20( 0.09) 0.47       6.3       6.00
     2       23.11    7.07    3.330  0.20( 0.09) 0.47       6.9      25.00
     3       24.43    8.42    3.011  0.20( 0.09) 0.47       8.3      14.00
     4       25.53    9.75    2.768  0.20( 0.09) 0.47       9.6      13.00
     5       25.79   10.23    2.694  0.20( 0.10) 0.48      10.0      19.00
     6       26.20   11.15    2.564  0.20( 0.10) 0.48      10.8      16.00
     7       26.28   11.46    2.523  0.20( 0.10) 0.49      11.0      17.00
     8       26.34   12.08    2.449  0.20( 0.10) 0.49      11.4      10.00
     9       26.26   12.35    2.418  0.20( 0.10) 0.49      11.5       7.00
    10       25.64   13.35    2.312  0.20( 0.10) 0.49      11.8       4.00
    11       24.24   15.01    2.162  0.20( 0.10) 0.50      12.1       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      26.34    Tc(MIN.) =    12.08
 EFFECTIVE AREA(ACRES) =      11.38   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       12.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.36
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.34
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   12.16
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.16
 RAINFALL INTENSITY(INCH/HR) =   2.44
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      11.38
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.34

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.33
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.78   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.678
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  3.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   2.68
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.00

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       22.36    6.57    3.470  0.20( 0.09) 0.47       6.3       6.00
     1       23.11    7.15    3.308  0.20( 0.09) 0.47       6.9      25.00
     1       24.43    8.50    2.995  0.20( 0.09) 0.47       8.3      14.00
     1       25.53    9.83    2.755  0.20( 0.09) 0.47       9.6      13.00
     1       25.79   10.31    2.682  0.20( 0.10) 0.48      10.0      19.00
     1       26.20   11.23    2.553  0.20( 0.10) 0.48      10.8      16.00
     1       26.28   11.54    2.513  0.20( 0.10) 0.49      11.0      17.00
     1       26.34   12.16    2.440  0.20( 0.10) 0.49      11.4      10.00
     1       26.26   12.43    2.409  0.20( 0.10) 0.49      11.5       7.00
     1       25.64   13.43    2.304  0.20( 0.10) 0.49      11.8       4.00
     1       24.24   15.09    2.156  0.20( 0.10) 0.50      12.1       1.00
     2        5.00   10.34    2.678  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       26.52    6.57    3.470  0.20( 0.10) 0.50       7.7       6.00
     2       27.42    7.15    3.308  0.20( 0.10) 0.50       8.4      25.00
     3       29.05    8.50    2.995  0.20( 0.10) 0.50      10.1      14.00
     4       30.42    9.83    2.755  0.20( 0.10) 0.50      11.7      13.00
     5       30.78   10.31    2.682  0.20( 0.10) 0.50      12.2      19.00
     6       30.79   10.34    2.678  0.20( 0.10) 0.50      12.2      29.00
     7       30.95   11.23    2.553  0.20( 0.10) 0.50      12.9      16.00
     8       30.96   11.54    2.513  0.20( 0.10) 0.50      13.2      17.00
     9       30.87   12.16    2.440  0.20( 0.10) 0.51      13.6      10.00
    10       30.73   12.43    2.409  0.20( 0.10) 0.51      13.7       7.00
    11       29.90   13.43    2.304  0.20( 0.10) 0.51      14.0       4.00
    12       28.22   15.09    2.156  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      30.96    Tc(MIN.) =    11.54
 EFFECTIVE AREA(ACRES) =      13.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.89
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.96
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.89
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      13.16
  TOTAL STREAM AREA(ACRES) =      14.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.96

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.281
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.24      0.20      0.100    75    7.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.25
  RAINFALL INTENSITY(INCH/HR) =   3.28
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.70

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.568
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D       0.25      0.20      0.100    75    6.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   3.57
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.52    6.94    3.364  0.20( 0.10) 0.50       7.7       6.00
      1       27.42    7.51    3.215  0.20( 0.10) 0.50       8.4      25.00
      1       29.05    8.86    2.924  0.20( 0.10) 0.50      10.1      14.00
      1       30.42   10.18    2.701  0.20( 0.10) 0.50      11.7      13.00
      1       30.78   10.66    2.631  0.20( 0.10) 0.50      12.2      19.00
      1       30.79   10.68    2.628  0.20( 0.10) 0.50      12.2      29.00
      1       30.95   11.58    2.509  0.20( 0.10) 0.50      12.9      16.00
      1       30.96   11.89    2.471  0.20( 0.10) 0.50      13.2      17.00
      1       30.87   12.51    2.401  0.20( 0.10) 0.51      13.6      10.00
      1       30.73   12.77    2.372  0.20( 0.10) 0.51      13.7       7.00
      1       29.90   13.78    2.271  0.20( 0.10) 0.51      14.0       4.00
      1       28.22   15.45    2.127  0.20( 0.10) 0.51      14.2       1.00
      2        0.70    7.25    3.281  0.20( 0.02) 0.10       0.2      24.00
      3        0.80    6.26    3.568  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.26    3.568  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    6.94    3.364  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.25    3.281  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.51    3.215  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.86    2.924  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.18    2.701  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.66    2.631  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.68    2.628  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.58    2.509  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.89    2.471  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.51    2.401  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.77    2.372  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.78    2.271  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.45    2.127  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.05    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =      13.42   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.24
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      32.05
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.66
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        D        1.20      0.20      0.600    75    8.46
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.11
 TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
 FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
 STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.33
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    8.93
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.42
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
 STREET FLOW TRAVEL TIME(MIN.) =   0.78   Tc(MIN.) =    9.24
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.855
 SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.99      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.99      SUBAREA RUNOFF(CFS) =     2.44
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  5.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.435
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.73      0.20      0.600    75    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.18

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   0.43   Tc(MIN.) =    7.13
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.314
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       3.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.13
  RAINFALL INTENSITY(INCH/HR) =   3.31
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.16
  TOTAL STREAM AREA(ACRES) =       1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.39    9.24    2.855  0.20( 0.12) 0.60       2.2      33.00
      2        3.33    7.13    3.314  0.20( 0.12) 0.60       1.2      35.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19    7.13    3.314  0.20( 0.12) 0.60       2.8      35.00
      2        8.25    9.24    2.855  0.20( 0.12) 0.60       3.4      33.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.25    Tc(MIN.) =     9.24
  EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.25
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.19    7.28    3.272  0.20( 0.12) 0.60       2.8      35.00
      2        8.25    9.40    2.827  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.89    6.35    3.541  0.20( 0.09) 0.47       7.4      31.00
      2       27.97    7.02    3.341  0.20( 0.09) 0.47       8.1       6.00
      3       28.45    7.34    3.259  0.20( 0.09) 0.47       8.6      24.00
      4       28.82    7.59    3.195  0.20( 0.10) 0.48       8.9      25.00
      5       30.33    8.95    2.908  0.20( 0.10) 0.48      10.6      14.00
      6       31.61   10.26    2.689  0.20( 0.10) 0.48      12.2      13.00
      7       31.93   10.74    2.620  0.20( 0.10) 0.48      12.7      19.00
      8       31.94   10.76    2.616  0.20( 0.10) 0.48      12.7      29.00
      9       32.05   11.66    2.499  0.20( 0.10) 0.49      13.4      16.00
     10       32.04   11.97    2.462  0.20( 0.10) 0.49      13.7      17.00
     11       31.92   12.59    2.392  0.20( 0.10) 0.49      14.0      10.00
     12       31.77   12.86    2.363  0.20( 0.10) 0.49      14.2       7.00
     13       30.89   13.86    2.263  0.20( 0.10) 0.50      14.5       4.00
     14       29.15   15.54    2.120  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    6.35    3.541  0.20( 0.10) 0.50       9.9      31.00
      2       36.04    7.02    3.341  0.20( 0.10) 0.50      10.9       6.00
      3       36.56    7.28    3.272  0.20( 0.10) 0.51      11.4      35.00
      4       36.64    7.34    3.259  0.20( 0.10) 0.51      11.4      24.00
      5       37.02    7.59    3.195  0.20( 0.10) 0.51      11.8      25.00
      6       38.57    8.95    2.908  0.20( 0.10) 0.51      13.8      14.00
      7       39.02    9.40    2.827  0.20( 0.10) 0.51      14.5      33.00
      8       39.43   10.26    2.689  0.20( 0.10) 0.51      15.5      13.00
      9       39.54   10.74    2.620  0.20( 0.10) 0.51      16.0      19.00
     10       39.55   10.76    2.616  0.20( 0.10) 0.51      16.0      29.00
     11       39.29   11.66    2.499  0.20( 0.10) 0.51      16.8      16.00
     12       39.17   11.97    2.462  0.20( 0.10) 0.51      17.0      17.00
     13       38.84   12.59    2.392  0.20( 0.10) 0.51      17.4      10.00
     14       38.60   12.86    2.363  0.20( 0.10) 0.51      17.5       7.00
     15       37.42   13.86    2.263  0.20( 0.10) 0.52      17.9       4.00
     16       35.24   15.54    2.120  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       39.55  Tc(MIN.) =   10.763
  EFFECTIVE AREA(ACRES) =     16.05  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.55
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   11.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.49
  RAINFALL INTENSITY(INCH/HR) =   2.52
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.05
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.55

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.789
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    75    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.79
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =    7.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.52      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.50
  EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.75
  FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.46
  RAINFALL INTENSITY(INCH/HR) =   3.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.86
  TOTAL STREAM AREA(ACRES) =       0.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.63    7.09    3.324  0.20( 0.10) 0.50       9.9      31.00
      1       36.04    7.76    3.156  0.20( 0.10) 0.50      10.9       6.00
      1       36.56    8.02    3.097  0.20( 0.10) 0.51      11.4      35.00
      1       36.64    8.07    3.086  0.20( 0.10) 0.51      11.4      24.00
      1       37.02    8.33    3.031  0.20( 0.10) 0.51      11.8      25.00
      1       38.57    9.68    2.781  0.20( 0.10) 0.51      13.8      14.00
      1       39.02   10.13    2.709  0.20( 0.10) 0.51      14.5      33.00
      1       39.43   10.99    2.585  0.20( 0.10) 0.51      15.5      13.00
      1       39.54   11.46    2.523  0.20( 0.10) 0.51      16.0      19.00
      1       39.55   11.49    2.520  0.20( 0.10) 0.51      16.0      29.00
      1       39.29   12.39    2.414  0.20( 0.10) 0.51      16.8      16.00
      1       39.17   12.70    2.380  0.20( 0.10) 0.51      17.0      17.00
      1       38.84   13.32    2.316  0.20( 0.10) 0.51      17.4      10.00
      1       38.60   13.58    2.290  0.20( 0.10) 0.51      17.5       7.00
      1       37.42   14.60    2.197  0.20( 0.10) 0.52      17.9       4.00
      1       35.24   16.28    2.064  0.20( 0.10) 0.52      18.1       1.00
      2        2.48    7.46    3.227  0.20( 0.02) 0.10       0.9      38.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	37.06	7.09	3.324	0.20(0.09)	0.47	10.7	31.00
2	37.90	7.46	3.227	0.20(0.09)	0.47	11.3	38.00
3	38.46	7.76	3.156	0.20(0.10)	0.48	11.8	6.00
4	38.94	8.02	3.097	0.20(0.10)	0.48	12.2	35.00
5	39.01	8.07	3.086	0.20(0.10)	0.48	12.3	24.00
6	39.35	8.33	3.031	0.20(0.10)	0.48	12.7	25.00
7	40.70	9.68	2.781	0.20(0.10)	0.48	14.7	14.00
8	41.10	10.13	2.709	0.20(0.10)	0.48	15.3	33.00
9	41.41	10.99	2.585	0.20(0.10)	0.49	16.4	13.00
10	41.48	11.46	2.523	0.20(0.10)	0.49	16.9	19.00
11	41.48	11.49	2.520	0.20(0.10)	0.49	16.9	29.00
12	41.15	12.39	2.414	0.20(0.10)	0.49	17.6	16.00
13	41.00	12.70	2.380	0.20(0.10)	0.49	17.9	17.00
14	40.61	13.32	2.316	0.20(0.10)	0.49	18.3	10.00
15	40.36	13.58	2.290	0.20(0.10)	0.49	18.4	7.00
16	39.11	14.60	2.197	0.20(0.10)	0.50	18.7	4.00
17	36.82	16.28	2.064	0.20(0.10)	0.50	18.9	1.00

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.48    Tc(MIN.) =    11.49
  EFFECTIVE AREA(ACRES) =      16.91   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.48
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.050
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        0.84      0.20     0.700    75    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      2.20
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      2.20

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
 STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =   11.04
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.78
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
 STREET FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =    9.87
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.750
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    4.33
 EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
 TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.30

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
 FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
 LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.87
 RAINFALL INTENSITY(INCH/HR) =   2.75
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.63
 EFFECTIVE STREAM AREA(ACRES) =       2.67
 TOTAL STREAM AREA(ACRES) =       2.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.30

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20      0.600    75    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.25
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      3.25

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    9.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.794
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    2.35
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       5.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.60
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.38
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.30    9.87    2.750  0.20( 0.13) 0.63       2.7      41.00
      2        5.38    9.60    2.794  0.20( 0.11) 0.56       2.2      43.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.62    9.60    2.794  0.20( 0.12) 0.60       4.8      43.00
      2       11.60    9.87    2.750  0.20( 0.12) 0.60       4.9      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.62    Tc(MIN.) =     9.60
  EFFECTIVE AREA(ACRES) =       4.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.62
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.00
  RAINFALL INTENSITY(INCH/HR) =   2.73
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.83
  TOTAL STREAM AREA(ACRES) =       4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.62

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.21
  TOTAL STREAM AREA(ACRES) =       0.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.76

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.072
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.45      0.20     0.600    75    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.13
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.45
  TOTAL STREAM AREA(ACRES) =       1.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.62   10.00    2.729  0.20( 0.12) 0.60       4.8      43.00
      1       11.60   10.27    2.688  0.20( 0.12) 0.60       4.9      41.00
      2        0.76    5.00    4.060  0.20( 0.02) 0.10       0.2      45.00
      3        3.85    8.13    3.072  0.20( 0.12) 0.60       1.5      46.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.00    4.060  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.13    3.072  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.00    2.729  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.27    2.688  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.54    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =       6.49   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.54
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.70    5.08    4.025  0.20( 0.11) 0.57       3.5      45.00
    2       15.02    8.21    3.056  0.20( 0.12) 0.58       5.6      46.00
    3       15.54   10.07    2.718  0.20( 0.12) 0.58       6.5      43.00
    4       15.46   10.34    2.677  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       37.06    7.15    3.307  0.20( 0.09) 0.47      10.7      31.00
    2       37.90    7.53    3.211  0.20( 0.09) 0.47      11.3      38.00
    3       38.46    7.82    3.141  0.20( 0.10) 0.48      11.8       6.00
    4       38.94    8.08    3.083  0.20( 0.10) 0.48      12.2      35.00
    5       39.01    8.13    3.072  0.20( 0.10) 0.48      12.3      24.00
    6       39.35    8.39    3.018  0.20( 0.10) 0.48      12.7      25.00
    7       40.70    9.74    2.771  0.20( 0.10) 0.48      14.7      14.00
    8       41.10   10.19    2.700  0.20( 0.10) 0.48      15.3      33.00
    9       41.41   11.05    2.577  0.20( 0.10) 0.49      16.4      13.00
   10       41.48   11.53    2.516  0.20( 0.10) 0.49      16.9      19.00
   11       41.48   11.55    2.513  0.20( 0.10) 0.49      16.9      29.00
   12       41.15   12.45    2.407  0.20( 0.10) 0.49      17.6      16.00
   13       41.00   12.76    2.373  0.20( 0.10) 0.49      17.9      17.00
   14       40.61   13.38    2.310  0.20( 0.10) 0.49      18.3      10.00
   15       40.36   13.65    2.284  0.20( 0.10) 0.49      18.4       7.00
   16       39.11   14.66    2.192  0.20( 0.10) 0.50      18.7       4.00
   17       36.82   16.34    2.060  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       44.88    5.08    4.025  0.20( 0.10) 0.50      11.1      45.00
    2       51.29    7.15    3.307  0.20( 0.10) 0.50      15.6      31.00
    3       52.41    7.53    3.211  0.20( 0.10) 0.51      16.4      38.00
```

```
      4       53.19    7.82    3.141  0.20( 0.10) 0.51      17.1       6.00
      5       53.86    8.08    3.083  0.20( 0.10) 0.51      17.7      35.00
      6       53.97    8.13    3.072  0.20( 0.10) 0.51      17.8      24.00
      7       54.13    8.21    3.056  0.20( 0.10) 0.51      18.0      46.00
      8       54.42    8.39    3.018  0.20( 0.10) 0.51      18.4      25.00
      9       56.15    9.74    2.771  0.20( 0.10) 0.51      21.0      14.00
     10       56.53   10.07    2.718  0.20( 0.10) 0.51      21.7      43.00
     11       56.60   10.19    2.700  0.20( 0.10) 0.51      21.9      33.00
     12       56.61   10.34    2.677  0.20( 0.10) 0.51      22.1      41.00
     13       56.26   11.05    2.577  0.20( 0.10) 0.51      22.9      13.00
     14       55.96   11.53    2.516  0.20( 0.10) 0.51      23.4      19.00
     15       55.94   11.55    2.513  0.20( 0.10) 0.51      23.5      29.00
     16       54.97   12.45    2.407  0.20( 0.10) 0.52      24.2      16.00
     17       54.62   12.76    2.373  0.20( 0.10) 0.52      24.4      17.00
     18       53.85   13.38    2.310  0.20( 0.10) 0.52      24.8      10.00
     19       53.44   13.65    2.284  0.20( 0.10) 0.52      24.9       7.00
     20       51.63   14.66    2.192  0.20( 0.10) 0.52      25.3       4.00
     21       48.55   16.34    2.060  0.20( 0.10) 0.52      25.5       1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       56.61  Tc(MIN.) =   10.339
  EFFECTIVE AREA(ACRES) =     22.08  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.44
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.61
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.08
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      56.61

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.588
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.27      0.20     0.200    75    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =    9.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.888
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.58      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    1.49
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.06
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

AREA-AVERAGED Ap = 0.20
EFFECTIVE STREAM AREA(ACRES) = 0.85
TOTAL STREAM AREA(ACRES) = 0.85
PEAK FLOW RATE(CFS) AT CONFLUENCE = 2.18

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.88	5.20	3.969	0.20(0.10)	0.50	11.1	45.00
1	51.29	7.27	3.275	0.20(0.10)	0.50	15.6	31.00
1	52.41	7.65	3.182	0.20(0.10)	0.51	16.4	38.00
1	53.19	7.94	3.114	0.20(0.10)	0.51	17.1	6.00
1	53.86	8.20	3.057	0.20(0.10)	0.51	17.7	35.00
1	53.97	8.25	3.046	0.20(0.10)	0.51	17.8	24.00
1	54.13	8.33	3.030	0.20(0.10)	0.51	18.0	46.00
1	54.42	8.51	2.993	0.20(0.10)	0.51	18.4	25.00
1	56.15	9.86	2.751	0.20(0.10)	0.51	21.0	14.00
1	56.53	10.19	2.700	0.20(0.10)	0.51	21.7	43.00
1	56.60	10.31	2.682	0.20(0.10)	0.51	21.9	33.00
1	56.61	10.46	2.660	0.20(0.10)	0.51	22.1	41.00
1	56.26	11.17	2.561	0.20(0.10)	0.51	22.9	13.00
1	55.96	11.65	2.501	0.20(0.10)	0.51	23.4	19.00
1	55.94	11.67	2.498	0.20(0.10)	0.51	23.5	29.00
1	54.97	12.57	2.394	0.20(0.10)	0.52	24.2	16.00
1	54.62	12.88	2.361	0.20(0.10)	0.52	24.4	17.00
1	53.85	13.50	2.298	0.20(0.10)	0.52	24.8	10.00
1	53.44	13.77	2.272	0.20(0.10)	0.52	24.9	7.00
1	51.63	14.78	2.182	0.20(0.10)	0.52	25.3	4.00
1	48.55	16.46	2.051	0.20(0.10)	0.52	25.5	1.00
2	2.18	9.06	2.888	0.20(0.04)	0.20	0.9	32.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.61	5.20	3.969	0.20(0.10)	0.49	11.6	45.00
2	53.28	7.27	3.275	0.20(0.10)	0.49	16.2	31.00
3	54.44	7.65	3.182	0.20(0.10)	0.49	17.2	38.00
4	55.26	7.94	3.114	0.20(0.10)	0.49	17.8	6.00
5	55.95	8.20	3.057	0.20(0.10)	0.50	18.5	35.00
6	56.06	8.25	3.046	0.20(0.10)	0.50	18.6	24.00
7	56.23	8.33	3.030	0.20(0.10)	0.50	18.8	46.00
8	56.54	8.51	2.993	0.20(0.10)	0.50	19.2	25.00
9	57.30	9.06	2.888	0.20(0.10)	0.50	20.3	32.00
10	58.22	9.86	2.751	0.20(0.10)	0.50	21.9	14.00
11	58.56	10.19	2.700	0.20(0.10)	0.50	22.5	43.00
12	58.62	10.31	2.682	0.20(0.10)	0.50	22.7	33.00
13	58.61	10.46	2.660	0.20(0.10)	0.50	22.9	41.00
14	58.19	11.17	2.561	0.20(0.10)	0.50	23.8	13.00
15	57.84	11.65	2.501	0.20(0.10)	0.50	24.3	19.00
16	57.82	11.67	2.498	0.20(0.10)	0.50	24.3	29.00
17	56.77	12.57	2.394	0.20(0.10)	0.50	25.0	16.00
18	56.39	12.88	2.361	0.20(0.10)	0.51	25.3	17.00
19	55.58	13.50	2.298	0.20(0.10)	0.51	25.7	10.00
20	55.15	13.77	2.272	0.20(0.10)	0.51	25.8	7.00
21	53.27	14.78	2.182	0.20(0.10)	0.51	26.1	4.00
22	50.09	16.46	2.051	0.20(0.10)	0.51	26.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 58.62 Tc(MIN.) = 10.31
EFFECTIVE AREA(ACRES) = 22.71 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 26.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 50.00 = 2585.00 FEET.

****
FLOW PROCESS FROM NODE 50.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.19
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.62
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   2.19   Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    2.61
  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.61
  FLOW VELOCITY(FEET/SEC.) =  2.45   DEPTH*VELOCITY(FT*FT/SEC.) =   0.89
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.495
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    3.58
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.74
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   12.51
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.51
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.74

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.013
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.67      0.20     0.600    75    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.57
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    9.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.860
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.67      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    1.65
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  4.14   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.21
  RAINFALL INTENSITY(INCH/HR) =   2.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
```

```
  EFFECTIVE STREAM AREA(ACRES) =       1.34
  TOTAL STREAM AREA(ACRES) =       1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.30

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.74   12.51    2.400  0.20( 0.10) 0.50       3.6      22.00
      2        3.30    9.21    2.860  0.20( 0.12) 0.60       1.3      53.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.14    9.21    2.860  0.20( 0.11) 0.53       4.0      53.00
      2       10.49   12.51    2.400  0.20( 0.11) 0.53       4.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.49    Tc(MIN.) =    12.51
  EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.49
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.54
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.54
  RAINFALL INTENSITY(INCH/HR) =   2.40
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       4.93
  TOTAL STREAM AREA(ACRES) =       4.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.49

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.019
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    9.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    9.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.816
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.12      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    2.72
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  4.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.46
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.61

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       10.14    9.24    2.855  0.20( 0.11) 0.53       4.0      53.00
    1       10.49   12.54    2.397  0.20( 0.11) 0.53       4.9      22.00
    2        4.61    9.46    2.816  0.20( 0.12) 0.60       1.9      56.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       14.71    9.24    2.855  0.20( 0.11) 0.55       5.8      53.00
    2       14.78    9.46    2.816  0.20( 0.11) 0.55       5.9      56.00
    3       14.38   12.54    2.397  0.20( 0.11) 0.55       6.8      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      14.78    Tc(MIN.) =     9.46
 EFFECTIVE AREA(ACRES) =       5.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.78
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.52
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.52
 RAINFALL INTENSITY(INCH/HR) =   2.81
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       5.95
 TOTAL STREAM AREA(ACRES) =       6.83
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.78

****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.11      0.20     0.100    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.11
  TOTAL STREAM AREA(ACRES) =       0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.71    9.30    2.845  0.20( 0.11) 0.55       5.8      53.00
      1       14.78    9.52    2.807  0.20( 0.11) 0.55       5.9      56.00
      1       14.38   12.60    2.390  0.20( 0.11) 0.55       6.8      22.00
      2        0.40    5.00    4.060  0.20( 0.02) 0.10       0.1      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.82    5.00    4.060  0.20( 0.11) 0.54       3.2      59.00
      2       14.99    9.30    2.845  0.20( 0.11) 0.55       5.9      53.00
      3       15.05    9.52    2.807  0.20( 0.11) 0.55       6.1      56.00
      4       14.62   12.60    2.390  0.20( 0.11) 0.54       6.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.05    Tc(MIN.) =     9.52
  EFFECTIVE AREA(ACRES) =       6.06   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.05
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   10.01
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.01
  RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       6.06
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.05

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.71

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    8.62
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.971
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    2.21
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.28
  FLOW VELOCITY(FEET/SEC.) =  4.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
```

```
 LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.62
 RAINFALL INTENSITY(INCH/HR) =   2.97
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.48
 TOTAL STREAM AREA(ACRES) =       1.48
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.82    5.51    3.839  0.20( 0.11) 0.54       3.2      59.00
     1       14.99    9.79    2.763  0.20( 0.11) 0.55       5.9      53.00
     1       15.05   10.01    2.728  0.20( 0.11) 0.55       6.1      56.00
     1       14.62   13.09    2.339  0.20( 0.11) 0.54       6.9      22.00
     2        3.80    8.62    2.971  0.20( 0.12) 0.60       1.5      61.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.51    3.839  0.20( 0.11) 0.55       4.2      59.00
     2       17.92    8.62    2.971  0.20( 0.11) 0.56       6.7      61.00
     3       18.51    9.79    2.763  0.20( 0.11) 0.56       7.4      53.00
     4       18.53   10.01    2.728  0.20( 0.11) 0.56       7.5      56.00
     5       17.57   13.09    2.339  0.20( 0.11) 0.55       8.4      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.53    Tc(MIN.) =    10.01
 EFFECTIVE AREA(ACRES) =       7.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        8.4
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.96
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.53
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.02
 RAINFALL INTENSITY(INCH/HR) =   2.73
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.53

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.172
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.87
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.87

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =    8.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    1.97
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.74

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
```

```
 LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.46
 RAINFALL INTENSITY(INCH/HR) =   3.00
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.74

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.99    5.53    3.832  0.20( 0.11) 0.55       4.2       59.00
     1       17.92    8.64    2.967  0.20( 0.11) 0.56       6.7       61.00
     1       18.51    9.80    2.760  0.20( 0.11) 0.56       7.4       53.00
     1       18.53   10.02    2.725  0.20( 0.11) 0.56       7.5       56.00
     1       17.57   13.10    2.337  0.20( 0.11) 0.55       8.4       22.00
     2        3.74    8.46    3.003  0.20( 0.12) 0.60       1.4       64.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.13    5.53    3.832  0.20( 0.11) 0.56       5.1       59.00
     2       21.49    8.46    3.003  0.20( 0.11) 0.56       8.0       64.00
     3       21.61    8.64    2.967  0.20( 0.11) 0.56       8.1       61.00
     4       21.93    9.80    2.760  0.20( 0.11) 0.56       8.9       53.00
     5       21.90   10.02    2.725  0.20( 0.11) 0.56       9.0       56.00
     6       20.45   13.10    2.337  0.20( 0.11) 0.56       9.9       22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      21.93    Tc(MIN.) =     9.80
 EFFECTIVE AREA(ACRES) =       8.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        9.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
 FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.54
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.93
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.12
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.12
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.87
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.93

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.023
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    75    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.58   Tc(MIN.) =    9.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.738
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.41

  END OF SUBAREA STREET FLOW HYDRAULICS:
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  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.39   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   2.74
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.02
  TOTAL STREAM AREA(ACRES) =       1.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.15      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.13    5.86    3.706  0.20( 0.11) 0.56       5.1      59.00
      1       21.49    8.78    2.939  0.20( 0.11) 0.56       8.0      64.00
      1       21.61    8.96    2.906  0.20( 0.11) 0.56       8.1      61.00
      1       21.93   10.12    2.710  0.20( 0.11) 0.56       8.9      53.00
      1       21.90   10.35    2.676  0.20( 0.11) 0.56       9.0      56.00
      1       20.45   13.43    2.305  0.20( 0.11) 0.56       9.9      22.00
      2        2.41    9.94    2.738  0.20( 0.11) 0.56       1.0      67.00
      3        0.55    5.00    4.060  0.20( 0.02) 0.10       0.2      63.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
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  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.00    4.060  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.86    3.706  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.78    2.939  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    8.96    2.906  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.94    2.738  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.12    2.710  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.35    2.676  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.43    2.305  0.20( 0.11) 0.55      11.0      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.68    Tc(MIN.) =    10.12
  EFFECTIVE AREA(ACRES) =      10.04   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       11.0
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.68
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.17
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36    5.05    4.034  0.20( 0.11) 0.55       5.0      63.00
      2       20.58    5.91    3.687  0.20( 0.11) 0.55       5.9      59.00
      3       24.18    8.83    2.930  0.20( 0.11) 0.56       9.0      64.00
      4       24.32    9.01    2.896  0.20( 0.11) 0.56       9.2      61.00
      5       24.66    9.99    2.730  0.20( 0.11) 0.56       9.9      67.00
      6       24.68   10.17    2.702  0.20( 0.11) 0.56      10.0      53.00
      7       24.62   10.40    2.669  0.20( 0.11) 0.56      10.1      56.00
      8       22.77   13.48    2.300  0.20( 0.11) 0.55      11.0      22.00
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.61    5.26    3.943  0.20( 0.10) 0.49      11.6      45.00
      2       53.28    7.33    3.260  0.20( 0.10) 0.49      16.2      31.00
      3       54.44    7.71    3.168  0.20( 0.10) 0.49      17.2      38.00
      4       55.26    8.00    3.101  0.20( 0.10) 0.49      17.8       6.00
      5       55.95    8.26    3.045  0.20( 0.10) 0.50      18.5      35.00
      6       56.06    8.31    3.034  0.20( 0.10) 0.50      18.6      24.00
      7       56.23    8.39    3.018  0.20( 0.10) 0.50      18.8      46.00
      8       56.54    8.57    2.981  0.20( 0.10) 0.50      19.2      25.00
      9       57.30    9.11    2.878  0.20( 0.10) 0.50      20.3      32.00
     10       58.22    9.92    2.742  0.20( 0.10) 0.50      21.9      14.00
     11       58.56   10.25    2.691  0.20( 0.10) 0.50      22.5      43.00
     12       58.62   10.37    2.673  0.20( 0.10) 0.50      22.7      33.00
     13       58.61   10.52    2.651  0.20( 0.10) 0.50      22.9      41.00
```

```
    14       58.19   11.23    2.554  0.20( 0.10) 0.50      23.8      13.00
    15       57.84   11.70    2.494  0.20( 0.10) 0.50      24.3      19.00
    16       57.82   11.73    2.491  0.20( 0.10) 0.50      24.3      29.00
    17       56.77   12.63    2.388  0.20( 0.10) 0.50      25.0      16.00
    18       56.39   12.94    2.354  0.20( 0.10) 0.51      25.3      17.00
    19       55.58   13.56    2.292  0.20( 0.10) 0.51      25.7      10.00
    20       55.15   13.83    2.267  0.20( 0.10) 0.51      25.8       7.00
    21       53.27   14.84    2.177  0.20( 0.10) 0.51      26.1       4.00
    22       50.09   16.52    2.047  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.05    4.034  0.20( 0.10) 0.51      16.2      63.00
      2       66.25    5.26    3.943  0.20( 0.10) 0.51      16.8      45.00
      3       69.29    5.91    3.687  0.20( 0.10) 0.51      18.9      59.00
      4       75.61    7.33    3.260  0.20( 0.10) 0.51      23.7      31.00
      5       77.23    7.71    3.168  0.20( 0.10) 0.51      25.0      38.00
      6       78.41    8.00    3.101  0.20( 0.10) 0.51      26.0       6.00
      7       79.42    8.26    3.045  0.20( 0.10) 0.51      26.9      35.00
      8       79.60    8.31    3.034  0.20( 0.10) 0.51      27.1      24.00
      9       79.86    8.39    3.018  0.20( 0.10) 0.51      27.3      46.00
     10       80.39    8.57    2.981  0.20( 0.10) 0.51      27.9      25.00
     11       81.09    8.83    2.930  0.20( 0.10) 0.52      28.8      64.00
     12       81.47    9.01    2.896  0.20( 0.10) 0.52      29.3      61.00
     13       81.65    9.11    2.878  0.20( 0.10) 0.52      29.6      32.00
     14       82.85    9.92    2.742  0.20( 0.10) 0.52      31.7      14.00
     15       82.96    9.99    2.730  0.20( 0.10) 0.52      31.9      67.00
     16       83.17   10.17    2.702  0.20( 0.10) 0.52      32.4      53.00
     17       83.22   10.25    2.691  0.20( 0.10) 0.52      32.6      43.00
     18       83.24   10.37    2.673  0.20( 0.10) 0.52      32.8      33.00
     19       83.23   10.40    2.669  0.20( 0.10) 0.52      32.9      56.00
     20       83.16   10.52    2.651  0.20( 0.10) 0.52      33.1      41.00
     21       82.31   11.23    2.554  0.20( 0.10) 0.52      34.2      13.00
     22       81.68   11.70    2.494  0.20( 0.10) 0.52      34.8      19.00
     23       81.64   11.73    2.491  0.20( 0.10) 0.52      34.8      29.00
     24       80.05   12.63    2.388  0.20( 0.10) 0.52      35.8      16.00
     25       79.49   12.94    2.354  0.20( 0.10) 0.52      36.1      17.00
     26       78.45   13.48    2.300  0.20( 0.10) 0.52      36.6      22.00
     27       78.27   13.56    2.292  0.20( 0.10) 0.52      36.7      10.00
     28       77.57   13.83    2.267  0.20( 0.10) 0.52      36.8       7.00
     29       74.76   14.84    2.177  0.20( 0.10) 0.52      37.2       4.00
     30       70.22   16.52    2.047  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.24  Tc(MIN.) =   10.367
  EFFECTIVE AREA(ACRES) =     32.84  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.83
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.24
```

```
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =      32.84
  TOTAL STREAM AREA(ACRES) =      37.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.24

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    75    5.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.34
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.34

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.20    5.14    3.994  0.20( 0.10) 0.51      16.2      63.00
      1       66.25    5.35    3.905  0.20( 0.10) 0.51      16.8      45.00
      1       69.29    6.00    3.656  0.20( 0.10) 0.51      18.9      59.00
      1       75.61    7.42    3.238  0.20( 0.10) 0.51      23.7      31.00
      1       77.23    7.79    3.148  0.20( 0.10) 0.51      25.0      38.00
      1       78.41    8.09    3.081  0.20( 0.10) 0.51      26.0       6.00
      1       79.42    8.35    3.027  0.20( 0.10) 0.51      26.9      35.00
      1       79.60    8.40    3.016  0.20( 0.10) 0.51      27.1      24.00
      1       79.86    8.47    3.001  0.20( 0.10) 0.51      27.3      46.00
      1       80.39    8.66    2.964  0.20( 0.10) 0.51      27.9      25.00
      1       81.09    8.92    2.913  0.20( 0.10) 0.52      28.8      64.00
```

1	81.47	9.10	2.881	0.20(0.10)	0.52	29.3	61.00
1	81.65	9.20	2.862	0.20(0.10)	0.52	29.6	32.00
1	82.85	10.00	2.729	0.20(0.10)	0.52	31.7	14.00
1	82.96	10.08	2.717	0.20(0.10)	0.52	31.9	67.00
1	83.17	10.26	2.689	0.20(0.10)	0.52	32.4	53.00
1	83.22	10.33	2.678	0.20(0.10)	0.52	32.6	43.00
1	83.24	10.45	2.661	0.20(0.10)	0.52	32.8	33.00
1	83.23	10.48	2.656	0.20(0.10)	0.52	32.9	56.00
1	83.16	10.60	2.639	0.20(0.10)	0.52	33.1	41.00
1	82.31	11.32	2.542	0.20(0.10)	0.52	34.2	13.00
1	81.68	11.79	2.483	0.20(0.10)	0.52	34.8	19.00
1	81.64	11.82	2.480	0.20(0.10)	0.52	34.8	29.00
1	80.05	12.71	2.378	0.20(0.10)	0.52	35.8	16.00
1	79.49	13.02	2.345	0.20(0.10)	0.52	36.1	17.00
1	78.45	13.57	2.291	0.20(0.10)	0.52	36.6	22.00
1	78.27	13.64	2.284	0.20(0.10)	0.52	36.7	10.00
1	77.57	13.91	2.258	0.20(0.10)	0.52	36.8	7.00
1	74.76	14.93	2.169	0.20(0.10)	0.52	37.2	4.00
1	70.22	16.61	2.040	0.20(0.10)	0.52	37.4	1.00
2	1.34	5.27	3.938	0.20(0.02)	0.10	0.4	47.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	66.53	5.14	3.994	0.20(0.10)	0.50	16.5	63.00
2	67.20	5.27	3.938	0.20(0.10)	0.50	17.0	47.00
3	67.58	5.35	3.905	0.20(0.10)	0.50	17.2	45.00
4	70.53	6.00	3.656	0.20(0.10)	0.50	19.3	59.00
5	76.71	7.42	3.238	0.20(0.10)	0.50	24.0	31.00
6	78.30	7.79	3.148	0.20(0.10)	0.51	25.4	38.00
7	79.46	8.09	3.081	0.20(0.10)	0.51	26.4	6.00
8	80.45	8.35	3.027	0.20(0.10)	0.51	27.3	35.00
9	80.62	8.40	3.016	0.20(0.10)	0.51	27.5	24.00
10	80.88	8.47	3.001	0.20(0.10)	0.51	27.7	46.00
11	81.40	8.66	2.964	0.20(0.10)	0.51	28.3	25.00
12	82.08	8.92	2.913	0.20(0.10)	0.51	29.1	64.00
13	82.45	9.10	2.881	0.20(0.10)	0.51	29.7	61.00
14	82.62	9.20	2.862	0.20(0.10)	0.51	30.0	32.00
15	83.78	10.00	2.729	0.20(0.10)	0.51	32.1	14.00
16	83.88	10.08	2.717	0.20(0.10)	0.51	32.3	67.00
17	84.08	10.26	2.689	0.20(0.10)	0.51	32.8	53.00
18	84.13	10.33	2.678	0.20(0.10)	0.51	33.0	43.00
19	84.15	10.45	2.661	0.20(0.10)	0.51	33.2	33.00
20	84.14	10.48	2.656	0.20(0.10)	0.51	33.3	56.00
21	84.05	10.60	2.639	0.20(0.10)	0.51	33.5	41.00
22	83.17	11.32	2.542	0.20(0.10)	0.51	34.6	13.00
23	82.52	11.79	2.483	0.20(0.10)	0.51	35.2	19.00
24	82.48	11.82	2.480	0.20(0.10)	0.51	35.2	29.00
25	80.86	12.71	2.378	0.20(0.10)	0.51	36.2	16.00
26	80.28	13.02	2.345	0.20(0.10)	0.52	36.5	17.00
27	79.22	13.57	2.291	0.20(0.10)	0.52	37.0	22.00
28	79.04	13.64	2.284	0.20(0.10)	0.52	37.1	10.00
29	78.34	13.91	2.258	0.20(0.10)	0.52	37.2	7.00
30	75.49	14.93	2.169	0.20(0.10)	0.52	37.5	4.00
31	70.91	16.61	2.040	0.20(0.10)	0.52	37.8	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 84.15 Tc(MIN.) = 10.45
EFFECTIVE AREA(ACRES) = 33.22 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 71.00 = 2745.00 FEET.

****
FLOW PROCESS FROM NODE 71.00 TO NODE 86.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   450.00  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.15
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.932
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.13      0.20     0.600    75    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.86
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      2.86

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.57   Tc(MIN.) =   10.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.670
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    2.98
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.58

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.960
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    75    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
```

```
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
  STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =   10.49
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.655
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.58
  EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  3.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.58   10.39    2.670  0.20( 0.12) 0.60       2.4      33.00
      2        4.15   10.49    2.655  0.20( 0.12) 0.60       1.8      73.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.71   10.39    2.670  0.20( 0.12) 0.60       4.2      33.00
      2        9.70   10.49    2.655  0.20( 0.12) 0.60       4.2      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.71    Tc(MIN.) =    10.39
  EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.2
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.71
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   11.15
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.71

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.110
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.45
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =    9.18
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.866
  SUBAREA LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.78      0.20      0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =     0.78      SUBAREA RUNOFF(CFS) =     1.93
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.82   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.18
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.26

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.251
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.49      0.20      0.500    75    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.39
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    8.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.982
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    1.98
  EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.15
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.88
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.57
  RAINFALL INTENSITY(INCH/HR) =   2.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.26
  TOTAL STREAM AREA(ACRES) =       1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.71   11.15    2.564  0.20( 0.12) 0.60       4.2      33.00
      1        9.70   11.25    2.551  0.20( 0.12) 0.60       4.2      73.00
      2        3.26    9.18    2.866  0.20( 0.12) 0.60       1.3      76.00
      3        3.25    8.57    2.982  0.20( 0.11) 0.56       1.3      78.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.17    8.57    2.982  0.20( 0.12) 0.59       5.7      78.00
      2       15.37    9.18    2.866  0.20( 0.12) 0.59       6.1      76.00
      3       15.40   11.15    2.564  0.20( 0.12) 0.59       6.8      33.00
      4       15.35   11.25    2.551  0.20( 0.12) 0.59       6.8      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.40    Tc(MIN.) =    11.15
  EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.40
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   11.37
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.37
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.536
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        3.28      0.20     0.900    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =    6.95
 EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
 TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      21.77

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.73    8.79    2.939  0.20( 0.14) 0.70       9.0      78.00
     2       22.61    9.40    2.828  0.20( 0.14) 0.70       9.3      76.00
     3       21.77   11.37    2.536  0.20( 0.14) 0.69      10.1      33.00
     4       21.70   11.47    2.523  0.20( 0.14) 0.69      10.1      73.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      22.73  Tc(MIN.) =    8.79
 AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.02

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
 FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.66
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.73
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.28
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.28
 RAINFALL INTENSITY(INCH/HR) =   2.85
 AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.02
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.73

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.087
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    75    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    9.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.736
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.57      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    1.39
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4         PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  5.18   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
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```
 FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.96
 RAINFALL INTENSITY(INCH/HR) =   2.74
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       1.44
 TOTAL STREAM AREA(ACRES) =       1.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

****************************************************************************
 FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.470
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.58
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      1.69
 TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
 FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
 STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.57
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    7.99
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
 STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    7.78
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.150
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
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  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.76
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       5.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  5.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.78
  RAINFALL INTENSITY(INCH/HR) =   3.15
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       22.73    9.28    2.849  0.20( 0.14) 0.70       9.0      78.00
      1       22.61    9.89    2.747  0.20( 0.14) 0.70       9.3      76.00
      1       21.77   11.86    2.474  0.20( 0.14) 0.69      10.1      33.00
      1       21.70   11.96    2.462  0.20( 0.14) 0.69      10.1      73.00
      2        3.44    9.96    2.736  0.20( 0.08) 0.40       1.4      82.00
      3        5.29    7.78    3.150  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.59    7.78    3.150  0.20( 0.13) 0.65      10.6      80.00
      2       30.84    9.28    2.849  0.20( 0.13) 0.65      12.3      78.00
      3       30.62    9.89    2.747  0.20( 0.13) 0.65      12.7      76.00
      4       30.59    9.96    2.736  0.20( 0.13) 0.65      12.7      82.00
      5       28.99   11.86    2.474  0.20( 0.13) 0.65      13.5      33.00
      6       28.87   11.96    2.462  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.84    Tc(MIN.) =     9.28
  EFFECTIVE AREA(ACRES) =      12.31   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.84
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.37
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.
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****************************************************************************
 FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       29.59    7.88    3.129  0.20( 0.13) 0.65      10.6      80.00
     2       30.84    9.37    2.833  0.20( 0.13) 0.65      12.3      78.00
     3       30.62    9.98    2.733  0.20( 0.13) 0.65      12.7      76.00
     4       30.59   10.05    2.722  0.20( 0.13) 0.65      12.7      82.00
     5       28.99   11.95    2.464  0.20( 0.13) 0.65      13.5      33.00
     6       28.87   12.05    2.452  0.20( 0.13) 0.65      13.5      73.00
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       66.53    5.19    3.973  0.20( 0.10) 0.50      16.5      63.00
     2       67.20    5.32    3.918  0.20( 0.10) 0.50      17.0      47.00
     3       67.58    5.40    3.886  0.20( 0.10) 0.50      17.2      45.00
     4       70.53    6.05    3.640  0.20( 0.10) 0.50      19.3      59.00
     5       76.71    7.46    3.227  0.20( 0.10) 0.50      24.0      31.00
     6       78.30    7.84    3.138  0.20( 0.10) 0.51      25.4      38.00
     7       79.46    8.13    3.072  0.20( 0.10) 0.51      26.4       6.00
     8       80.45    8.39    3.018  0.20( 0.10) 0.51      27.3      35.00
     9       80.62    8.44    3.007  0.20( 0.10) 0.51      27.5      24.00
    10       80.88    8.52    2.992  0.20( 0.10) 0.51      27.7      46.00
    11       81.40    8.70    2.956  0.20( 0.10) 0.51      28.3      25.00
    12       82.08    8.97    2.905  0.20( 0.10) 0.51      29.1      64.00
    13       82.45    9.14    2.873  0.20( 0.10) 0.51      29.7      61.00
    14       82.62    9.24    2.854  0.20( 0.10) 0.51      30.0      32.00
    15       83.78   10.04    2.722  0.20( 0.10) 0.51      32.1      14.00
    16       83.88   10.12    2.710  0.20( 0.10) 0.51      32.3      67.00
    17       84.08   10.30    2.683  0.20( 0.10) 0.51      32.8      53.00
    18       84.13   10.38    2.672  0.20( 0.10) 0.51      33.0      43.00
    19       84.15   10.50    2.654  0.20( 0.10) 0.51      33.2      33.00
    20       84.14   10.52    2.650  0.20( 0.10) 0.51      33.3      56.00
    21       84.05   10.64    2.633  0.20( 0.10) 0.51      33.5      41.00
    22       83.17   11.36    2.537  0.20( 0.10) 0.51      34.6      13.00
    23       82.52   11.83    2.478  0.20( 0.10) 0.51      35.2      19.00
    24       82.48   11.86    2.475  0.20( 0.10) 0.51      35.2      29.00
    25       80.86   12.76    2.373  0.20( 0.10) 0.51      36.2      16.00
    26       80.28   13.07    2.341  0.20( 0.10) 0.52      36.5      17.00
    27       79.22   13.61    2.287  0.20( 0.10) 0.52      37.0      22.00
    28       79.04   13.69    2.280  0.20( 0.10) 0.52      37.1      10.00
    29       78.34   13.96    2.254  0.20( 0.10) 0.52      37.2       7.00
    30       75.49   14.97    2.165  0.20( 0.10) 0.52      37.5       4.00
    31       70.91   16.66    2.037  0.20( 0.10) 0.52      37.8       1.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       91.53    5.19    3.973  0.20( 0.11) 0.54      23.6      63.00
     2       92.44    5.32    3.918  0.20( 0.11) 0.54      24.1      47.00
     3       92.98    5.40    3.886  0.20( 0.11) 0.54      24.5      45.00
     4       97.13    6.05    3.640  0.20( 0.11) 0.55      27.5      59.00
     5      105.67    7.46    3.227  0.20( 0.11) 0.55      34.1      31.00
     6      107.84    7.84    3.138  0.20( 0.11) 0.55      35.9      38.00
     7      108.04    7.88    3.129  0.20( 0.11) 0.55      36.1      80.00
     8      109.27    8.13    3.072  0.20( 0.11) 0.55      37.3       6.00
     9      110.47    8.39    3.018  0.20( 0.11) 0.55      38.5      35.00
    10      110.69    8.44    3.007  0.20( 0.11) 0.55      38.7      24.00
    11      111.01    8.52    2.992  0.20( 0.11) 0.55      39.1      46.00
    12      111.68    8.70    2.956  0.20( 0.11) 0.55      39.9      25.00
    13      112.58    8.97    2.905  0.20( 0.11) 0.55      41.0      64.00
    14      113.10    9.14    2.873  0.20( 0.11) 0.55      41.7      61.00
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    15      113.35    9.24    2.854  0.20( 0.11) 0.55      42.1      32.00
    16      113.63    9.37    2.833  0.20( 0.11) 0.55      42.6      78.00
    17      114.31    9.98    2.733  0.20( 0.11) 0.55      44.6      76.00
    18      114.37   10.04    2.722  0.20( 0.11) 0.55      44.9      14.00
    19      114.37   10.05    2.722  0.20( 0.11) 0.55      44.9      82.00
    20      114.40   10.12    2.710  0.20( 0.11) 0.55      45.1      67.00
    21      114.45   10.30    2.683  0.20( 0.11) 0.55      45.6      53.00
    22      114.44   10.38    2.672  0.20( 0.11) 0.55      45.8      43.00
    23      114.36   10.50    2.654  0.20( 0.11) 0.55      46.1      33.00
    24      114.32   10.52    2.650  0.20( 0.11) 0.55      46.2      56.00
    25      114.14   10.64    2.633  0.20( 0.11) 0.55      46.5      41.00
    26      112.66   11.36    2.537  0.20( 0.11) 0.55      47.8      13.00
    27      111.61   11.83    2.478  0.20( 0.11) 0.55      48.6      19.00
    28      111.55   11.86    2.475  0.20( 0.11) 0.55      48.7      29.00
    29      111.30   11.95    2.464  0.20( 0.11) 0.55      48.8      33.00
    30      111.00   12.05    2.452  0.20( 0.11) 0.55      48.9      73.00
    31      108.75   12.76    2.373  0.20( 0.11) 0.55      49.7      16.00
    32      107.78   13.07    2.341  0.20( 0.11) 0.55      50.0      17.00
    33      106.05   13.61    2.287  0.20( 0.11) 0.55      50.5      22.00
    34      105.78   13.69    2.280  0.20( 0.11) 0.55      50.6      10.00
    35      104.75   13.96    2.254  0.20( 0.11) 0.55      50.7       7.00
    36      100.80   14.97    2.165  0.20( 0.11) 0.55      51.0       4.00
    37       94.63   16.66    2.037  0.20( 0.11) 0.55      51.3       1.00
  TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      114.45  Tc(MIN.) =   10.302
  EFFECTIVE AREA(ACRES) =     45.63  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.28
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     114.45
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.31   RAINFALL INTENSITY(INCH/HR) =  2.68
  EFFECTIVE AREA(ACRES) =    26.50
  TOTAL AREA(ACRES) =    29.79        PEAK FLOW RATE(CFS) =     66.50
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.55
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.52
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.50
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.73
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      26.50
  TOTAL STREAM AREA(ACRES) =      29.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      66.50

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.43      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.50
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.50

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.50
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.49
```

```
 RAINFALL INTENSITY(INCH/HR) =   3.85
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.50

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       66.50   10.73    2.621  0.20( 0.11) 0.55      26.5       1.00
     2        1.50    5.49    3.848  0.20( 0.18) 0.90       0.4      88.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       52.15    5.49    3.848  0.20( 0.11) 0.56      14.0       88.00
     2       67.50   10.73    2.621  0.20( 0.11) 0.56      26.9        1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      67.50    Tc(MIN.) =    10.73
 EFFECTIVE AREA(ACRES) =      26.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       30.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.85
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      67.50
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.88
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
 ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.547
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.29      0.20      0.100    75    6.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.92
 TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.92
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.82   Tc(MIN.) =    8.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.069
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.77
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       1.56

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  1.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.54
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.15
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20      0.900    75    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.092
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.24      0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.07
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   0.69
  Tc(MIN.) =    8.04
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    3.25
  EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.52   FLOW VELOCITY(FEET/SEC.) =   8.96
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.77
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
```

```
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.77

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.56    8.15    3.069  0.20( 0.02) 0.10       0.6      85.00
     2        4.77    8.80    2.937  0.20( 0.18) 0.90       1.8      92.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.19    8.15    3.069  0.20( 0.14) 0.70       2.3      85.00
     2        6.27    8.80    2.937  0.20( 0.14) 0.71       2.4      92.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.27    Tc(MIN.) =     8.80
 EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =        2.4
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.72
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.27
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.82
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.19    8.17    3.063  0.20( 0.14) 0.70       2.3      85.00
     2        6.27    8.82    2.932  0.20( 0.14) 0.71       2.4      92.00
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       52.15    5.65    3.786  0.20( 0.11) 0.56      14.0      88.00
     2       67.50   10.88    2.601  0.20( 0.11) 0.56      26.9       1.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       57.49    5.65    3.786  0.20( 0.11) 0.57      15.5      88.00
     2       65.76    8.17    3.063  0.20( 0.11) 0.57      22.5      85.00
     3       67.73    8.82    2.932  0.20( 0.11) 0.57      24.2      92.00
     4       73.02   10.88    2.601  0.20( 0.11) 0.57      29.3       1.00
   TOTAL AREA(ACRES) =        32.6
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       73.02  Tc(MIN.) =   10.876
  EFFECTIVE AREA(ACRES) =     29.32  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       32.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.26
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.02
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      29.32
  TOTAL STREAM AREA(ACRES) =      32.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      73.02

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.138
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.14      0.20     0.900    75    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.03
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      3.03

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.063
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        5.08      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.65
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    8.18
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   13.18
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2          PEAK FLOW RATE(CFS) =      16.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   9.97
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.14
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.25
  RAINFALL INTENSITY(INCH/HR) =   3.05
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.14

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.95      0.20      0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.49
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      2.49

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   3.02   Tc(MIN.) =   11.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.538
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.69      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    3.71
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       5.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.02
  FLOW VELOCITY(FEET/SEC.) =  2.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.35
  RAINFALL INTENSITY(INCH/HR) =   2.54
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.77

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       57.49    5.74    3.751  0.20( 0.11) 0.57      15.5      88.00
    1       65.76    8.26    3.044  0.20( 0.11) 0.57      22.5      85.00
    1       67.73    8.91    2.916  0.20( 0.11) 0.57      24.2      92.00
    1       73.02   10.96    2.589  0.20( 0.11) 0.57      29.3       1.00
    2       16.14    8.25    3.047  0.20( 0.18) 0.90       6.2      97.00
    3        5.77   11.35    2.538  0.20( 0.11) 0.54       2.6     100.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       75.85    5.74    3.751  0.20( 0.13) 0.64      21.2      88.00
    2       86.93    8.25    3.047  0.20( 0.13) 0.64      30.6      97.00
    3       86.96    8.26    3.044  0.20( 0.13) 0.64      30.6      85.00
    4       88.37    8.91    2.916  0.20( 0.13) 0.63      32.5      92.00
    5       92.27   10.96    2.589  0.20( 0.12) 0.62      38.1       1.00
    6       90.56   11.35    2.538  0.20( 0.12) 0.62      38.2     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      92.27    Tc(MIN.) =    10.96
  EFFECTIVE AREA(ACRES) =      38.09   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       41.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.82
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.27
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.05
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      38.09
  TOTAL STREAM AREA(ACRES) =      41.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      92.27

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.44      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.54
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      1.54

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.54

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       75.85    5.83    3.716  0.20( 0.13) 0.64      21.2      88.00
      1       86.93    8.34    3.028  0.20( 0.13) 0.64      30.6      97.00
      1       86.96    8.35    3.025  0.20( 0.13) 0.64      30.6      85.00
      1       88.37    9.00    2.899  0.20( 0.13) 0.63      32.5      92.00
      1       92.27   11.05    2.577  0.20( 0.12) 0.62      38.1       1.00
      1       90.56   11.44    2.526  0.20( 0.12) 0.62      38.2     100.00
      2        1.54    5.28    3.937  0.20( 0.18) 0.90       0.4     104.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       74.35    5.28    3.937  0.20( 0.13) 0.64      19.6     104.00
      2       77.30    5.83    3.716  0.20( 0.13) 0.64      21.6      88.00
      3       88.09    8.34    3.028  0.20( 0.13) 0.64      31.0      97.00
      4       88.12    8.35    3.025  0.20( 0.13) 0.64      31.1      85.00
      5       89.48    9.00    2.899  0.20( 0.13) 0.64      33.0      92.00
      6       93.26   11.05    2.577  0.20( 0.12) 0.62      38.5       1.00
      7       91.52   11.44    2.526  0.20( 0.12) 0.62      38.6     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.26    Tc(MIN.) =    11.05
  EFFECTIVE AREA(ACRES) =      38.53   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       41.9
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   420.30
  FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.93
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.26
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.39
  RAINFALL INTENSITY(INCH/HR) =   2.53
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      38.53
  TOTAL STREAM AREA(ACRES) =      41.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      93.26

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.771
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.24
   HALFSTREET FLOOD WIDTH(FEET) =    6.23
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.55
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
 STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =    7.10
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.322
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.35      0.20     0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.04
 EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
 FLOW VELOCITY(FEET/SEC.) =  3.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
 LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.10
 RAINFALL INTENSITY(INCH/HR) =   3.32
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.67
 TOTAL STREAM AREA(ACRES) =       0.67
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       74.35    5.64    3.791  0.20( 0.13) 0.64      19.6     104.00
     1       77.30    6.19    3.592  0.20( 0.13) 0.64      21.6      88.00
     1       88.09    8.68    2.959  0.20( 0.13) 0.64      31.0      97.00
     1       88.12    8.70    2.956  0.20( 0.13) 0.64      31.1      85.00
     1       89.48    9.34    2.838  0.20( 0.13) 0.64      33.0      92.00
     1       93.26   11.39    2.532  0.20( 0.12) 0.62      38.5       1.00
     1       91.52   11.78    2.484  0.20( 0.12) 0.62      38.6     100.00
     2        1.99    7.10    3.322  0.20( 0.02) 0.10       0.7      95.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       76.15    5.64    3.791  0.20( 0.13) 0.63      20.2     104.00
     2       79.18    6.19    3.592  0.20( 0.13) 0.63      22.2      88.00
     3       83.20    7.10    3.322  0.20( 0.13) 0.63      25.7      95.00
     4       89.87    8.68    2.959  0.20( 0.13) 0.63      31.7      97.00
     5       89.89    8.70    2.956  0.20( 0.13) 0.63      31.7      85.00
     6       91.18    9.34    2.838  0.20( 0.13) 0.63      33.6      92.00
     7       94.77   11.39    2.532  0.20( 0.12) 0.61      39.2       1.00
     8       93.00   11.78    2.484  0.20( 0.12) 0.61      39.3     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      94.77    Tc(MIN.) =    11.39
  EFFECTIVE AREA(ACRES) =      39.20   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       42.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  38.62
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      94.77
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.133
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.93      0.20     0.900    75    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.47
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      2.47

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.972
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.84      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.88
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    8.62
```

```
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    2.11
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       4.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =  10.48
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.45
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.45

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    75    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =   10.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.609
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    0.99
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.68
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.81
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.45   10.45    2.661  0.20( 0.18) 0.90       1.8      97.00
      2        2.37   10.81    2.609  0.20( 0.10) 0.50       1.0     111.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.79   10.45    2.661  0.20( 0.15) 0.75       2.8      97.00
      2        6.73   10.81    2.609  0.20( 0.15) 0.75       2.8     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.79    Tc(MIN.) =    10.45
  EFFECTIVE AREA(ACRES) =       2.78   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

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  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.58
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.964
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    75    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.82
```

```
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =    9.48
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.813
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.20
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.81
  FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.09

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.279
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.09
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.09

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =    8.17
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.064
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.05
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  3.89   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.17
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.09    9.48    2.813  0.20( 0.11) 0.56       1.3     114.00
      2        4.00    8.17    3.064  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.91    8.17    3.064  0.20( 0.11) 0.53       2.6     116.00
      2        6.75    9.48    2.813  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.91    Tc(MIN.) =     8.17
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.91
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    8.29
 LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        6.91    8.29    3.038  0.20( 0.11) 0.53       2.6     116.00
     2        6.75    9.61    2.793  0.20( 0.11) 0.53       2.8     114.00
 LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        6.79   10.58    2.642  0.20( 0.15) 0.75       2.8      97.00
     2        6.73   10.94    2.592  0.20( 0.15) 0.75       2.8     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       13.07    8.29    3.038  0.20( 0.13) 0.63       4.8     116.00
     2       13.28    9.61    2.793  0.20( 0.13) 0.64       5.3     114.00
     3       13.16   10.58    2.642  0.20( 0.13) 0.64       5.6      97.00
     4       12.97   10.94    2.592  0.20( 0.13) 0.64       5.6     111.00
   TOTAL AREA(ACRES) =         5.6

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       13.28  Tc(MIN.) =    9.605
 EFFECTIVE AREA(ACRES) =      5.30  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
 TOTAL AREA(ACRES) =        5.6
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
 FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.63
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.28
 PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.89
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.89
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.30
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.28

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    75    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.59

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.27
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   2.22   Tc(MIN.) =   11.16
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.68
  FLOW VELOCITY(FEET/SEC.) =  2.31   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.16
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.55
  TOTAL STREAM AREA(ACRES) =       1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.07    8.58    2.979  0.20( 0.13) 0.63       4.8     116.00
      1       13.28    9.89    2.746  0.20( 0.13) 0.64       5.3     114.00
      1       13.16   10.87    2.602  0.20( 0.13) 0.64       5.6      97.00
      1       12.97   11.23    2.553  0.20( 0.13) 0.64       5.6     111.00
      2        3.43   11.16    2.562  0.20( 0.10) 0.50       1.5     120.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.16    8.58    2.979  0.20( 0.12) 0.60       6.0     116.00
      2       16.55    9.89    2.746  0.20( 0.12) 0.61       6.7     114.00
      3       16.56   10.87    2.602  0.20( 0.12) 0.61       7.1      97.00
      4       16.44   11.16    2.562  0.20( 0.12) 0.61       7.1     120.00
      5       16.39   11.23    2.553  0.20( 0.12) 0.61       7.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.56    Tc(MIN.) =    10.87
  EFFECTIVE AREA(ACRES) =       7.06   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.86
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.56
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.06
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.06
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.06
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.56

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20     0.100    75    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   3.77
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.28

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.992
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    8.52
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.90
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    2.54
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  2.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.598
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.67
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       4.86

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.89
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       2.16
  TOTAL STREAM AREA(ACRES) =       2.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       16.16    8.77    2.942  0.20( 0.12) 0.60       6.0     116.00
      1       16.55   10.08    2.716  0.20( 0.12) 0.61       6.7     114.00
      1       16.56   11.06    2.576  0.20( 0.12) 0.61       7.1      97.00
      1       16.44   11.35    2.537  0.20( 0.12) 0.61       7.1     120.00
      1       16.39   11.42    2.529  0.20( 0.12) 0.61       7.1     111.00
      2        1.28    5.68    3.772  0.20( 0.02) 0.10       0.4     118.00
      3        4.86   10.89    2.598  0.20( 0.10) 0.50       2.2     123.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.56    5.68    3.772  0.20( 0.11) 0.55       5.4     118.00
      2       21.61    8.77    2.942  0.20( 0.11) 0.56       8.1     116.00
      3       22.18   10.08    2.716  0.20( 0.11) 0.56       9.1     114.00
      4       22.29   10.89    2.598  0.20( 0.11) 0.57       9.5     123.00
      5       22.24   11.06    2.576  0.20( 0.11) 0.57       9.6      97.00
      6       22.04   11.35    2.537  0.20( 0.11) 0.57       9.7     120.00
      7       21.97   11.42    2.529  0.20( 0.11) 0.57       9.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.29    Tc(MIN.) =    10.89
  EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.13
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.29
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.92
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.54
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.29
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.23
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.884
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.59      0.20     0.900    75    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      1.44

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =   10.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.589
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.49      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.34
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       4.62
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.45
  FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.96
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.62

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.300
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    8.39
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
```

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.89      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    2.34
  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       4.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.39
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.59
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.62   10.96    2.589  0.20( 0.12) 0.61       2.1     127.00
      2        4.17    8.39    3.018  0.20( 0.10) 0.50       1.6     129.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.32    8.39    3.018  0.20( 0.11) 0.56       3.2     129.00
      2        8.18   10.96    2.589  0.20( 0.11) 0.56       3.7     127.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.32    Tc(MIN.) =     8.39
  EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.32
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.45
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.32    8.45    3.006  0.20( 0.11) 0.56       3.2     129.00
      2        8.18   11.02    2.581  0.20( 0.11) 0.56       3.7     127.00
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.56    6.04    3.642  0.20( 0.11) 0.55       5.4     118.00
      2       21.61    9.12    2.876  0.20( 0.11) 0.56       8.1     116.00
      3       22.18   10.42    2.665  0.20( 0.11) 0.56       9.1     114.00
      4       22.29   11.23    2.553  0.20( 0.11) 0.57       9.5     123.00
      5       22.24   11.40    2.532  0.20( 0.11) 0.57       9.6      97.00
      6       22.04   11.69    2.495  0.20( 0.11) 0.57       9.7     120.00
      7       21.97   11.77    2.485  0.20( 0.11) 0.57       9.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       25.82    6.04    3.642  0.20( 0.11) 0.55       7.7     118.00
      2       29.26    8.45    3.006  0.20( 0.11) 0.56      10.7     129.00
      3       29.89    9.12    2.876  0.20( 0.11) 0.56      11.4     116.00
      4       30.39   10.42    2.665  0.20( 0.11) 0.56      12.6     114.00
      5       30.44   11.02    2.581  0.20( 0.11) 0.56      13.1     127.00
      6       30.38   11.23    2.553  0.20( 0.11) 0.57      13.2     123.00
      7       30.26   11.40    2.532  0.20( 0.11) 0.57      13.3      97.00
      8       29.93   11.69    2.495  0.20( 0.11) 0.57      13.3     120.00
      9       29.83   11.77    2.485  0.20( 0.11) 0.57      13.4     111.00
    TOTAL AREA(ACRES) =        13.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       30.44  Tc(MIN.) =   11.019
  EFFECTIVE AREA(ACRES) =     13.08  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.44
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.17
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.17
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      13.08
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.44

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    75    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   3.52
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.82    6.20    3.589  0.20( 0.11) 0.55       7.7     118.00
      1       29.26    8.60    2.976  0.20( 0.11) 0.56      10.7     129.00
      1       29.89    9.27    2.850  0.20( 0.11) 0.56      11.4     116.00
      1       30.39   10.57    2.643  0.20( 0.11) 0.56      12.6     114.00
      1       30.44   11.17    2.562  0.20( 0.11) 0.56      13.1     127.00
      1       30.38   11.38    2.534  0.20( 0.11) 0.57      13.2     123.00
      1       30.26   11.55    2.513  0.20( 0.11) 0.57      13.3      97.00
      1       29.93   11.84    2.477  0.20( 0.11) 0.57      13.3     120.00
      1       29.83   11.92    2.467  0.20( 0.11) 0.57      13.4     111.00
      2        0.98    6.40    3.523  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       26.79    6.20    3.589  0.20( 0.11) 0.53       8.0     118.00
      2       27.09    6.40    3.523  0.20( 0.11) 0.53       8.2     138.00
      3       30.08    8.60    2.976  0.20( 0.11) 0.54      11.0     129.00
      4       30.68    9.27    2.850  0.20( 0.11) 0.55      11.7     116.00
      5       31.13   10.57    2.643  0.20( 0.11) 0.55      12.9     114.00
      6       31.15   11.17    2.562  0.20( 0.11) 0.55      13.4     127.00
      7       31.08   11.38    2.534  0.20( 0.11) 0.55      13.5     123.00
      8       30.95   11.55    2.513  0.20( 0.11) 0.55      13.6      97.00
      9       30.62   11.84    2.477  0.20( 0.11) 0.55      13.7     120.00
     10       30.51   11.92    2.467  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.15    Tc(MIN.) =    11.17
  EFFECTIVE AREA(ACRES) =      13.39   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.15
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   11.89
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.040
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.46      0.20     0.500    75    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    9.70
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.777
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.17      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    2.80
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       3.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.63
  FLOW VELOCITY(FEET/SEC.) =  4.29   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   2.78
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.91

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.267
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.08
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.08
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.77
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.06
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    8.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.041
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.28
  RAINFALL INTENSITY(INCH/HR) =   3.04
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.91    9.70    2.777  0.20( 0.11) 0.57       1.6     134.00
      2        3.79    8.28    3.041  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.45    8.28    3.041  0.20( 0.11) 0.54       2.8     136.00
      2        7.35    9.70    2.777  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.45    Tc(MIN.) =     8.28
  EFFECTIVE AREA(ACRES) =       2.82   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.45
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.36
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.45    8.36    3.025  0.20( 0.11) 0.54       2.8     136.00
      2        7.35    9.78    2.764  0.20( 0.11) 0.54       3.1     134.00
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.79    6.96    3.358  0.20( 0.11) 0.53       8.0     118.00
      2       27.09    7.17    3.303  0.20( 0.11) 0.53       8.2     138.00
      3       30.08    9.32    2.840  0.20( 0.11) 0.54      11.0     129.00
      4       30.68   10.00    2.729  0.20( 0.11) 0.55      11.7     116.00
      5       31.13   11.30    2.545  0.20( 0.11) 0.55      12.9     114.00
      6       31.15   11.89    2.471  0.20( 0.11) 0.55      13.4     127.00
      7       31.08   12.11    2.446  0.20( 0.11) 0.55      13.5     123.00
      8       30.95   12.27    2.427  0.20( 0.11) 0.55      13.6      97.00
      9       30.62   12.57    2.394  0.20( 0.11) 0.55      13.7     120.00
     10       30.51   12.65    2.385  0.20( 0.11) 0.55      13.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.70    6.96    3.358  0.20( 0.11) 0.53      10.3     118.00
      2       34.09    7.17    3.303  0.20( 0.11) 0.53      10.6     138.00
      3       36.19    8.36    3.025  0.20( 0.11) 0.54      12.6     136.00
      4       37.47    9.32    2.840  0.20( 0.11) 0.54      14.0     129.00
      5       37.84    9.78    2.764  0.20( 0.11) 0.54      14.5     134.00
      6       37.93   10.00    2.729  0.20( 0.11) 0.54      14.8     116.00
      7       37.87   11.30    2.545  0.20( 0.11) 0.55      16.0     114.00
      8       37.69   11.89    2.471  0.20( 0.11) 0.55      16.4     127.00
      9       37.55   12.11    2.446  0.20( 0.11) 0.55      16.6     123.00
     10       37.37   12.27    2.427  0.20( 0.11) 0.55      16.6      97.00
     11       36.94   12.57    2.394  0.20( 0.11) 0.55      16.7     120.00
```

```
    12       36.82   12.65    2.385  0.20( 0.11) 0.55      16.7     111.00
   TOTAL AREA(ACRES) =        16.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       37.93  Tc(MIN.) =    9.999
  EFFECTIVE AREA(ACRES) =     14.77  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.93
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       33.70    7.34    3.259  0.20( 0.11) 0.53      10.3     118.00
      2       34.09    7.54    3.209  0.20( 0.11) 0.53      10.6     138.00
      3       36.19    8.73    2.951  0.20( 0.11) 0.54      12.6     136.00
      4       37.47    9.69    2.778  0.20( 0.11) 0.54      14.0     129.00
      5       37.84   10.13    2.708  0.20( 0.11) 0.54      14.5     134.00
      6       37.93   10.36    2.675  0.20( 0.11) 0.54      14.8     116.00
      7       37.87   11.66    2.500  0.20( 0.11) 0.55      16.0     114.00
      8       37.69   12.25    2.429  0.20( 0.11) 0.55      16.4     127.00
      9       37.55   12.48    2.404  0.20( 0.11) 0.55      16.6     123.00
     10       37.37   12.64    2.386  0.20( 0.11) 0.55      16.6      97.00
     11       36.94   12.94    2.354  0.20( 0.11) 0.55      16.7     120.00
     12       36.82   13.02    2.346  0.20( 0.11) 0.55      16.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       76.15    5.66    3.781  0.20( 0.13) 0.63      20.2     104.00
      2       79.18    6.22    3.584  0.20( 0.13) 0.63      22.2      88.00
      3       83.20    7.12    3.315  0.20( 0.13) 0.63      25.7      95.00
      4       89.87    8.71    2.954  0.20( 0.13) 0.63      31.7      97.00
      5       89.89    8.72    2.952  0.20( 0.13) 0.63      31.7      85.00
      6       91.18    9.36    2.834  0.20( 0.13) 0.63      33.6      92.00
      7       94.77   11.42    2.529  0.20( 0.12) 0.61      39.2       1.00
      8       93.00   11.81    2.481  0.20( 0.12) 0.61      39.3     100.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      106.46    5.66    3.781  0.20( 0.12) 0.60      28.1     104.00
```

```
      2      110.67    6.22    3.584  0.20( 0.12) 0.60      31.0      88.00
      3      116.50    7.12    3.315  0.20( 0.12) 0.60      35.7      95.00
      4      117.81    7.34    3.259  0.20( 0.12) 0.60      36.8     118.00
      5      119.05    7.54    3.209  0.20( 0.12) 0.60      37.9     138.00
      6      126.02    8.71    2.954  0.20( 0.12) 0.60      44.2      97.00
      7      126.07    8.72    2.952  0.20( 0.12) 0.60      44.3      85.00
      8      126.09    8.73    2.951  0.20( 0.12) 0.60      44.3     136.00
      9      128.21    9.36    2.834  0.20( 0.12) 0.60      47.1      92.00
     10      129.22    9.69    2.778  0.20( 0.12) 0.60      48.5     129.00
     11      130.36   10.13    2.708  0.20( 0.12) 0.60      50.3     134.00
     12      130.85   10.36    2.675  0.20( 0.12) 0.60      51.1     116.00
     13      132.65   11.42    2.529  0.20( 0.12) 0.60      55.0       1.00
     14      131.55   11.66    2.500  0.20( 0.12) 0.60      55.2     114.00
     15      130.83   11.81    2.481  0.20( 0.12) 0.60      55.4     100.00
     16      128.64   12.25    2.429  0.20( 0.12) 0.60      55.7     127.00
     17      127.50   12.48    2.404  0.20( 0.12) 0.60      55.9     123.00
     18      126.61   12.64    2.386  0.20( 0.12) 0.60      55.9      97.00
     19      124.94   12.94    2.354  0.20( 0.12) 0.60      56.0     120.00
     20      124.48   13.02    2.346  0.20( 0.12) 0.60      56.0     111.00
    TOTAL AREA(ACRES) =        59.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      132.65  Tc(MIN.) =   11.416
  EFFECTIVE AREA(ACRES) =     54.95  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       59.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.49
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     132.65
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   11.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.60
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      54.95
  TOTAL STREAM AREA(ACRES) =      59.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     132.65

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.12      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.44

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    75    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    8.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       3.80

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      106.46    5.86    3.708  0.20( 0.12) 0.60      28.1     104.00
      1      110.67    6.41    3.522  0.20( 0.12) 0.60      31.0      88.00
      1      116.50    7.31    3.265  0.20( 0.12) 0.60      35.7      95.00
      1      117.81    7.53    3.212  0.20( 0.12) 0.60      36.8     118.00
      1      119.05    7.73    3.163  0.20( 0.12) 0.60      37.9     138.00
      1      126.02    8.90    2.918  0.20( 0.12) 0.60      44.2      97.00
```

```
     1      126.07    8.91    2.915  0.20( 0.12) 0.60      44.3      85.00
     1      126.09    8.92    2.914  0.20( 0.12) 0.60      44.3     136.00
     1      128.21    9.55    2.801  0.20( 0.12) 0.60      47.1      92.00
     1      129.22    9.88    2.748  0.20( 0.12) 0.60      48.5     129.00
     1      130.36   10.32    2.680  0.20( 0.12) 0.60      50.3     134.00
     1      130.85   10.54    2.648  0.20( 0.12) 0.60      51.1     116.00
     1      132.65   11.60    2.506  0.20( 0.12) 0.60      55.0       1.00
     1      131.55   11.84    2.477  0.20( 0.12) 0.60      55.2     114.00
     1      130.83   11.99    2.459  0.20( 0.12) 0.60      55.4     100.00
     1      128.64   12.44    2.408  0.20( 0.12) 0.60      55.7     127.00
     1      127.50   12.67    2.383  0.20( 0.12) 0.60      55.9     123.00
     1      126.61   12.83    2.366  0.20( 0.12) 0.60      55.9      97.00
     1      124.94   13.13    2.335  0.20( 0.12) 0.60      56.0     120.00
     1      124.48   13.21    2.327  0.20( 0.12) 0.60      56.0     111.00
     2        0.44    5.00    4.060  0.20( 0.02) 0.10       0.1     140.00
     3        3.80    8.20    3.058  0.20( 0.04) 0.20       1.4     141.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      103.32    5.00    4.060  0.20( 0.12) 0.59      25.0     140.00
      2      110.16    5.86    3.708  0.20( 0.12) 0.59      29.2     104.00
      3      114.48    6.41    3.522  0.20( 0.12) 0.59      32.2      88.00
      4      120.48    7.31    3.265  0.20( 0.12) 0.59      37.1      95.00
      5      121.83    7.53    3.212  0.20( 0.12) 0.59      38.2     118.00
      6      123.10    7.73    3.163  0.20( 0.12) 0.59      39.4     138.00
      7      125.97    8.20    3.058  0.20( 0.12) 0.59      42.0     141.00
      8      129.96    8.90    2.918  0.20( 0.12) 0.59      45.8      97.00
      9      130.01    8.91    2.915  0.20( 0.12) 0.59      45.8      85.00
     10      130.03    8.92    2.914  0.20( 0.12) 0.59      45.8     136.00
     11      131.99    9.55    2.801  0.20( 0.12) 0.59      48.6      92.00
     12      132.93    9.88    2.748  0.20( 0.12) 0.59      50.0     129.00
     13      133.98   10.32    2.680  0.20( 0.12) 0.59      51.8     134.00
     14      134.42   10.54    2.648  0.20( 0.12) 0.59      52.6     116.00
     15      136.03   11.60    2.506  0.20( 0.12) 0.58      56.5       1.00
     16      134.89   11.84    2.477  0.20( 0.12) 0.58      56.8     114.00
     17      134.14   11.99    2.459  0.20( 0.12) 0.58      56.9     100.00
     18      131.88   12.44    2.408  0.20( 0.12) 0.58      57.3     127.00
     19      130.71   12.67    2.383  0.20( 0.12) 0.58      57.4     123.00
     20      129.79   12.83    2.366  0.20( 0.12) 0.58      57.5      97.00
     21      128.08   13.13    2.335  0.20( 0.12) 0.58      57.5     120.00
     22      127.61   13.21    2.327  0.20( 0.12) 0.58      57.5     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     136.03    Tc(MIN.) =    11.60
  EFFECTIVE AREA(ACRES) =      56.47   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       60.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.83
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     136.03
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
```

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.475
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.96      0.20     0.600    75   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      2.03

********************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.83
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =   13.35
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.313
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.82      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       5.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.67
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.49
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.40
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.461
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    75   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.56
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =   13.15
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.37   FLOW VELOCITY(FEET/SEC.) =   3.80
```

```
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
 FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.88
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.05
 PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   15.09
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   15.09
 RAINFALL INTENSITY(INCH/HR) =   2.16
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       0.54
 TOTAL STREAM AREA(ACRES) =       0.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.05

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
 ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.915
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    8.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      1.56
 TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.91
 RAINFALL INTENSITY(INCH/HR) =   2.92
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       0.62
 TOTAL STREAM AREA(ACRES) =       0.62
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.05   15.09    2.156  0.20( 0.18) 0.90       0.5     147.00
     2        1.56    8.91    2.915  0.20( 0.12) 0.60       0.6      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.42    8.91    2.915  0.20( 0.14) 0.70       0.9      10.00
     2        2.18   15.09    2.156  0.20( 0.15) 0.74       1.2     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       2.42    Tc(MIN.) =     8.91
 EFFECTIVE AREA(ACRES) =       0.94   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
 TOTAL AREA(ACRES) =        1.2
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.42
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.16
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.42    9.16    2.870  0.20( 0.14) 0.70       0.9      10.00
     2        2.18   15.34    2.136  0.20( 0.15) 0.74       1.2     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.49   13.40    2.307  0.20( 0.12) 0.60       2.8     144.00
 LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
     2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
     3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
   TOTAL AREA(ACRES) =         3.9

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        7.74  Tc(MIN.) =   13.403
 EFFECTIVE AREA(ACRES) =      3.87  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
```

```
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.08      0.20     0.500    75    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   1.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.22
  PIPE TRAVEL TIME(MIN.) =   2.39    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.03
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.22

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.799
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    75    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   0.77   Tc(MIN.) =   10.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.677
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.86

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.34
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   2.68
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.22   10.03    2.725  0.20( 0.10) 0.50       0.1     147.00
      2        1.86   10.34    2.677  0.20( 0.09) 0.44       0.8     152.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.06   10.03    2.725  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.34    2.677  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.08    Tc(MIN.) =    10.34
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.08
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.39
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.06   10.08    2.716  0.20( 0.09) 0.45       0.9     147.00
      2        2.08   10.39    2.669  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.13    9.16    2.870  0.20( 0.13) 0.63       2.8      10.00
      2        7.74   13.40    2.307  0.20( 0.13) 0.64       3.9     144.00
      3        7.24   15.34    2.136  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
      1        9.11    9.16    2.870  0.20( 0.12) 0.59       3.6      10.00
      2        9.32   10.08    2.716  0.20( 0.12) 0.59       3.9     147.00
      3        9.39   10.39    2.669  0.20( 0.12) 0.59       4.0     152.00
      4        9.53   13.40    2.307  0.20( 0.12) 0.60       4.8     144.00
      5        8.89   15.34    2.136  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        9.53  Tc(MIN.) =   13.403
  EFFECTIVE AREA(ACRES) =      4.75  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.53
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   13.85
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.85
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.75
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.53

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.051
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    75    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.83
```

```
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.23
  TOTAL STREAM AREA(ACRES) =       0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.11    9.61    2.792  0.20( 0.12) 0.59       3.6      10.00
      1        9.32   10.53    2.649  0.20( 0.12) 0.59       3.9     147.00
      1        9.39   10.84    2.606  0.20( 0.12) 0.59       4.0     152.00
      1        9.53   13.85    2.265  0.20( 0.12) 0.60       4.8     144.00
      1        8.89   15.79    2.100  0.20( 0.12) 0.61       4.8     147.00
      2        0.83    5.02    4.051  0.20( 0.04) 0.20       0.2     150.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.02    4.051  0.20( 0.11) 0.55       2.1     150.00
      2        9.68    9.61    2.792  0.20( 0.11) 0.57       3.8      10.00
      3        9.86   10.53    2.649  0.20( 0.11) 0.57       4.1     147.00
      4        9.92   10.84    2.606  0.20( 0.11) 0.57       4.2     152.00
      5        9.99   13.85    2.265  0.20( 0.12) 0.58       5.0     144.00
      6        9.32   15.79    2.100  0.20( 0.12) 0.59       5.1     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.99    Tc(MIN.) =    13.85
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.99
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   13.88
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.88
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.98
  TOTAL STREAM AREA(ACRES) =       5.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.99

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.814
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.30      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.83    5.06    4.033  0.20( 0.11) 0.55       2.1     150.00
      1        9.68    9.64    2.786  0.20( 0.11) 0.57       3.8      10.00
      1        9.86   10.57    2.644  0.20( 0.11) 0.57       4.1     147.00
      1        9.92   10.88    2.600  0.20( 0.11) 0.57       4.2     152.00
      1        9.99   13.88    2.261  0.20( 0.12) 0.58       5.0     144.00
      1        9.32   15.83    2.098  0.20( 0.12) 0.59       5.1     147.00
      2        1.02    5.58    3.814  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.06    4.033  0.20( 0.10) 0.51       2.4     150.00
      2        9.06    5.58    3.814  0.20( 0.10) 0.51       2.6      14.00
      3       10.42    9.64    2.786  0.20( 0.11) 0.54       4.1      10.00
      4       10.57   10.57    2.644  0.20( 0.11) 0.55       4.4     147.00
      5       10.61   10.88    2.600  0.20( 0.11) 0.55       4.5     152.00
```

```
      6       10.59   13.88    2.261  0.20( 0.11) 0.56       5.3     144.00
      7        9.87   15.83    2.098  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.61    Tc(MIN.) =    10.88
  EFFECTIVE AREA(ACRES) =       4.55   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.61
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   11.18
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.18
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       4.55
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.61

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.823
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    75    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
```

```
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.88
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =    6.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.462
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.26      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.58
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
  LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.60
  RAINFALL INTENSITY(INCH/HR) =   3.46
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       0.52
  TOTAL STREAM AREA(ACRES) =       0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.81    5.37    3.895  0.20( 0.10) 0.51       2.4     150.00
      1        9.06    5.89    3.696  0.20( 0.10) 0.51       2.6      14.00
      1       10.42    9.95    2.737  0.20( 0.11) 0.54       4.1      10.00
      1       10.57   10.87    2.602  0.20( 0.11) 0.55       4.4     147.00
      1       10.61   11.18    2.560  0.20( 0.11) 0.55       4.5     152.00
      1       10.59   14.19    2.233  0.20( 0.11) 0.56       5.3     144.00
      1        9.87   16.14    2.075  0.20( 0.11) 0.57       5.4     147.00
      2        1.61    6.60    3.462  0.20( 0.03) 0.15       0.5     154.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       10.28    5.37    3.895  0.20( 0.09) 0.46       2.8      150.00
      2       10.59    5.89    3.696  0.20( 0.09) 0.46       3.1       14.00
      3       10.90    6.60    3.462  0.20( 0.09) 0.46       3.4      154.00
      4       11.69    9.95    2.737  0.20( 0.10) 0.50       4.7       10.00
      5       11.77   10.87    2.602  0.20( 0.10) 0.51       5.0      147.00
      6       11.79   11.18    2.560  0.20( 0.10) 0.51       5.1      152.00
      7       11.62   14.19    2.233  0.20( 0.10) 0.52       5.8      144.00
      8       10.83   16.14    2.075  0.20( 0.11) 0.53       5.9      147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.79    Tc(MIN.) =    11.18
  EFFECTIVE AREA(ACRES) =       5.07   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.26
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.897
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.24      0.20     0.600    75    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.10
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      3.10

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
```

```
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.10

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.903
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    75    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      1.70

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.70

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.10    9.01    2.897  0.20( 0.12) 0.60       1.2     159.00
      2        1.70    8.98    2.903  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    8.98    2.903  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.01    2.897  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.80    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.80
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.21
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.80    9.18    2.866  0.20( 0.12) 0.60       1.9     160.00
      2        4.80    9.21    2.861  0.20( 0.12) 0.60       1.9     159.00
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.28    5.46    3.861  0.20( 0.09) 0.46       2.8     150.00
      2       10.59    5.97    3.667  0.20( 0.09) 0.46       3.1      14.00
      3       10.90    6.68    3.438  0.20( 0.09) 0.46       3.4     154.00
      4       11.69   10.03    2.725  0.20( 0.10) 0.50       4.7      10.00
      5       11.77   10.95    2.591  0.20( 0.10) 0.51       5.0     147.00
      6       11.79   11.26    2.549  0.20( 0.10) 0.51       5.1     152.00
      7       11.62   14.27    2.226  0.20( 0.10) 0.52       5.8     144.00
      8       10.83   16.22    2.069  0.20( 0.11) 0.53       5.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.46    3.861  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    5.97    3.667  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.68    3.438  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.18    2.866  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.21    2.861  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.03    2.725  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   10.95    2.591  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.26    2.549  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.27    2.226  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.22    2.069  0.20( 0.11) 0.55       7.8     147.00
    TOTAL AREA(ACRES) =         7.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       16.30  Tc(MIN.) =    9.211
  EFFECTIVE AREA(ACRES) =      6.28  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
```

```
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.30
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    9.45
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.921
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.28      0.20     0.600    75    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.23
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      3.23

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.23
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   2.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.23

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.109
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.28
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      3.28

********************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   3.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.23    9.41    2.825  0.20( 0.12) 0.60       1.3      17.00
      2        3.28    7.97    3.109  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.29    7.97    3.109  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.41    2.825  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.29    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.29
```

```
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.29    8.02    3.097  0.20( 0.11) 0.55       2.3      16.00
      2        6.19    9.47    2.816  0.20( 0.11) 0.55       2.5      17.00
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.17    5.70    3.767  0.20( 0.10) 0.50       4.0     150.00
      2       14.62    6.21    3.585  0.20( 0.10) 0.50       4.3      14.00
      3       15.12    6.92    3.370  0.20( 0.10) 0.50       4.8     154.00
      4       16.29    9.41    2.825  0.20( 0.10) 0.52       6.3     160.00
      5       16.30    9.45    2.820  0.20( 0.10) 0.52       6.3     159.00
      6       16.25   10.26    2.689  0.20( 0.11) 0.53       6.6      10.00
      7       16.10   11.19    2.559  0.20( 0.11) 0.53       6.9     147.00
      8       16.05   11.50    2.519  0.20( 0.11) 0.53       7.0     152.00
      9       15.31   14.51    2.205  0.20( 0.11) 0.54       7.7     144.00
     10       14.24   16.46    2.051  0.20( 0.11) 0.55       7.8     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.64    5.70    3.767  0.20( 0.10) 0.51       5.6     150.00
      2       20.29    6.21    3.585  0.20( 0.10) 0.51       6.1      14.00
      3       21.05    6.92    3.370  0.20( 0.10) 0.52       6.8     154.00
      4       21.93    8.02    3.097  0.20( 0.10) 0.52       7.7      16.00
      5       22.48    9.41    2.825  0.20( 0.11) 0.53       8.7     160.00
      6       22.49    9.45    2.820  0.20( 0.11) 0.53       8.8     159.00
      7       22.49    9.47    2.816  0.20( 0.11) 0.53       8.8      17.00
      8       22.15   10.26    2.689  0.20( 0.11) 0.54       9.1      10.00
      9       21.70   11.19    2.559  0.20( 0.11) 0.54       9.4     147.00
     10       21.56   11.50    2.519  0.20( 0.11) 0.54       9.5     152.00
     11       20.11   14.51    2.205  0.20( 0.11) 0.55      10.2     144.00
     12       18.68   16.46    2.051  0.20( 0.11) 0.55      10.3     147.00
    TOTAL AREA(ACRES) =        10.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       22.49  Tc(MIN.) =    9.445
  EFFECTIVE AREA(ACRES) =      8.76  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.97
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       8.76
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.49

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.622
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    75    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   1.62   Tc(MIN.) =    7.72
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.166
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.44      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.06

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.29
  FLOW VELOCITY(FEET/SEC.) =  3.60   DEPTH*VELOCITY(FT*FT/SEC.) =   0.92
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.06

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.039
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.31      0.20     0.100    75    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.12
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.12

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       19.64    5.76    3.745  0.20( 0.10) 0.51       5.6     150.00
    1       20.29    6.27    3.566  0.20( 0.10) 0.51       6.1      14.00
    1       21.05    6.98    3.353  0.20( 0.10) 0.52       6.8     154.00
    1       21.93    8.07    3.085  0.20( 0.10) 0.52       7.7      16.00
    1       22.48    9.47    2.816  0.20( 0.11) 0.53       8.7     160.00
    1       22.49    9.50    2.810  0.20( 0.11) 0.53       8.8     159.00
    1       22.49    9.52    2.807  0.20( 0.11) 0.53       8.8      17.00
    1       22.15   10.32    2.680  0.20( 0.11) 0.54       9.1      10.00
    1       21.70   11.24    2.552  0.20( 0.11) 0.54       9.4     147.00
    1       21.56   11.55    2.512  0.20( 0.11) 0.54       9.5     152.00
    1       20.11   14.56    2.200  0.20( 0.11) 0.55      10.2     144.00
    1       18.68   16.52    2.047  0.20( 0.11) 0.55      10.3     147.00
    2        2.06    7.72    3.166  0.20( 0.03) 0.16       0.7      19.00
    3        1.12    5.04    4.039  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.44    5.04    4.039  0.20( 0.09) 0.46       5.7     161.00
    2       22.50    5.76    3.745  0.20( 0.09) 0.46       6.4     150.00
    3       23.17    6.27    3.566  0.20( 0.09) 0.46       7.0      14.00
    4       23.96    6.98    3.353  0.20( 0.09) 0.47       7.7     154.00
    5       24.58    7.72    3.166  0.20( 0.09) 0.47       8.5      19.00
    6       24.79    8.07    3.085  0.20( 0.10) 0.48       8.8      16.00
    7       25.09    9.47    2.816  0.20( 0.10) 0.49       9.8     160.00
    8       25.09    9.50    2.810  0.20( 0.10) 0.49       9.8     159.00
    9       25.09    9.52    2.807  0.20( 0.10) 0.49       9.8      17.00
   10       24.63   10.32    2.680  0.20( 0.10) 0.49      10.1      10.00
   11       24.06   11.24    2.552  0.20( 0.10) 0.50      10.4     147.00
   12       23.89   11.55    2.512  0.20( 0.10) 0.50      10.5     152.00
   13       22.14   14.56    2.200  0.20( 0.10) 0.51      11.3     144.00
   14       20.57   16.52    2.047  0.20( 0.10) 0.51      11.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.09    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       9.80   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.32
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.09
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.089
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.85      0.20     0.600    75    8.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.27
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   3.09
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.066
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    75    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.62
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.27    8.05    3.089  0.20( 0.12) 0.60       0.9     168.00
      2        2.62    8.16    3.066  0.20( 0.12) 0.60       1.0     169.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.88    8.05    3.089  0.20( 0.12) 0.60       1.8     168.00
      2        4.88    8.16    3.066  0.20( 0.12) 0.60       1.8     169.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.88    Tc(MIN.) =     8.05
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.88
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.88    8.21    3.056  0.20( 0.12) 0.60       1.8     168.00
      2        4.88    8.32    3.033  0.20( 0.12) 0.60       1.8     169.00
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       21.44    5.11    4.008  0.20( 0.09) 0.46       5.7     161.00
      2       22.50    5.82    3.720  0.20( 0.09) 0.46       6.4     150.00
      3       23.17    6.34    3.544  0.20( 0.09) 0.46       7.0      14.00
      4       23.96    7.04    3.335  0.20( 0.09) 0.47       7.7     154.00
      5       24.58    7.78    3.151  0.20( 0.09) 0.47       8.5      19.00
      6       24.79    8.14    3.070  0.20( 0.10) 0.48       8.8      16.00
      7       25.09    9.53    2.805  0.20( 0.10) 0.49       9.8     160.00
      8       25.09    9.57    2.799  0.20( 0.10) 0.49       9.8     159.00
      9       25.09    9.59    2.796  0.20( 0.10) 0.49       9.8      17.00
     10       24.63   10.39    2.670  0.20( 0.10) 0.49      10.1      10.00
     11       24.06   11.31    2.543  0.20( 0.10) 0.50      10.4     147.00
     12       23.89   11.62    2.504  0.20( 0.10) 0.50      10.5     152.00
     13       22.14   14.63    2.194  0.20( 0.10) 0.51      11.3     144.00
     14       20.57   16.59    2.042  0.20( 0.10) 0.51      11.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

  ** PEAK FLOW RATE TABLE **
```

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	25.47	5.11	4.008	0.20(0.10)	0.48	6.8	161.00
2	26.75	5.82	3.720	0.20(0.10)	0.49	7.7	150.00
3	27.56	6.34	3.544	0.20(0.10)	0.49	8.4	14.00
4	28.54	7.04	3.335	0.20(0.10)	0.49	9.3	154.00
5	29.36	7.78	3.151	0.20(0.10)	0.50	10.2	19.00
6	29.66	8.14	3.070	0.20(0.10)	0.50	10.6	16.00
7	29.69	8.21	3.056	0.20(0.10)	0.50	10.6	168.00
8	29.71	8.32	3.033	0.20(0.10)	0.50	10.7	169.00
9	29.59	9.53	2.805	0.20(0.10)	0.51	11.6	160.00
10	29.58	9.57	2.799	0.20(0.10)	0.51	11.6	159.00
11	29.57	9.59	2.796	0.20(0.10)	0.51	11.7	17.00
12	28.90	10.39	2.670	0.20(0.10)	0.51	12.0	10.00
13	28.12	11.31	2.543	0.20(0.10)	0.51	12.3	147.00
14	27.88	11.62	2.504	0.20(0.10)	0.51	12.4	152.00
15	25.61	14.63	2.194	0.20(0.10)	0.52	13.1	144.00
16	23.79	16.59	2.042	0.20(0.10)	0.52	13.2	147.00

TOTAL AREA(ACRES) = 13.2

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 29.71 Tc(MIN.) = 8.316
EFFECTIVE AREA(ACRES) = 10.74 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 13.2
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 171.00 = 1710.00 FEET.

****
FLOW PROCESS FROM NODE 171.00 TO NODE 171.00 IS CODE = 12

>>>>>CLEAR MEMORY BANK # 2 <<<<<
==========

****
FLOW PROCESS FROM NODE 171.00 TO NODE 172.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 481.00 DOWNSTREAM(FEET) = 472.00
FLOW LENGTH(FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.89
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 29.71
PIPE TRAVEL TIME(MIN.) = 0.23 Tc(MIN.) = 8.55
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 172.00 = 1915.00 FEET.

****
FLOW PROCESS FROM NODE 172.00 TO NODE 172.00 IS CODE = 1

>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 8.55
RAINFALL INTENSITY(INCH/HR) = 2.99
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20
AREA-AVERAGED Ap = 0.50
EFFECTIVE STREAM AREA(ACRES) = 10.74
TOTAL STREAM AREA(ACRES) = 13.16
PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.71

****
FLOW PROCESS FROM NODE 170.00 TO NODE 172.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========
INITIAL SUBAREA FLOW-LENGTH(FEET) = 185.00

```
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.28      0.20     0.100    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.02
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
 FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   4.06
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.28
 TOTAL STREAM AREA(ACRES) =       0.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       25.47    5.35    3.906  0.20( 0.10) 0.48       6.8     161.00
     1       26.75    6.06    3.638  0.20( 0.10) 0.49       7.7     150.00
     1       27.56    6.57    3.472  0.20( 0.10) 0.49       8.4      14.00
     1       28.54    7.28    3.275  0.20( 0.10) 0.49       9.3     154.00
     1       29.36    8.01    3.099  0.20( 0.10) 0.50      10.2      19.00
     1       29.66    8.37    3.022  0.20( 0.10) 0.50      10.6      16.00
     1       29.69    8.44    3.008  0.20( 0.10) 0.50      10.6     168.00
     1       29.71    8.55    2.986  0.20( 0.10) 0.50      10.7     169.00
     1       29.59    9.76    2.767  0.20( 0.10) 0.51      11.6     160.00
     1       29.58    9.80    2.761  0.20( 0.10) 0.51      11.6     159.00
     1       29.57    9.82    2.758  0.20( 0.10) 0.51      11.7      17.00
     1       28.90   10.62    2.637  0.20( 0.10) 0.51      12.0      10.00
     1       28.12   11.54    2.514  0.20( 0.10) 0.51      12.3     147.00
     1       27.88   11.85    2.476  0.20( 0.10) 0.51      12.4     152.00
     1       25.61   14.87    2.174  0.20( 0.10) 0.52      13.1     144.00
     1       23.79   16.82    2.025  0.20( 0.10) 0.52      13.2     147.00
     2        1.02    5.00    4.060  0.20( 0.02) 0.10       0.3     170.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       25.79    5.00    4.060  0.20( 0.09) 0.47       6.7     170.00
     2       26.45    5.35    3.906  0.20( 0.09) 0.47       7.1     161.00
     3       27.66    6.06    3.638  0.20( 0.09) 0.47       8.0     150.00
     4       28.43    6.57    3.472  0.20( 0.10) 0.48       8.7      14.00
     5       29.37    7.28    3.275  0.20( 0.10) 0.48       9.6     154.00
     6       30.13    8.01    3.099  0.20( 0.10) 0.48      10.5      19.00
     7       30.41    8.37    3.022  0.20( 0.10) 0.49      10.9      16.00
     8       30.44    8.44    3.008  0.20( 0.10) 0.49      10.9     168.00
     9       30.45    8.55    2.986  0.20( 0.10) 0.49      11.0     169.00
    10       30.28    9.76    2.767  0.20( 0.10) 0.50      11.9     160.00
    11       30.27    9.80    2.761  0.20( 0.10) 0.50      11.9     159.00
    12       30.26    9.82    2.758  0.20( 0.10) 0.50      11.9      17.00
    13       29.56   10.62    2.637  0.20( 0.10) 0.50      12.2      10.00
```

```
    14       28.75   11.54    2.514  0.20( 0.10) 0.50      12.5     147.00
    15       28.50   11.85    2.476  0.20( 0.10) 0.50      12.6     152.00
    16       26.15   14.87    2.174  0.20( 0.10) 0.51      13.4     144.00
    17       24.30   16.82    2.025  0.20( 0.10) 0.51      13.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.45    Tc(MIN.) =     8.55
  EFFECTIVE AREA(ACRES) =      11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.45
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.61
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.677
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.81      0.20     0.200    75    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.65

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   3.68
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.813
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.74
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.74

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.65    5.94    3.677  0.20( 0.04) 0.20       0.8     173.00
      2        1.74    5.58    3.813  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.32    5.58    3.813  0.20( 0.03) 0.16       1.3     174.00
      2        4.33    5.94    3.677  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.33    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.79
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.33
 PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.10
 LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.32    5.74    3.752  0.20( 0.03) 0.16       1.3     174.00
     2        4.33    6.10    3.621  0.20( 0.03) 0.16       1.3     173.00
 LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       25.79    5.07    4.026  0.20( 0.09) 0.47       6.7     170.00
     2       26.45    5.42    3.877  0.20( 0.09) 0.47       7.1     161.00
     3       27.66    6.13    3.614  0.20( 0.09) 0.47       8.0     150.00
     4       28.43    6.64    3.451  0.20( 0.10) 0.48       8.7      14.00
     5       29.37    7.35    3.257  0.20( 0.10) 0.48       9.6     154.00
     6       30.13    8.08    3.083  0.20( 0.10) 0.48      10.5      19.00
     7       30.41    8.44    3.008  0.20( 0.10) 0.49      10.9      16.00
     8       30.44    8.51    2.994  0.20( 0.10) 0.49      10.9     168.00
     9       30.45    8.61    2.972  0.20( 0.10) 0.49      11.0     169.00
    10       30.28    9.83    2.755  0.20( 0.10) 0.50      11.9     160.00
    11       30.27    9.87    2.750  0.20( 0.10) 0.50      11.9     159.00
    12       30.26    9.89    2.747  0.20( 0.10) 0.50      11.9      17.00
    13       29.56   10.69    2.627  0.20( 0.10) 0.50      12.2      10.00
    14       28.75   11.61    2.505  0.20( 0.10) 0.50      12.5     147.00
    15       28.50   11.92    2.468  0.20( 0.10) 0.50      12.6     152.00
    16       26.15   14.94    2.168  0.20( 0.10) 0.51      13.4     144.00
    17       24.30   16.90    2.020  0.20( 0.10) 0.51      13.4     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       29.90    5.07    4.026  0.20( 0.08) 0.42       7.8     170.00
     2       30.67    5.42    3.877  0.20( 0.08) 0.42       8.3     161.00
     3       31.32    5.74    3.752  0.20( 0.09) 0.43       8.8     174.00
     4       31.95    6.10    3.621  0.20( 0.09) 0.43       9.3     173.00
     5       31.98    6.13    3.614  0.20( 0.09) 0.43       9.3     150.00
     6       32.56    6.64    3.451  0.20( 0.09) 0.43      10.0      14.00
     7       33.26    7.35    3.257  0.20( 0.09) 0.44      10.9     154.00
     8       33.81    8.08    3.083  0.20( 0.09) 0.45      11.8      19.00
     9       34.00    8.44    3.008  0.20( 0.09) 0.45      12.2      16.00
    10       34.01    8.51    2.994  0.20( 0.09) 0.45      12.2     168.00
    11       34.00    8.61    2.972  0.20( 0.09) 0.45      12.3     169.00
    12       33.57    9.83    2.755  0.20( 0.09) 0.46      13.2     160.00
    13       33.55    9.87    2.750  0.20( 0.09) 0.46      13.2     159.00
    14       33.53    9.89    2.747  0.20( 0.09) 0.46      13.3      17.00
    15       32.69   10.69    2.627  0.20( 0.09) 0.47      13.6      10.00
    16       31.73   11.61    2.505  0.20( 0.09) 0.47      13.9     147.00
    17       31.44   11.92    2.468  0.20( 0.09) 0.47      14.0     152.00
    18       28.73   14.94    2.168  0.20( 0.10) 0.48      14.7     144.00
    19       26.69   16.90    2.020  0.20( 0.10) 0.48      14.8     147.00
   TOTAL AREA(ACRES) =        14.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       34.01  Tc(MIN.) =    8.507
 EFFECTIVE AREA(ACRES) =     12.25  AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       14.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.
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****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
 FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.51
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.01
 PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =    8.90
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.90
 RAINFALL INTENSITY(INCH/HR) =   2.92
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.45
 EFFECTIVE STREAM AREA(ACRES) =      12.25
 TOTAL STREAM AREA(ACRES) =      14.76
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.01

****************************************************************************
 FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.764
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.43      0.20      0.100    75    5.70
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.45
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.45

****************************************************************************
 FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.70
 RAINFALL INTENSITY(INCH/HR) =   3.76
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
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  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.45

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.812
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    75    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    7.51
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.217
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.32
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   7.87
  FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   0.93
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.51
  RAINFALL INTENSITY(INCH/HR) =   3.22
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.90    5.47    3.857  0.20( 0.08) 0.42       7.8     170.00
      1       30.67    5.81    3.724  0.20( 0.08) 0.42       8.3     161.00
      1       31.32    6.13    3.612  0.20( 0.09) 0.43       8.8     174.00
      1       31.95    6.50    3.494  0.20( 0.09) 0.43       9.3     173.00
      1       31.98    6.52    3.487  0.20( 0.09) 0.43       9.3     150.00
      1       32.56    7.03    3.340  0.20( 0.09) 0.43      10.0      14.00
      1       33.26    7.73    3.162  0.20( 0.09) 0.44      10.9     154.00
      1       33.81    8.47    3.001  0.20( 0.09) 0.45      11.8      19.00
      1       34.00    8.83    2.931  0.20( 0.09) 0.45      12.2      16.00
      1       34.01    8.90    2.918  0.20( 0.09) 0.45      12.2     168.00
      1       34.00    9.00    2.898  0.20( 0.09) 0.45      12.3     169.00
      1       33.57   10.22    2.695  0.20( 0.09) 0.46      13.2     160.00
      1       33.55   10.25    2.690  0.20( 0.09) 0.46      13.2     159.00
      1       33.53   10.28    2.687  0.20( 0.09) 0.46      13.3      17.00
      1       32.69   11.08    2.574  0.20( 0.09) 0.47      13.6      10.00
      1       31.73   12.00    2.458  0.20( 0.09) 0.47      13.9     147.00
      1       31.44   12.31    2.422  0.20( 0.09) 0.47      14.0     152.00
      1       28.73   15.34    2.136  0.20( 0.10) 0.48      14.7     144.00
      1       26.69   17.30    1.993  0.20( 0.10) 0.48      14.8     147.00
      2        1.45    5.70    3.764  0.20( 0.02) 0.10       0.4     175.00
      3        2.29    7.51    3.217  0.20( 0.04) 0.20       0.8     167.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.32    5.47    3.857  0.20( 0.08) 0.39       8.8     170.00
      2       33.91    5.70    3.764  0.20( 0.08) 0.39       9.2     175.00
      3       34.16    5.81    3.724  0.20( 0.08) 0.39       9.3     161.00
      4       34.81    6.13    3.612  0.20( 0.08) 0.40       9.9     174.00
      5       35.45    6.50    3.494  0.20( 0.08) 0.40      10.4     173.00
      6       35.48    6.52    3.487  0.20( 0.08) 0.40      10.5     150.00
      7       36.07    7.03    3.340  0.20( 0.08) 0.41      11.2      14.00
      8       36.55    7.51    3.217  0.20( 0.08) 0.41      11.9     167.00
      9       36.72    7.73    3.162  0.20( 0.08) 0.41      12.1     154.00
     10       37.10    8.47    3.001  0.20( 0.08) 0.42      13.0      19.00
     11       37.21    8.83    2.931  0.20( 0.09) 0.43      13.4      16.00
     12       37.21    8.90    2.918  0.20( 0.09) 0.43      13.5     168.00
     13       37.17    9.00    2.898  0.20( 0.09) 0.43      13.6     169.00
     14       36.51   10.22    2.695  0.20( 0.09) 0.44      14.5     160.00
     15       36.49   10.25    2.690  0.20( 0.09) 0.44      14.5     159.00
     16       36.47   10.28    2.687  0.20( 0.09) 0.44      14.5      17.00
     17       35.51   11.08    2.574  0.20( 0.09) 0.44      14.8      10.00
     18       34.42   12.00    2.458  0.20( 0.09) 0.45      15.1     147.00
     19       34.08   12.31    2.422  0.20( 0.09) 0.45      15.2     152.00
     20       31.06   15.34    2.136  0.20( 0.09) 0.46      15.9     144.00
     21       28.86   17.30    1.993  0.20( 0.09) 0.46      16.0     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.21    Tc(MIN.) =     8.83
  EFFECTIVE AREA(ACRES) =      13.42   AREA-AVERAGED Fm(INCH/HR) =  0.09
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```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       16.0
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   458.40  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.38
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.21
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.058
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    75    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.13
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    9.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       2.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.39
  FLOW VELOCITY(FEET/SEC.) =  3.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       1.17
  TOTAL STREAM AREA(ACRES) =       1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.84

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    2.39
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  3.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.06
  RAINFALL INTENSITY(INCH/HR) =   2.72
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.14
  TOTAL STREAM AREA(ACRES) =       2.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.84    9.50    2.810  0.20( 0.11) 0.54       1.2     179.00
      2        5.01   10.06    2.720  0.20( 0.12) 0.60       2.1     181.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.74    9.50    2.810  0.20( 0.12) 0.58       3.2     179.00
      2        7.76   10.06    2.720  0.20( 0.12) 0.58       3.3     181.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.76    Tc(MIN.) =    10.06
  EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
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```
 FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.76
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.20
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.74    9.65    2.785  0.20( 0.12) 0.58       3.2     179.00
     2        7.76   10.20    2.698  0.20( 0.12) 0.58       3.3     181.00
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.32    5.53    3.830  0.20( 0.08) 0.39       8.8     170.00
     2       33.91    5.77    3.739  0.20( 0.08) 0.39       9.2     175.00
     3       34.16    5.88    3.700  0.20( 0.08) 0.39       9.3     161.00
     4       34.81    6.20    3.590  0.20( 0.08) 0.40       9.9     174.00
     5       35.45    6.56    3.474  0.20( 0.08) 0.40      10.4     173.00
     6       35.48    6.58    3.467  0.20( 0.08) 0.40      10.5     150.00
     7       36.07    7.09    3.322  0.20( 0.08) 0.41      11.2      14.00
     8       36.55    7.57    3.201  0.20( 0.08) 0.41      11.9     167.00
     9       36.72    7.80    3.146  0.20( 0.08) 0.41      12.1     154.00
    10       37.10    8.54    2.988  0.20( 0.08) 0.42      13.0      19.00
    11       37.21    8.89    2.919  0.20( 0.09) 0.43      13.4      16.00
    12       37.21    8.96    2.906  0.20( 0.09) 0.43      13.5     168.00
    13       37.17    9.07    2.886  0.20( 0.09) 0.43      13.6     169.00
    14       36.51   10.29    2.685  0.20( 0.09) 0.44      14.5     160.00
    15       36.49   10.32    2.680  0.20( 0.09) 0.44      14.5     159.00
    16       36.47   10.34    2.677  0.20( 0.09) 0.44      14.5      17.00
    17       35.51   11.14    2.565  0.20( 0.09) 0.44      14.8      10.00
    18       34.42   12.07    2.450  0.20( 0.09) 0.45      15.1     147.00
    19       34.08   12.38    2.415  0.20( 0.09) 0.45      15.2     152.00
    20       31.06   15.41    2.130  0.20( 0.09) 0.46      15.9     144.00
    21       28.86   17.37    1.989  0.20( 0.09) 0.46      16.0     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
     2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
     3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
     4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
     5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
     6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
     7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
     8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
     9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
    10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
    11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
    12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
    13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
    14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
    15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
```

```
    16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
    23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
   TOTAL AREA(ACRES) =        19.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       44.72  Tc(MIN.) =    9.069
  EFFECTIVE AREA(ACRES) =     16.57  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.763
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    75    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.37
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   11.14
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.566
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    2.51
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.28   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.39
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   11.29
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.29
  RAINFALL INTENSITY(INCH/HR) =   2.55
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.845
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    75    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.00
  STREET FLOW TRAVEL TIME(MIN.) =   0.91   Tc(MIN.) =   10.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.697
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    1.71
  EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   2.70
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
    1        5.39   11.29    2.546  0.20( 0.12) 0.60       2.4     184.00
    2        3.14   10.21    2.697  0.20( 0.11) 0.55       1.4     187.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.33   10.21    2.697  0.20( 0.12) 0.58       3.6     187.00
      2        8.35   11.29    2.546  0.20( 0.12) 0.58       3.8     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.35    Tc(MIN.) =    11.29
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.35
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.78
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.78
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.35

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.337
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    75    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.56
```

```
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   0.98   Tc(MIN.) =    8.02
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.097
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    2.06
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       3.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  3.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.02
  RAINFALL INTENSITY(INCH/HR) =   3.10
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.380
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    75    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.67
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      1.67

****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.64
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =    7.68
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.18
  EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.46
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.03
  LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.00
```

```
  TOTAL STREAM AREA(ACRES) =       1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.33   10.70    2.625  0.20( 0.12) 0.58       3.6     187.00
      1        8.35   11.78    2.485  0.20( 0.12) 0.58       3.8     184.00
      2        3.51    8.02    3.097  0.20( 0.12) 0.60       1.3     190.00
      3        2.75    7.68    3.175  0.20( 0.12) 0.60       1.0     191.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.68    3.175  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.02    3.097  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.70    2.625  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.78    2.485  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.60    Tc(MIN.) =     8.02
  EFFECTIVE AREA(ACRES) =       4.98   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.60
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.07
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.48    7.73    3.162  0.20( 0.12) 0.59       4.8     191.10
      2       13.60    8.07    3.085  0.20( 0.12) 0.59       5.0     190.00
      3       13.53   10.76    2.617  0.20( 0.12) 0.59       5.9     187.00
      4       13.27   11.83    2.478  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.50    5.53    3.830  0.20( 0.09) 0.43      10.6     170.00
      2       40.20    5.77    3.739  0.20( 0.09) 0.43      11.1     175.00
      3       40.49    5.88    3.700  0.20( 0.09) 0.43      11.3     161.00
      4       41.28    6.20    3.590  0.20( 0.09) 0.43      11.9     174.00
      5       42.07    6.56    3.474  0.20( 0.09) 0.43      12.6     173.00
      6       42.11    6.58    3.467  0.20( 0.09) 0.43      12.6     150.00
      7       42.90    7.09    3.322  0.20( 0.09) 0.44      13.5      14.00
      8       43.57    7.57    3.201  0.20( 0.09) 0.44      14.4     167.00
      9       43.82    7.80    3.146  0.20( 0.09) 0.44      14.7     154.00
```

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    10       44.47    8.54    2.988  0.20( 0.09) 0.45      15.8      19.00
    11       44.70    8.89    2.919  0.20( 0.09) 0.45      16.4      16.00
    12       44.72    8.96    2.906  0.20( 0.09) 0.45      16.4     168.00
    13       44.72    9.07    2.886  0.20( 0.09) 0.46      16.6     169.00
    14       44.60    9.65    2.785  0.20( 0.09) 0.46      17.2     179.00
    15       44.32   10.20    2.698  0.20( 0.09) 0.46      17.7     181.00
    16       44.23   10.29    2.685  0.20( 0.09) 0.47      17.8     160.00
    17       44.20   10.32    2.680  0.20( 0.09) 0.47      17.8     159.00
    18       44.17   10.34    2.677  0.20( 0.09) 0.47      17.8      17.00
    19       42.87   11.14    2.565  0.20( 0.09) 0.47      18.1      10.00
    20       41.43   12.07    2.450  0.20( 0.09) 0.47      18.4     147.00
    21       40.99   12.38    2.415  0.20( 0.09) 0.47      18.5     152.00
    22       37.11   15.41    2.130  0.20( 0.10) 0.48      19.2     144.00
    23       34.49   17.37    1.989  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.26    5.53    3.830  0.20( 0.09) 0.47      14.0     170.00
      2       52.17    5.77    3.739  0.20( 0.09) 0.47      14.7     175.00
      3       52.55    5.88    3.700  0.20( 0.09) 0.47      15.0     161.00
      4       53.60    6.20    3.590  0.20( 0.09) 0.47      15.8     174.00
      5       54.68    6.56    3.474  0.20( 0.09) 0.47      16.7     173.00
      6       54.73    6.58    3.467  0.20( 0.09) 0.47      16.7     150.00
      7       55.92    7.09    3.322  0.20( 0.09) 0.47      18.0      14.00
      8       56.94    7.57    3.201  0.20( 0.10) 0.48      19.1     167.00
      9       57.23    7.73    3.162  0.20( 0.10) 0.48      19.4     191.10
     10       57.33    7.80    3.146  0.20( 0.10) 0.48      19.6     154.00
     11       57.66    8.07    3.085  0.20( 0.10) 0.48      20.1     190.00
     12       58.06    8.54    2.988  0.20( 0.10) 0.48      21.0      19.00
     13       58.28    8.89    2.919  0.20( 0.10) 0.49      21.6      16.00
     14       58.30    8.96    2.906  0.20( 0.10) 0.49      21.7     168.00
     15       58.30    9.07    2.886  0.20( 0.10) 0.49      21.9     169.00
     16       58.16    9.65    2.785  0.20( 0.10) 0.49      22.7     179.00
     17       57.86   10.20    2.698  0.20( 0.10) 0.49      23.4     181.00
     18       57.78   10.29    2.685  0.20( 0.10) 0.50      23.5     160.00
     19       57.74   10.32    2.680  0.20( 0.10) 0.50      23.5     159.00
     20       57.71   10.34    2.677  0.20( 0.10) 0.50      23.5      17.00
     21       57.02   10.76    2.617  0.20( 0.10) 0.50      23.8     187.00
     22       56.31   11.14    2.565  0.20( 0.10) 0.50      24.1      10.00
     23       55.07   11.83    2.478  0.20( 0.10) 0.50      24.4     184.00
     24       54.55   12.07    2.450  0.20( 0.10) 0.50      24.5     147.00
     25       53.90   12.38    2.415  0.20( 0.10) 0.50      24.6     152.00
     26       48.43   15.41    2.130  0.20( 0.10) 0.50      25.3     144.00
     27       45.01   17.37    1.989  0.20( 0.10) 0.51      25.4     147.00
    TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.30  Tc(MIN.) =    8.961
  EFFECTIVE AREA(ACRES) =     21.72  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.59
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.30
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.04
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    194.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =    9.04   RAINFALL INTENSITY(INCH/HR) =  2.89
  EFFECTIVE AREA(ACRES) =     3.73
  TOTAL AREA(ACRES) =     4.36        PEAK FLOW RATE(CFS) =     10.00
  AREA-AVERAGED Fm(INCH/HR) =   0.10  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.49
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.07
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.07
  RAINFALL INTENSITY(INCH/HR) =   2.89
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =       3.73
  TOTAL STREAM AREA(ACRES) =       4.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.00

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.22
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      4.22

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.22
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    5.31
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.31
  RAINFALL INTENSITY(INCH/HR) =   3.92
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.00    9.07    2.886  0.20( 0.10) 0.49       3.7     147.00
      2        4.22    5.31    3.923  0.20( 0.18) 0.90       1.2     195.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.25    5.31    3.923  0.20( 0.13) 0.64       3.4     195.00
      2       13.05    9.07    2.886  0.20( 0.12) 0.59       4.9     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.05    Tc(MIN.) =     9.07
  EFFECTIVE AREA(ACRES) =       4.94   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.43
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.05
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.56
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   2.80
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       4.94
  TOTAL STREAM AREA(ACRES) =       5.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.05

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.912
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    75    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.16
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.33
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.33
  TOTAL STREAM AREA(ACRES) =       0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.25    5.80    3.727  0.20( 0.13) 0.64       3.4     195.00
      1       13.05    9.56    2.800  0.20( 0.12) 0.59       4.9     147.00
      2        1.16    5.33    3.912  0.20( 0.02) 0.10       0.3     183.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.00    5.33    3.912  0.20( 0.12) 0.58       3.4     183.00
      2       13.35    5.80    3.727  0.20( 0.12) 0.59       3.7     195.00
      3       13.88    9.56    2.800  0.20( 0.11) 0.56       5.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.88    Tc(MIN.) =     9.56
```

```
  EFFECTIVE AREA(ACRES) =       5.27   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.19
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.88
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.71
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.123
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.12      0.20     0.500    75    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.05
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      3.05

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   3.12
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.05

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.989
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.07
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.07

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.05    7.90    3.123  0.20( 0.10) 0.50       1.1     199.00
      2        2.07    8.53    2.989  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.05    7.90    3.123  0.20( 0.11) 0.54       1.9     199.00
      2        4.98    8.53    2.989  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.05    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.05
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.99
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.05    7.99    3.102  0.20( 0.11) 0.54       1.9     199.00
     2        4.98    8.62    2.971  0.20( 0.11) 0.54       1.9     200.00
 LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.00    5.48    3.852  0.20( 0.12) 0.58       3.4     183.00
     2       13.35    5.95    3.675  0.20( 0.12) 0.59       3.7     195.00
     3       13.88    9.71    2.776  0.20( 0.11) 0.56       5.3     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.32    5.48    3.852  0.20( 0.11) 0.57       4.7     183.00
     2       17.83    5.95    3.675  0.20( 0.12) 0.58       5.1     195.00
     3       18.69    7.99    3.102  0.20( 0.11) 0.56       6.4     199.00
     4       18.71    8.62    2.971  0.20( 0.11) 0.56       6.7     200.00
     5       18.52    9.71    2.776  0.20( 0.11) 0.55       7.2     147.00
   TOTAL AREA(ACRES) =         7.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       18.71  Tc(MIN.) =    8.621
 EFFECTIVE AREA(ACRES) =      6.74  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =        7.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
 FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.12
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.71
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    9.10
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.10
 RAINFALL INTENSITY(INCH/HR) =   2.88
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       6.74
```

```
  TOTAL STREAM AREA(ACRES) =       7.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.71

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.708
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    75    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.31
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    7.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.238
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.42      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.21
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.99
  FLOW VELOCITY(FEET/SEC.) =  3.51   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.42
  RAINFALL INTENSITY(INCH/HR) =   3.24
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.32    5.96    3.670  0.20( 0.11) 0.57       4.7     183.00
      1       17.83    6.43    3.515  0.20( 0.12) 0.58       5.1     195.00
      1       18.69    8.47    3.001  0.20( 0.11) 0.56       6.4     199.00
      1       18.71    9.10    2.881  0.20( 0.11) 0.56       6.7     200.00
      1       18.52   10.19    2.700  0.20( 0.11) 0.55       7.2     147.00
      2        2.33    7.42    3.238  0.20( 0.04) 0.20       0.8     192.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.45    5.96    3.670  0.20( 0.11) 0.53       5.4     183.00
      2       20.03    6.43    3.515  0.20( 0.11) 0.53       5.8     195.00
      3       20.58    7.42    3.238  0.20( 0.10) 0.52       6.6     192.00
      4       20.85    8.47    3.001  0.20( 0.10) 0.52       7.2     199.00
      5       20.78    9.10    2.881  0.20( 0.10) 0.52       7.6     200.00
      6       20.46   10.19    2.700  0.20( 0.10) 0.52       8.0     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.85    Tc(MIN.) =     8.47
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.88
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.85
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.53
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.849
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    75    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.97

**************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.35
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   10.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.638
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    4.76
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =       6.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.73
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.61
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.12
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  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.57

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.833
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.17      0.20      0.100    75    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   3.83
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.58

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.57   10.61    2.638  0.20( 0.12) 0.60       2.9     184.00
      2        0.58    5.53    3.833  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.63    5.53    3.833  0.20( 0.11) 0.55       1.7      59.00
      2        6.97   10.61    2.638  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.97    Tc(MIN.) =    10.61
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.81      0.20     0.600    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.22
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.22

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.63    5.93    3.680  0.20( 0.11) 0.55       1.7      59.00
      1        6.97   11.00    2.584  0.20( 0.11) 0.57       3.1     184.00
```

```
     2        2.22    7.72    3.165  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.93    3.680  0.20( 0.11) 0.56       2.3      59.00
      2        8.32    7.72    3.165  0.20( 0.11) 0.57       3.0      64.00
      3        8.77   11.00    2.584  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.77    Tc(MIN.) =    11.00
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.77
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.03
  RAINFALL INTENSITY(INCH/HR) =   2.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.77

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.784
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.48      0.20     0.600    75    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.15
```

```
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.15

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
  STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =   11.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.563
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    4.13
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       5.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.92
  FLOW VELOCITY(FEET/SEC.) =  4.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.63    5.97    3.667  0.20( 0.11) 0.56       2.3      59.00
      1        8.32    7.76    3.156  0.20( 0.11) 0.57       3.0      64.00
      1        8.77   11.03    2.579  0.20( 0.12) 0.58       3.9     184.00
      2        5.19   11.15    2.563  0.20( 0.12) 0.60       2.4     208.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.66    5.97    3.667  0.20( 0.12) 0.58       3.6      59.00
      2       12.81    7.76    3.156  0.20( 0.12) 0.58       4.6      64.00
      3       13.93   11.03    2.579  0.20( 0.12) 0.59       6.2     184.00
      4       13.90   11.15    2.563  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.93    Tc(MIN.) =    11.03
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.93
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   11.92
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.92
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.93

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.809
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    75    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.78
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =   10.95
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.591
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.04      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.04      SUBAREA RUNOFF(CFS) =    4.54
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       6.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  5.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   2.59
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.17

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.036
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    75    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.19
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.19

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
  STREET FLOW TRAVEL TIME(MIN.) =   1.02   Tc(MIN.) =    9.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.841
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    2.44
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       3.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.32
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.55
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.66    6.90    3.375  0.20( 0.12) 0.58       3.6      59.00
     1       12.81    8.67    2.962  0.20( 0.12) 0.58       4.6      64.00
     1       13.93   11.92    2.467  0.20( 0.12) 0.59       6.2     184.00
     1       13.90   12.05    2.453  0.20( 0.12) 0.59       6.2     208.00
     2        6.17   10.95    2.591  0.20( 0.11) 0.57       2.8     211.00
     3        3.55    9.32    2.841  0.20( 0.10) 0.50       1.4     213.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.93    6.90    3.375  0.20( 0.11) 0.56       6.4      59.00
     2       21.88    8.67    2.962  0.20( 0.11) 0.57       8.2      64.00
     3       22.36    9.32    2.841  0.20( 0.11) 0.57       8.7     213.00
     4       23.00   10.95    2.591  0.20( 0.11) 0.57       9.9     211.00
     5       22.87   11.92    2.467  0.20( 0.11) 0.57      10.4     184.00
     6       22.78   12.05    2.453  0.20( 0.11) 0.57      10.5     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.00    Tc(MIN.) =    10.95
 EFFECTIVE AREA(ACRES) =       9.95   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =       10.5
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.11
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.00
 PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.20
 LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.20
 RAINFALL INTENSITY(INCH/HR) =   2.56
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.57
 EFFECTIVE STREAM AREA(ACRES) =       9.95
 TOTAL STREAM AREA(ACRES) =      10.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.00

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
 ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.18      0.20      0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.93    7.17    3.302  0.20( 0.11) 0.56       6.4      59.00
      1       21.88    8.93    2.911  0.20( 0.11) 0.57       8.2      64.00
      1       22.36    9.58    2.796  0.20( 0.11) 0.57       8.7     213.00
      1       23.00   11.20    2.557  0.20( 0.11) 0.57       9.9     211.00
      1       22.87   12.18    2.437  0.20( 0.11) 0.57      10.4     184.00
      1       22.78   12.30    2.423  0.20( 0.11) 0.57      10.5     208.00
      2        0.65    5.00    4.060  0.20( 0.02) 0.10       0.2     215.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       17.85    5.00    4.060  0.20( 0.11) 0.54       4.6     215.00
      2       20.46    7.17    3.302  0.20( 0.11) 0.55       6.6      59.00
      3       22.34    8.93    2.911  0.20( 0.11) 0.56       8.3      64.00
      4       22.81    9.58    2.796  0.20( 0.11) 0.56       8.9     213.00
      5       23.41   11.20    2.557  0.20( 0.11) 0.56      10.1     211.00
      6       23.26   12.18    2.437  0.20( 0.11) 0.56      10.6     184.00
      7       23.17   12.30    2.423  0.20( 0.11) 0.56      10.6     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.41    Tc(MIN.) =    11.20
  EFFECTIVE AREA(ACRES) =      10.13   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       10.6
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.01
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.41
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.26
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.85    5.06    4.031  0.20( 0.11) 0.54       4.6     215.00
      2       20.46    7.23    3.287  0.20( 0.11) 0.55       6.6      59.00
      3       22.34    8.99    2.901  0.20( 0.11) 0.56       8.3      64.00
      4       22.81    9.64    2.786  0.20( 0.11) 0.56       8.9     213.00
      5       23.41   11.26    2.549  0.20( 0.11) 0.56      10.1     211.00
      6       23.26   12.24    2.431  0.20( 0.11) 0.56      10.6     184.00
      7       23.17   12.36    2.417  0.20( 0.11) 0.56      10.6     208.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.45    6.02    3.649  0.20( 0.11) 0.53       5.4     183.00
      2       20.03    6.49    3.496  0.20( 0.11) 0.53       5.8     195.00
      3       20.58    7.48    3.224  0.20( 0.10) 0.52       6.6     192.00
      4       20.85    8.53    2.989  0.20( 0.10) 0.52       7.2     199.00
      5       20.78    9.16    2.870  0.20( 0.10) 0.52       7.6     200.00
      6       20.46   10.24    2.691  0.20( 0.10) 0.52       8.0     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.96    5.06    4.031  0.20( 0.11) 0.54       9.1     215.00
      2       38.46    6.02    3.649  0.20( 0.11) 0.54      10.9     183.00
      3       39.59    6.49    3.496  0.20( 0.11) 0.54      11.7     195.00
      4       40.90    7.23    3.287  0.20( 0.11) 0.54      12.9      59.00
      5       41.30    7.48    3.224  0.20( 0.11) 0.54      13.4     192.00
      6       42.70    8.53    2.989  0.20( 0.11) 0.54      15.1     199.00
      7       43.14    8.99    2.901  0.20( 0.11) 0.54      15.8      64.00
      8       43.24    9.16    2.870  0.20( 0.11) 0.54      16.0     200.00
      9       43.45    9.64    2.786  0.20( 0.11) 0.54      16.7     213.00
     10       43.49   10.24    2.691  0.20( 0.11) 0.54      17.4     147.00
     11       42.74   11.26    2.549  0.20( 0.11) 0.54      18.1     211.00
     12       41.65   12.24    2.431  0.20( 0.11) 0.54      18.6     184.00
     13       41.45   12.36    2.417  0.20( 0.11) 0.54      18.6     208.00
    TOTAL AREA(ACRES) =        19.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       43.49  Tc(MIN.) =   10.244
  EFFECTIVE AREA(ACRES) =     17.37  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.89
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.49
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.67
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.67
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      17.37
  TOTAL STREAM AREA(ACRES) =      19.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.49

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.175
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    75    7.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.93
```

```
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
 STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    9.27
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.850
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    3.42
 EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.65

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
 FLOW VELOCITY(FEET/SEC.) =  4.22   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.27
 RAINFALL INTENSITY(INCH/HR) =   2.85
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.30
 TOTAL STREAM AREA(ACRES) =       2.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.65

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       35.96    5.51    3.838  0.20( 0.11) 0.54       9.1     215.00
     1       38.46    6.47    3.501  0.20( 0.11) 0.54      10.9     183.00
     1       39.59    6.92    3.369  0.20( 0.11) 0.54      11.7     195.00
     1       40.90    7.66    3.180  0.20( 0.11) 0.54      12.9      59.00
     1       41.30    7.91    3.122  0.20( 0.11) 0.54      13.4     192.00
     1       42.70    8.96    2.907  0.20( 0.11) 0.54      15.1     199.00
     1       43.14    9.42    2.825  0.20( 0.11) 0.54      15.8      64.00
     1       43.24    9.58    2.796  0.20( 0.11) 0.54      16.0     200.00
     1       43.45   10.07    2.718  0.20( 0.11) 0.54      16.7     213.00
     1       43.49   10.67    2.629  0.20( 0.11) 0.54      17.4     147.00
     1       42.74   11.69    2.496  0.20( 0.11) 0.54      18.1     211.00
     1       41.65   12.67    2.383  0.20( 0.11) 0.54      18.6     184.00
     1       41.45   12.79    2.370  0.20( 0.11) 0.54      18.6     208.00
     2        5.65    9.27    2.850  0.20( 0.12) 0.60       2.3     201.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       40.54    5.51    3.838  0.20( 0.11) 0.54      10.5     215.00
     2       43.34    6.47    3.501  0.20( 0.11) 0.55      12.5     183.00
     3       44.62    6.92    3.369  0.20( 0.11) 0.55      13.4     195.00
     4       46.13    7.66    3.180  0.20( 0.11) 0.55      14.8      59.00
     5       46.60    7.91    3.122  0.20( 0.11) 0.55      15.3     192.00
     6       48.28    8.96    2.907  0.20( 0.11) 0.55      17.3     199.00
     7       48.65    9.27    2.850  0.20( 0.11) 0.55      17.9     201.00
     8       48.74    9.42    2.825  0.20( 0.11) 0.55      18.1      64.00
     9       48.78    9.58    2.796  0.20( 0.11) 0.55      18.3     200.00
    10       48.83   10.07    2.718  0.20( 0.11) 0.55      19.0     213.00
```

```
    11       48.69   10.67    2.629  0.20( 0.11) 0.55      19.7     147.00
    12       47.66   11.69    2.496  0.20( 0.11) 0.55      20.4     211.00
    13       46.34   12.67    2.383  0.20( 0.11) 0.55      20.9     184.00
    14       46.11   12.79    2.370  0.20( 0.11) 0.55      20.9     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.83    Tc(MIN.) =    10.07
  EFFECTIVE AREA(ACRES) =      18.97   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       21.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.29
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.83
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.10
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.030
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =    9.07
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.885
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    3.24
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.15
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   2.87
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.15

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.205
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    75    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.19
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   0.79   Tc(MIN.) =    8.34
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.028
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       4.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  3.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   3.03
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.98
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.15    9.16    2.869  0.20( 0.12) 0.60       2.1     220.00
      2        4.98    8.34    3.028  0.20( 0.10) 0.50       1.9     223.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.94    8.34    3.028  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.16    2.869  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.94    Tc(MIN.) =     8.34
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.94
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.94    8.68    2.959  0.20( 0.11) 0.55       3.8     223.00
      2        9.86    9.51    2.809  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.54    5.55    3.824  0.20( 0.11) 0.54      10.5     215.00
      2       43.34    6.51    3.491  0.20( 0.11) 0.55      12.5     183.00
      3       44.62    6.96    3.360  0.20( 0.11) 0.55      13.4     195.00
      4       46.13    7.69    3.172  0.20( 0.11) 0.55      14.8      59.00
      5       46.60    7.94    3.115  0.20( 0.11) 0.55      15.3     192.00
      6       48.28    8.99    2.901  0.20( 0.11) 0.55      17.3     199.00
      7       48.65    9.30    2.845  0.20( 0.11) 0.55      17.9     201.00
      8       48.74    9.45    2.819  0.20( 0.11) 0.55      18.1      64.00
      9       48.78    9.62    2.791  0.20( 0.11) 0.55      18.3     200.00
     10       48.83   10.10    2.713  0.20( 0.11) 0.55      19.0     213.00
     11       48.69   10.70    2.625  0.20( 0.11) 0.55      19.7     147.00
     12       47.66   11.72    2.492  0.20( 0.11) 0.55      20.4     211.00
     13       46.34   12.70    2.380  0.20( 0.11) 0.55      20.9     184.00
     14       46.11   12.82    2.367  0.20( 0.11) 0.55      20.9     208.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.82    5.55    3.824  0.20( 0.11) 0.55      12.9     215.00
      2       52.18    6.51    3.491  0.20( 0.11) 0.55      15.3     183.00
      3       53.70    6.96    3.360  0.20( 0.11) 0.55      16.5     195.00
      4       55.59    7.69    3.172  0.20( 0.11) 0.55      18.2      59.00
      5       56.19    7.94    3.115  0.20( 0.11) 0.55      18.8     192.00
      6       57.72    8.68    2.959  0.20( 0.11) 0.55      20.5     223.00
      7       58.19    8.99    2.901  0.20( 0.11) 0.55      21.2     199.00
      8       58.53    9.30    2.845  0.20( 0.11) 0.55      21.8     201.00
      9       58.61    9.45    2.819  0.20( 0.11) 0.55      22.0      64.00
     10       58.62    9.51    2.809  0.20( 0.11) 0.55      22.1     220.00
     11       58.58    9.62    2.791  0.20( 0.11) 0.55      22.3     200.00
     12       58.34   10.10    2.713  0.20( 0.11) 0.55      22.9     213.00
     13       57.87   10.70    2.625  0.20( 0.11) 0.55      23.6     147.00
     14       56.36   11.72    2.492  0.20( 0.11) 0.55      24.4     211.00
     15       54.63   12.70    2.380  0.20( 0.11) 0.55      24.9     184.00
     16       54.36   12.82    2.367  0.20( 0.11) 0.55      24.9     208.00
    TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.62  Tc(MIN.) =    9.507
  EFFECTIVE AREA(ACRES) =     22.14  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  46.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.62
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.82    5.56    3.822  0.20( 0.11) 0.55      12.9     215.00
      2       52.18    6.51    3.489  0.20( 0.11) 0.55      15.3     183.00
      3       53.70    6.96    3.358  0.20( 0.11) 0.55      16.5     195.00
      4       55.59    7.70    3.170  0.20( 0.11) 0.55      18.2      59.00
      5       56.19    7.95    3.113  0.20( 0.11) 0.55      18.8     192.00
      6       57.72    8.69    2.958  0.20( 0.11) 0.55      20.5     223.00
      7       58.19    9.00    2.899  0.20( 0.11) 0.55      21.2     199.00
      8       58.53    9.31    2.843  0.20( 0.11) 0.55      21.8     201.00
      9       58.61    9.46    2.818  0.20( 0.11) 0.55      22.0      64.00
     10       58.62    9.51    2.808  0.20( 0.11) 0.55      22.1     220.00
     11       58.58    9.62    2.790  0.20( 0.11) 0.55      22.3     200.00
     12       58.34   10.11    2.712  0.20( 0.11) 0.55      22.9     213.00
     13       57.87   10.71    2.624  0.20( 0.11) 0.55      23.6     147.00
```

14	56.36	11.73	2.491	0.20(0.11)	0.55	24.4	211.00
15	54.63	12.71	2.379	0.20(0.11)	0.55	24.9	184.00
16	54.36	12.83	2.366	0.20(0.11)	0.55	24.9	208.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 230.00 = 3455.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	103.32	5.07	4.025	0.20(0.12)	0.59	25.0	140.00
2	110.16	5.93	3.681	0.20(0.12)	0.59	29.2	104.00
3	114.48	6.48	3.499	0.20(0.12)	0.59	32.2	88.00
4	120.48	7.38	3.247	0.20(0.12)	0.59	37.1	95.00
5	121.83	7.60	3.194	0.20(0.12)	0.59	38.2	118.00
6	123.10	7.80	3.146	0.20(0.12)	0.59	39.4	138.00
7	125.97	8.27	3.043	0.20(0.12)	0.59	42.0	141.00
8	129.96	8.97	2.905	0.20(0.12)	0.59	45.8	97.00
9	130.01	8.98	2.902	0.20(0.12)	0.59	45.8	85.00
10	130.03	8.99	2.901	0.20(0.12)	0.59	45.8	136.00
11	131.99	9.62	2.790	0.20(0.12)	0.59	48.6	92.00
12	132.93	9.95	2.737	0.20(0.12)	0.59	50.0	129.00
13	133.98	10.39	2.670	0.20(0.12)	0.59	51.8	134.00
14	134.42	10.61	2.638	0.20(0.12)	0.59	52.6	116.00
15	136.03	11.67	2.498	0.20(0.12)	0.58	56.5	1.00
16	134.89	11.91	2.469	0.20(0.12)	0.58	56.8	114.00
17	134.14	12.06	2.451	0.20(0.12)	0.58	56.9	100.00
18	131.88	12.51	2.400	0.20(0.12)	0.58	57.3	127.00
19	130.71	12.74	2.376	0.20(0.12)	0.58	57.4	123.00
20	129.79	12.90	2.358	0.20(0.12)	0.58	57.5	97.00
21	128.08	13.20	2.328	0.20(0.12)	0.58	57.5	120.00
22	127.61	13.28	2.319	0.20(0.12)	0.58	57.5	111.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 230.00 = 4035.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	150.36	5.07	4.025	0.20(0.11)	0.57	36.8	140.00
2	155.99	5.56	3.822	0.20(0.11)	0.57	40.3	215.00
3	160.31	5.93	3.681	0.20(0.11)	0.57	43.1	104.00
4	166.55	6.48	3.499	0.20(0.11)	0.57	47.4	88.00
5	166.89	6.51	3.489	0.20(0.11)	0.57	47.7	183.00
6	171.39	6.96	3.358	0.20(0.11)	0.57	51.3	195.00
7	175.26	7.38	3.247	0.20(0.11)	0.57	54.5	95.00
8	177.16	7.60	3.194	0.20(0.11)	0.57	56.2	118.00
9	178.06	7.70	3.170	0.20(0.11)	0.57	57.0	59.00
10	178.94	7.80	3.146	0.20(0.11)	0.57	57.8	138.00
11	180.19	7.95	3.113	0.20(0.11)	0.57	59.0	192.00
12	182.82	8.27	3.043	0.20(0.11)	0.57	61.5	141.00
13	186.08	8.69	2.958	0.20(0.12)	0.58	64.8	223.00
14	188.11	8.97	2.905	0.20(0.12)	0.58	66.9	97.00
15	188.17	8.98	2.902	0.20(0.12)	0.58	67.0	85.00
16	188.20	8.99	2.901	0.20(0.12)	0.58	67.0	136.00
17	188.25	9.00	2.899	0.20(0.12)	0.58	67.1	199.00
18	189.55	9.31	2.843	0.20(0.12)	0.58	69.1	201.00
19	190.08	9.46	2.818	0.20(0.12)	0.58	70.0	64.00
20	190.27	9.51	2.808	0.20(0.12)	0.58	70.3	220.00
21	190.56	9.62	2.790	0.20(0.12)	0.58	70.9	200.00
22	190.57	9.62	2.790	0.20(0.12)	0.58	70.9	92.00
23	191.35	9.95	2.737	0.20(0.12)	0.58	72.7	129.00
24	191.65	10.11	2.712	0.20(0.12)	0.58	73.6	213.00
25	192.10	10.39	2.670	0.20(0.11)	0.57	75.0	134.00
26	192.37	10.61	2.638	0.20(0.11)	0.57	76.1	116.00
27	192.44	10.71	2.624	0.20(0.11)	0.57	76.6	147.00
28	192.48	11.67	2.498	0.20(0.11)	0.57	80.8	1.00
29	192.11	11.73	2.491	0.20(0.11)	0.57	80.9	211.00
30	190.93	11.91	2.469	0.20(0.11)	0.57	81.2	114.00
31	189.91	12.06	2.451	0.20(0.11)	0.57	81.5	100.00
32	186.86	12.51	2.400	0.20(0.11)	0.57	82.0	127.00
33	185.50	12.71	2.379	0.20(0.11)	0.57	82.2	184.00
34	185.27	12.74	2.376	0.20(0.11)	0.57	82.3	123.00
35	184.56	12.83	2.366	0.20(0.11)	0.57	82.3	208.00
36	183.96	12.90	2.358	0.20(0.11)	0.57	82.3	97.00

```
    37      181.52   13.20    2.328  0.20( 0.11) 0.57      82.4     120.00
    38      180.85   13.28    2.319  0.20( 0.11) 0.57      82.4     111.00
   TOTAL AREA(ACRES) =        86.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      192.48  Tc(MIN.) =   11.670
  EFFECTIVE AREA(ACRES) =     80.82  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       86.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       86.3  TC(MIN.) =     11.67
  EFFECTIVE AREA(ACRES) =     80.82  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.574
  PEAK FLOW RATE(CFS)   =     192.48

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      150.36    5.07    4.025  0.20( 0.11) 0.57      36.8     140.00
      2      155.99    5.56    3.822  0.20( 0.11) 0.57      40.3     215.00
      3      160.31    5.93    3.681  0.20( 0.11) 0.57      43.1     104.00
      4      166.55    6.48    3.499  0.20( 0.11) 0.57      47.4      88.00
      5      166.89    6.51    3.489  0.20( 0.11) 0.57      47.7     183.00
      6      171.39    6.96    3.358  0.20( 0.11) 0.57      51.3     195.00
      7      175.26    7.38    3.247  0.20( 0.11) 0.57      54.5      95.00
      8      177.16    7.60    3.194  0.20( 0.11) 0.57      56.2     118.00
      9      178.06    7.70    3.170  0.20( 0.11) 0.57      57.0      59.00
     10      178.94    7.80    3.146  0.20( 0.11) 0.57      57.8     138.00
     11      180.19    7.95    3.113  0.20( 0.11) 0.57      59.0     192.00
     12      182.82    8.27    3.043  0.20( 0.11) 0.57      61.5     141.00
     13      186.08    8.69    2.958  0.20( 0.12) 0.58      64.8     223.00
     14      188.11    8.97    2.905  0.20( 0.12) 0.58      66.9      97.00
     15      188.17    8.98    2.902  0.20( 0.12) 0.58      67.0      85.00
     16      188.20    8.99    2.901  0.20( 0.12) 0.58      67.0     136.00
     17      188.25    9.00    2.899  0.20( 0.12) 0.58      67.1     199.00
     18      189.55    9.31    2.843  0.20( 0.12) 0.58      69.1     201.00
     19      190.08    9.46    2.818  0.20( 0.12) 0.58      70.0      64.00
     20      190.27    9.51    2.808  0.20( 0.12) 0.58      70.3     220.00
     21      190.56    9.62    2.790  0.20( 0.12) 0.58      70.9     200.00
     22      190.57    9.62    2.790  0.20( 0.12) 0.58      70.9      92.00
     23      191.35    9.95    2.737  0.20( 0.12) 0.58      72.7     129.00
     24      191.65   10.11    2.712  0.20( 0.12) 0.58      73.6     213.00
     25      192.10   10.39    2.670  0.20( 0.11) 0.57      75.0     134.00
     26      192.37   10.61    2.638  0.20( 0.11) 0.57      76.1     116.00
     27      192.44   10.71    2.624  0.20( 0.11) 0.57      76.6     147.00
     28      192.48   11.67    2.498  0.20( 0.11) 0.57      80.8       1.00
     29      192.11   11.73    2.491  0.20( 0.11) 0.57      80.9     211.00
     30      190.93   11.91    2.469  0.20( 0.11) 0.57      81.2     114.00
     31      189.91   12.06    2.451  0.20( 0.11) 0.57      81.5     100.00
     32      186.86   12.51    2.400  0.20( 0.11) 0.57      82.0     127.00
     33      185.50   12.71    2.379  0.20( 0.11) 0.57      82.2     184.00
     34      185.27   12.74    2.376  0.20( 0.11) 0.57      82.3     123.00
     35      184.56   12.83    2.366  0.20( 0.11) 0.57      82.3     208.00
     36      183.96   12.90    2.358  0.20( 0.11) 0.57      82.3      97.00
     37      181.52   13.20    2.328  0.20( 0.11) 0.57      82.4     120.00
     38      180.85   13.28    2.319  0.20( 0.11) 0.57      82.4     111.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - EAST - AREA 'A' (CONTINUE) - WITH 2 FLOW-BY DETENTION BASINS  *
 ************************************************************************

  FILE NAME: EASTB210.DAT
  TIME/DATE OF STUDY: 17:10 01/10/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   11.67   RAINFALL INTENSITY(INCH/HR) =  2.50
  EFFECTIVE AREA(ACRES) =    80.82
  TOTAL AREA(ACRES) =    86.30        PEAK FLOW RATE(CFS) =    192.50
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.57
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  50.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.33
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     192.50
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   11.97
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.60      0.20     0.900    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.58
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.58

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.898
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.92      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.79
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.03
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    2.25
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       3.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   4.09
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.72
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.72

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.854
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    75    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.43
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    5.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =   10.63
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.635
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       2.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.05
  FLOW VELOCITY(FEET/SEC.) =  4.06   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.63
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.72   10.46    2.660  0.20( 0.18) 0.90       1.5     231.00
      2        2.21   10.63    2.635  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.46    2.660  0.20( 0.15) 0.76       2.5     231.00
      2        5.89   10.63    2.635  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.91    Tc(MIN.) =    10.46
  EFFECTIVE AREA(ACRES) =       2.47   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.91
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   2.62
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.47
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.403
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.91   10.76    2.616  0.20( 0.15) 0.76       2.5     231.00
      1        5.89   10.93    2.593  0.20( 0.15) 0.76       2.5     234.00
      2        1.65    6.80    3.403  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.58    6.80    3.403  0.20( 0.14) 0.72       2.1     237.00
     2        7.17   10.76    2.616  0.20( 0.15) 0.73       3.0     231.00
     3        7.14   10.93    2.593  0.20( 0.15) 0.73       3.0     234.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.17    Tc(MIN.) =    10.76
 EFFECTIVE AREA(ACRES) =       3.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
 TOTAL AREA(ACRES) =        3.0
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
 FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.47
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.17
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.78
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.78
 RAINFALL INTENSITY(INCH/HR) =   2.61
 AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.73
 EFFECTIVE STREAM AREA(ACRES) =       3.03
 TOTAL STREAM AREA(ACRES) =       3.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.17

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
 ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    75    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.77
 TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
 FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.58    6.82    3.397  0.20( 0.14) 0.72       2.1     237.00
      1        7.17   10.78    2.614  0.20( 0.15) 0.73       3.0     231.00
      1        7.14   10.95    2.590  0.20( 0.15) 0.73       3.0     234.00
      2        1.77    5.00    4.060  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.00    4.060  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.82    3.397  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.78    2.614  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   10.95    2.590  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.31    Tc(MIN.) =    10.78
  EFFECTIVE AREA(ACRES) =       3.52   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.31
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.58    5.05    4.038  0.20( 0.12) 0.59       2.0     219.00
      2        8.06    6.87    3.384  0.20( 0.12) 0.62       2.6     237.00
      3        8.31   10.83    2.607  0.20( 0.13) 0.65       3.5     231.00
      4        8.26   11.00    2.584  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      192.50   11.97    2.462  0.20( 0.11) 0.57      80.8     230.00
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      143.26    5.05    4.038  0.20( 0.12) 0.58      36.1     219.00
      2      161.96    6.87    3.384  0.20( 0.12) 0.58      49.0     237.00
      3      193.25   10.83    2.607  0.20( 0.12) 0.58      76.6     231.00
      4      194.36   11.00    2.584  0.20( 0.12) 0.58      77.8     234.00
      5      200.35   11.97    2.462  0.20( 0.12) 0.58      84.4     230.00
    TOTAL AREA(ACRES) =        89.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      200.35  Tc(MIN.) =   11.968
  EFFECTIVE AREA(ACRES) =     84.36  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       89.8
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  48.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.71
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     200.35
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.00
  RAINFALL INTENSITY(INCH/HR) =   2.46
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =      84.36
  TOTAL STREAM AREA(ACRES) =      89.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     200.35

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.573
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        0.51      0.20     0.400    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA RUNOFF(CFS) =      1.60
 TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.60

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.25
 RAINFALL INTENSITY(INCH/HR) =   3.57
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       0.51
 TOTAL STREAM AREA(ACRES) =       0.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.60

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      143.26    5.08    4.022  0.20( 0.12) 0.58      36.1     219.00
     1      161.96    6.90    3.375  0.20( 0.12) 0.58      49.0     237.00
     1      193.25   10.86    2.603  0.20( 0.12) 0.58      76.6     231.00
     1      194.36   11.03    2.580  0.20( 0.12) 0.58      77.8     234.00
     1      200.35   12.00    2.458  0.20( 0.12) 0.58      84.4     230.00
     2        1.60    6.25    3.573  0.20( 0.08) 0.40       0.5     241.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      144.73    5.08    4.022  0.20( 0.11) 0.57      36.5     219.00
     2      156.85    6.25    3.573  0.20( 0.11) 0.57      44.9     241.00
     3      163.47    6.90    3.375  0.20( 0.11) 0.57      49.5     237.00
     4      194.41   10.86    2.603  0.20( 0.12) 0.58      77.2     231.00
     5      195.50   11.03    2.580  0.20( 0.12) 0.58      78.3     234.00
     6      201.44   12.00    2.458  0.20( 0.12) 0.58      84.9     230.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     201.44    Tc(MIN.) =    12.00
 EFFECTIVE AREA(ACRES) =      84.87   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =       90.4
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.194
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    75    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.11
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   8.83   Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        3.25      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    5.71
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =       6.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  2.36   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.43
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.053
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.19      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.32
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       6.74
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         3.8  TC(MIN.) =     16.43
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =       6.74
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

SOUTHEAST – AREA 'B'

10-YR STUDY

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
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          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: SE-10.DAT
  TIME/DATE OF STUDY: 19:54 01/06/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.20

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.83
  Tc(MIN.) =    6.83
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =    8.10
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =       9.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   7.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.10
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.23
  RAINFALL INTENSITY(INCH/HR) =   3.29
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.10

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.887
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    75    9.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =   11.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.53
  FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.11
  RAINFALL INTENSITY(INCH/HR) =   2.57
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =       1.80
  TOTAL STREAM AREA(ACRES) =       1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.02
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.10    7.23    3.285  0.20( 0.16) 0.82       3.1       1.00
      2        4.02   11.11    2.570  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.48    7.23    3.285  0.20( 0.14) 0.71       4.3       1.00
      2       11.04   11.11    2.570  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.48    Tc(MIN.) =     7.23
  EFFECTIVE AREA(ACRES) =       4.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.48
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    8.30
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.865
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    75    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =   10.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.84
  FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.49
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.90

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.639
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    75    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.54
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.54

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   3.64
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.54

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        1.90   10.49    2.655  0.20( 0.07) 0.36       0.8       7.00
     2        2.54    6.05    3.639  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.06    6.05    3.639  0.20( 0.04) 0.20       1.2      10.00
     2        3.75   10.49    2.655  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.06    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.60
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.06
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.21
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.21
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.528
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20     0.100    75    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.74
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.74

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.06    6.21    3.584  0.20( 0.04) 0.20       1.2      10.00
      1        3.75   10.66    2.631  0.20( 0.05) 0.23       1.6       7.00
      2        4.74    6.39    3.528  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1        8.74    6.21    3.584  0.20( 0.03) 0.14       2.7      10.00
      2        8.78    6.39    3.528  0.20( 0.03) 0.14       2.8      12.00
      3        7.28   10.66    2.631  0.20( 0.03) 0.17       3.1       7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.78    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.76   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   3.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.14
  EFFECTIVE STREAM AREA(ACRES) =       2.76
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.757
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    75    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.38
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.72
  RAINFALL INTENSITY(INCH/HR) =   3.76
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.41
  TOTAL STREAM AREA(ACRES) =       0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.74    6.28    3.562  0.20( 0.03) 0.14       2.7      10.00
      1        8.78    6.45    3.507  0.20( 0.03) 0.14       2.8      12.00
      1        7.28   10.73    2.621  0.20( 0.03) 0.17       3.1       7.00
      2        1.38    5.72    3.757  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.78    5.72    3.757  0.20( 0.03) 0.14       2.9      14.00
      2       10.05    6.28    3.562  0.20( 0.03) 0.14       3.1      10.00
      3       10.07    6.45    3.507  0.20( 0.03) 0.14       3.2      12.00
      4        8.24   10.73    2.621  0.20( 0.03) 0.16       3.5       7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.07    Tc(MIN.) =     6.45
  EFFECTIVE AREA(ACRES) =       3.17   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.07
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.78    6.21    3.586  0.20( 0.03) 0.14       2.9      14.00
      2       10.05    6.76    3.414  0.20( 0.03) 0.14       3.1      10.00
      3       10.07    6.94    3.365  0.20( 0.03) 0.14       3.2      12.00
      4        8.24   11.23    2.554  0.20( 0.03) 0.16       3.5       7.00
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.48    8.30    3.036  0.20( 0.14) 0.71       4.3       1.00
      2       11.04   12.20    2.435  0.20( 0.14) 0.68       4.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.21    3.586  0.20( 0.09) 0.44       6.1      14.00
      2       21.54    6.76    3.414  0.20( 0.09) 0.44       6.6      10.00
      3       21.68    6.94    3.365  0.20( 0.09) 0.44       6.8      12.00
      4       21.96    8.30    3.036  0.20( 0.09) 0.47       7.6       1.00
      5       19.64   11.23    2.554  0.20( 0.09) 0.46       8.3       7.00
      6       18.89   12.20    2.435  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       21.96  Tc(MIN.) =    8.302
  EFFECTIVE AREA(ACRES) =      7.58  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.96
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.58
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.96

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.638
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   3.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.71    3.429  0.20( 0.09) 0.44       6.1      14.00
      1       21.54    7.27    3.277  0.20( 0.09) 0.44       6.6      10.00
      1       21.68    7.44    3.233  0.20( 0.09) 0.44       6.8      12.00
      1       21.96    8.80    2.936  0.20( 0.09) 0.47       7.6       1.00
      1       19.64   11.75    2.488  0.20( 0.09) 0.46       8.3       7.00
      1       18.89   12.73    2.377  0.20( 0.09) 0.46       8.4       4.00
      2        1.49    6.05    3.638  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.50    6.05    3.638  0.20( 0.08) 0.42       6.0      16.00
      2       22.29    6.71    3.429  0.20( 0.08) 0.42       6.6      14.00
      3       22.88    7.27    3.277  0.20( 0.09) 0.43       7.1      10.00
      4       23.00    7.44    3.233  0.20( 0.09) 0.43       7.2      12.00
      5       23.16    8.80    2.936  0.20( 0.09) 0.45       8.0       1.00
      6       20.65   11.75    2.488  0.20( 0.09) 0.45       8.7       7.00
      7       19.86   12.73    2.377  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.16    Tc(MIN.) =     8.80
  EFFECTIVE AREA(ACRES) =       8.04   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.16
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.571
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        0.34      0.20     0.200    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.08
 TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
 FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.09
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.08
 PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =    7.68
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.68
 RAINFALL INTENSITY(INCH/HR) =   3.17
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.34
 TOTAL STREAM AREA(ACRES) =       0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20     0.900    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.08    7.68    3.173  0.20( 0.04) 0.20       0.3      18.00
      2        0.78    7.72    3.165  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.86    7.68    3.173  0.20( 0.10) 0.52       0.6      18.00
      2        1.86    7.72    3.165  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.86    Tc(MIN.) =     7.68
  EFFECTIVE AREA(ACRES) =       0.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.86
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.63
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    6.26
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       7.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    4.05
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      11.37

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.38
 RAINFALL INTENSITY(INCH/HR) =   3.02
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.59
 EFFECTIVE STREAM AREA(ACRES) =       4.35
 TOTAL STREAM AREA(ACRES) =       4.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.37

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.86    9.25    2.854  0.20( 0.10) 0.52       0.6      18.00
     1        1.86    9.28    2.848  0.20( 0.10) 0.52       0.6      18.00
     2       11.37    8.38    3.020  0.20( 0.12) 0.59       4.4      21.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.15    8.38    3.020  0.20( 0.12) 0.58       4.9      21.00
     2       12.57    9.25    2.854  0.20( 0.12) 0.58       5.0      18.00
     3       12.55    9.28    2.848  0.20( 0.12) 0.58       5.0      18.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.15    Tc(MIN.) =     8.38
 EFFECTIVE AREA(ACRES) =       4.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =        5.0
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.15
 PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    9.33
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.33
 RAINFALL INTENSITY(INCH/HR) =   2.84
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =       4.92
 TOTAL STREAM AREA(ACRES) =       4.98
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.15
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.405
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.13

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.341
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.40      0.20     0.100    75    7.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   3.34
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.40
 TOTAL STREAM AREA(ACRES) =       0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.20

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.15    9.33    2.839  0.20( 0.12) 0.58       4.9      21.00
     1       12.57   10.21    2.697  0.20( 0.12) 0.58       5.0      18.00
     1       12.55   10.24    2.691  0.20( 0.12) 0.58       5.0      18.00
     2        1.13    6.80    3.405  0.20( 0.02) 0.10       0.4      26.00
     3        1.20    7.02    3.341  0.20( 0.02) 0.10       0.4      27.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.87    6.80    3.405  0.20( 0.10) 0.49       4.3      26.00
     2       14.02    7.02    3.341  0.20( 0.10) 0.50       4.5      27.00
     3       15.11    9.33    2.839  0.20( 0.10) 0.51       5.7      21.00
     4       14.43   10.21    2.697  0.20( 0.10) 0.51       5.7      18.00
     5       14.40   10.24    2.691  0.20( 0.10) 0.51       5.8      18.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.11    Tc(MIN.) =     9.33
 EFFECTIVE AREA(ACRES) =       5.69   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =        5.8
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.16
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.11
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.41
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.87    6.88    3.381  0.20( 0.10) 0.49       4.3      26.00
     2       14.02    7.11    3.319  0.20( 0.10) 0.50       4.5      27.00
     3       15.11    9.41    2.825  0.20( 0.10) 0.51       5.7      21.00
     4       14.43   10.29    2.684  0.20( 0.10) 0.51       5.7      18.00
     5       14.40   10.33    2.679  0.20( 0.10) 0.51       5.8      18.00
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.50    6.15    3.607  0.20( 0.08) 0.42       6.0      16.00
     2       22.29    6.80    3.403  0.20( 0.08) 0.42       6.6      14.00
     3       22.88    7.36    3.254  0.20( 0.09) 0.43       7.1      10.00
     4       23.00    7.53    3.211  0.20( 0.09) 0.43       7.2      12.00
     5       23.16    8.89    2.919  0.20( 0.09) 0.45       8.0       1.00
```

```
     6       20.65   11.84    2.477  0.20( 0.09) 0.45       8.7       7.00
     7       19.86   12.82    2.367  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.15    3.607  0.20( 0.09) 0.45       9.8      16.00
     2       36.10    6.80    3.403  0.20( 0.09) 0.45      10.8      14.00
     3       36.24    6.88    3.381  0.20( 0.09) 0.45      11.0      26.00
     4       36.63    7.11    3.319  0.20( 0.09) 0.45      11.3      27.00
     5       37.01    7.36    3.254  0.20( 0.09) 0.45      11.7      10.00
     6       37.22    7.53    3.211  0.20( 0.09) 0.46      11.9      12.00
     7       38.02    8.89    2.919  0.20( 0.09) 0.47      13.5       1.00
     8       37.82    9.41    2.825  0.20( 0.10) 0.48      13.9      21.00
     9       36.40   10.29    2.684  0.20( 0.10) 0.48      14.1      18.00
    10       36.34   10.33    2.679  0.20( 0.10) 0.48      14.1      18.00
    11       33.92   11.84    2.477  0.20( 0.09) 0.47      14.5       7.00
    12       32.51   12.82    2.367  0.20( 0.09) 0.47      14.6       4.00
   TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       38.02  Tc(MIN.) =    8.891
  EFFECTIVE AREA(ACRES) =     13.45  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.45
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.02

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.03

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.03
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.75    6.75    3.419  0.20( 0.09) 0.45       9.8      16.00
      1       36.10    7.40    3.243  0.20( 0.09) 0.45      10.8      14.00
      1       36.24    7.48    3.224  0.20( 0.09) 0.45      11.0      26.00
      1       36.63    7.70    3.169  0.20( 0.09) 0.45      11.3      27.00
      1       37.01    7.95    3.112  0.20( 0.09) 0.45      11.7      10.00
      1       37.22    8.12    3.074  0.20( 0.09) 0.46      11.9      12.00
      1       38.02    9.48    2.813  0.20( 0.09) 0.47      13.5       1.00
```

```
     1       37.82   10.01    2.728  0.20( 0.10) 0.48      13.9      21.00
     1       36.40   10.89    2.599  0.20( 0.10) 0.48      14.1      18.00
     1       36.34   10.92    2.594  0.20( 0.10) 0.48      14.1      18.00
     1       33.92   12.45    2.407  0.20( 0.09) 0.47      14.5       7.00
     1       32.51   13.43    2.305  0.20( 0.09) 0.47      14.6       4.00
     2        2.03    5.29    3.929  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.47    5.29    3.929  0.20( 0.10) 0.48       8.3      31.00
      2       36.50    6.75    3.419  0.20( 0.10) 0.48      10.4      16.00
      3       37.75    7.40    3.243  0.20( 0.09) 0.47      11.4      14.00
      4       37.89    7.48    3.224  0.20( 0.09) 0.47      11.5      26.00
      5       38.25    7.70    3.169  0.20( 0.09) 0.47      11.9      27.00
      6       38.60    7.95    3.112  0.20( 0.10) 0.48      12.3      10.00
      7       38.78    8.12    3.074  0.20( 0.10) 0.48      12.5      12.00
      8       39.44    9.48    2.813  0.20( 0.10) 0.49      14.0       1.00
      9       39.20   10.01    2.728  0.20( 0.10) 0.49      14.4      21.00
     10       37.71   10.89    2.599  0.20( 0.10) 0.49      14.7      18.00
     11       37.65   10.92    2.594  0.20( 0.10) 0.49      14.7      18.00
     12       35.12   12.45    2.407  0.20( 0.10) 0.49      15.1       7.00
     13       33.66   13.43    2.305  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.44    Tc(MIN.) =     9.48
  EFFECTIVE AREA(ACRES) =      14.03   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.399
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.01      0.20     1.000    93   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.98
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      3.98

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.952
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
```

```
  "BARREN"                   D        3.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   5.42
  Tc(MIN.) =   17.94
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    5.53
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =       8.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.14
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.70
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   19.25
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.25
  RAINFALL INTENSITY(INCH/HR) =   1.87
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.70

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.23      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.15      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =    8.88
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       9.56

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.75

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.70   19.25    1.875  0.20( 0.20) 1.00       5.5      37.00
      2       10.75    7.06    3.331  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.06    3.331  0.20( 0.18) 0.90       5.8      40.00
      2       14.50   19.25    1.875  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.72    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
```

```
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.72
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.63
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       5.80
  TOTAL STREAM AREA(ACRES) =       9.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.72

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.63      0.20     1.000    93    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.00      0.20     1.000    93
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.43
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.66
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   11.83
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      13.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   5.28
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.98
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.32
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.61
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.63    3.186  0.20( 0.18) 0.90       5.8      40.00
      1       14.50   19.84    1.843  0.20( 0.19) 0.94       9.3      37.00
      2       13.32    9.61    2.792  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.91    7.63    3.186  0.20( 0.19) 0.94      10.3      40.00
      2       29.69    9.61    2.792  0.20( 0.19) 0.95      12.0      42.00
      3       22.95   19.84    1.843  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.69    Tc(MIN.) =     9.61
  EFFECTIVE AREA(ACRES) =      12.00   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.69
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   2.65
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =      12.00
  TOTAL STREAM AREA(ACRES) =      14.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.69

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.252
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    75    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    8.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.934
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.64
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.58

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.096
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    75    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
```

```
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.48
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   14.11
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
 STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    9.75
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.768
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        1.99      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    4.89
 EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.70

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  16.57
 FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.75
 RAINFALL INTENSITY(INCH/HR) =   2.77
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       2.73
 TOTAL STREAM AREA(ACRES) =       2.73
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.70

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.91    8.53    2.988  0.20( 0.19) 0.94      10.3      40.00
     1       29.69   10.51    2.652  0.20( 0.19) 0.95      12.0      42.00
     1       22.95   20.80    1.794  0.20( 0.19) 0.96      14.9      37.00
     2        4.58    8.81    2.934  0.20( 0.04) 0.20       1.8      46.00
     3        6.70    9.75    2.768  0.20( 0.04) 0.20       2.7      48.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       39.77    8.53    2.988  0.20( 0.15) 0.73      14.4      40.00
     2       40.03    8.81    2.934  0.20( 0.15) 0.73      14.7      46.00
```

```
     3       40.43    9.75    2.768  0.20( 0.15) 0.74      15.8      48.00
     4       40.24   10.51    2.652  0.20( 0.15) 0.75      16.5      42.00
     5       30.04   20.80    1.794  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.43    Tc(MIN.) =     9.75
  EFFECTIVE AREA(ACRES) =      15.83   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.43
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"         D        0.64      0.20     0.200    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
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  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.12   Tc(MIN.) =    9.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  15.75
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.09
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.289
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    75    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.89
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      3.89

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.188
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.19
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =    7.62
  SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    4.25
  EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
  TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =       8.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.62
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.83
  TOTAL STREAM AREA(ACRES) =       2.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.37    9.09    2.883  0.20( 0.04) 0.20       2.1      14.00
      2        8.02    7.62    3.188  0.20( 0.04) 0.20       2.8      52.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.01    7.62    3.188  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.09    2.883  0.20( 0.04) 0.20       4.9      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.01    Tc(MIN.) =     7.62
  EFFECTIVE AREA(ACRES) =       4.59   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
```

```
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.01
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.01    8.50    2.994  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.97    2.733  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.77    8.60    2.975  0.20( 0.15) 0.73      14.4      40.00
      2       40.03    8.88    2.921  0.20( 0.15) 0.73      14.7      46.00
      3       40.43    9.82    2.757  0.20( 0.15) 0.74      15.8      48.00
      4       40.24   10.58    2.642  0.20( 0.15) 0.75      16.5      42.00
      5       30.04   20.87    1.790  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.50    2.994  0.20( 0.12) 0.60      18.8      52.00
      2       52.76    8.60    2.975  0.20( 0.12) 0.60      19.0      40.00
      3       52.94    8.88    2.921  0.20( 0.12) 0.60      19.4      46.00
      4       53.08    9.82    2.757  0.20( 0.12) 0.61      20.7      48.00
      5       53.01    9.97    2.733  0.20( 0.12) 0.61      20.9      14.00
      6       52.43   10.58    2.642  0.20( 0.12) 0.62      21.4      42.00
      7       38.24   20.87    1.790  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       53.08  Tc(MIN.) =    9.820
  EFFECTIVE AREA(ACRES) =     20.72  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.08
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.61
 EFFECTIVE STREAM AREA(ACRES) =      20.72
 TOTAL STREAM AREA(ACRES) =      24.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.08

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.875
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        0.88      0.20     0.900    75    9.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      2.13
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.13

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.767
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D        0.25      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.43
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.22
 AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.63
 Tc(MIN.) =    9.76
 SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.60
 EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
 TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       2.65

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   4.34
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.65
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.91    2.915  0.20( 0.12) 0.60      18.8      52.00
      1       52.76    9.01    2.896  0.20( 0.12) 0.60      19.0      40.00
      1       52.94    9.29    2.846  0.20( 0.12) 0.60      19.4      46.00
      1       53.08   10.23    2.693  0.20( 0.12) 0.61      20.7      48.00
      1       53.01   10.38    2.671  0.20( 0.12) 0.61      20.9      14.00
      1       52.43   10.99    2.585  0.20( 0.12) 0.62      21.4      42.00
      1       38.24   21.31    1.769  0.20( 0.13) 0.67      24.4      37.00
      2        2.65   10.69    2.627  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.07    8.91    2.915  0.20( 0.12) 0.61      19.7      52.00
      2       55.24    9.01    2.896  0.20( 0.12) 0.61      19.9      40.00
      3       55.45    9.29    2.846  0.20( 0.12) 0.61      20.4      46.00
      4       55.69   10.23    2.693  0.20( 0.12) 0.62      21.8      48.00
      5       55.63   10.38    2.671  0.20( 0.12) 0.62      22.0      14.00
      6       55.37   10.69    2.627  0.20( 0.13) 0.63      22.3      56.00
      7       55.03   10.99    2.585  0.20( 0.13) 0.63      22.6      42.00
      8       39.96   21.31    1.769  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      55.69    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      21.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.69
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      21.81
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.69

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.531
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.095
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =    9.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.749
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  1.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.18
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       55.07    9.35    2.836  0.20( 0.12) 0.61      19.7      52.00
     1       55.24    9.45    2.819  0.20( 0.12) 0.61      19.9      40.00
     1       55.45    9.72    2.774  0.20( 0.12) 0.61      20.4      46.00
     1       55.69   10.66    2.631  0.20( 0.12) 0.62      21.8      48.00
     1       55.63   10.81    2.610  0.20( 0.12) 0.62      22.0      14.00
     1       55.37   11.12    2.567  0.20( 0.13) 0.63      22.3      56.00
     1       55.03   11.43    2.528  0.20( 0.13) 0.63      22.6      42.00
     1       39.96   21.77    1.747  0.20( 0.13) 0.67      25.5      37.00
     2        1.61    6.38    3.531  0.20( 0.02) 0.10       0.5      60.00
     3        1.18    9.87    2.749  0.20( 0.02) 0.10       0.5      58.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       49.78    6.38    3.531  0.20( 0.12) 0.58      14.3      60.00
     2       57.52    9.35    2.836  0.20( 0.12) 0.59      20.7      52.00
     3       57.68    9.45    2.819  0.20( 0.12) 0.59      20.9      40.00
     4       57.88    9.72    2.774  0.20( 0.12) 0.59      21.4      46.00
     5       57.92    9.87    2.749  0.20( 0.12) 0.59      21.6      58.00
     6       58.02   10.66    2.631  0.20( 0.12) 0.60      22.8      48.00
     7       57.93   10.81    2.610  0.20( 0.12) 0.60      23.0      14.00
     8       57.64   11.12    2.567  0.20( 0.12) 0.60      23.3      56.00
     9       57.27   11.43    2.528  0.20( 0.12) 0.61      23.5      42.00
    10       41.50   21.77    1.747  0.20( 0.13) 0.65      26.5      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      58.02    Tc(MIN.) =    10.66
 EFFECTIVE AREA(ACRES) =      22.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       26.5
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      58.02
 PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.88
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  17.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  27.59
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      58.02
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.90
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.90
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      22.80
  TOTAL STREAM AREA(ACRES) =      26.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.02

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.79

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.79
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       49.78    6.64    3.452  0.20( 0.12) 0.58      14.3      60.00
      1       57.52    9.61    2.792  0.20( 0.12) 0.59      20.7      52.00
```

```
     1       57.68    9.71    2.776  0.20( 0.12) 0.59      20.9      40.00
     1       57.88    9.96    2.734  0.20( 0.12) 0.59      21.4      46.00
     1       57.92   10.12    2.711  0.20( 0.12) 0.59      21.6      58.00
     1       58.02   10.90    2.597  0.20( 0.12) 0.60      22.8      48.00
     1       57.93   11.06    2.576  0.20( 0.12) 0.60      23.0      14.00
     1       57.64   11.38    2.534  0.20( 0.12) 0.60      23.3      56.00
     1       57.27   11.68    2.496  0.20( 0.12) 0.61      23.5      42.00
     1       41.50   22.04    1.735  0.20( 0.13) 0.65      26.5      37.00
     2        2.79    5.29    3.931  0.20( 0.18) 0.90       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       48.17    5.29    3.931  0.20( 0.12) 0.60      12.2      64.00
      2       52.21    6.64    3.452  0.20( 0.12) 0.60      15.1      60.00
      3       59.46    9.61    2.792  0.20( 0.12) 0.60      21.5      52.00
      4       59.61    9.71    2.776  0.20( 0.12) 0.60      21.7      40.00
      5       59.78    9.96    2.734  0.20( 0.12) 0.60      22.2      46.00
      6       59.80   10.12    2.711  0.20( 0.12) 0.60      22.4      58.00
      7       59.82   10.90    2.597  0.20( 0.12) 0.61      23.6      48.00
      8       59.72   11.06    2.576  0.20( 0.12) 0.61      23.8      14.00
      9       59.39   11.38    2.534  0.20( 0.12) 0.61      24.1      56.00
     10       58.99   11.68    2.496  0.20( 0.12) 0.62      24.3      42.00
     11       42.66   22.04    1.735  0.20( 0.13) 0.66      27.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      59.82    Tc(MIN.) =    10.90
  EFFECTIVE AREA(ACRES) =      23.60   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       27.3
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.00  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.490
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.55      0.20     0.100    75    6.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.244
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.283
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  NATURAL POOR COVER
  "BARREN"                    D        0.62      0.20     1.000    93    7.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.15
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   12.92
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1         PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   7.73
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.39
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      14.38
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY                                                           *
* PROPOSED - SOUTHEAST - AREA 'B' - WITH A FLOW-BY DETENTION BASIN      *
 ************************************************************************

  FILE NAME: SE-B-10.DAT
  TIME/DATE OF STUDY: 19:03 01/10/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.20

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.394
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.27
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =   1.83
  Tc(MIN.) =    6.83
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =    8.10
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =       9.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   7.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.10
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    7.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.23
  RAINFALL INTENSITY(INCH/HR) =   3.29
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.10

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.887
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    75    9.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   11.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.04   Tc(MIN.) =   11.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.570
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.02

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.53
  FLOW VELOCITY(FEET/SEC.) =  2.29   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.11
  RAINFALL INTENSITY(INCH/HR) =   2.57
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.43
  EFFECTIVE STREAM AREA(ACRES) =       1.80
  TOTAL STREAM AREA(ACRES) =       1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.02
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.10    7.23    3.285  0.20( 0.16) 0.82       3.1       1.00
      2        4.02   11.11    2.570  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.48    7.23    3.285  0.20( 0.14) 0.71       4.3       1.00
      2       11.04   11.11    2.570  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.48    Tc(MIN.) =     7.23
  EFFECTIVE AREA(ACRES) =       4.30   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.48
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    8.30
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.865
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    75    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      1.29

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =   10.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.684
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.90

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.84
  FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.39
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.49
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   2.66
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.90

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.639
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    75    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.54
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      2.54

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   3.64
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.54

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        1.90   10.49    2.655  0.20( 0.07) 0.36       0.8       7.00
     2        2.54    6.05    3.639  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.06    6.05    3.639  0.20( 0.04) 0.20       1.2      10.00
     2        3.75   10.49    2.655  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.06    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.60
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.06
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.21
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.21
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.528
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20     0.100    75    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      4.74
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.74

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.06    6.21    3.584  0.20( 0.04) 0.20       1.2      10.00
      1        3.75   10.66    2.631  0.20( 0.05) 0.23       1.6       7.00
      2        4.74    6.39    3.528  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1        8.74    6.21    3.584  0.20( 0.03) 0.14       2.7      10.00
      2        8.78    6.39    3.528  0.20( 0.03) 0.14       2.8      12.00
      3        7.28   10.66    2.631  0.20( 0.03) 0.17       3.1       7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.78    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.76   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.78
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   3.51
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.14
  EFFECTIVE STREAM AREA(ACRES) =       2.76
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.757
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    75    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.38
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      1.38

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.72
  RAINFALL INTENSITY(INCH/HR) =   3.76
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.41
  TOTAL STREAM AREA(ACRES) =       0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.74    6.28    3.562  0.20( 0.03) 0.14       2.7      10.00
      1        8.78    6.45    3.507  0.20( 0.03) 0.14       2.8      12.00
      1        7.28   10.73    2.621  0.20( 0.03) 0.17       3.1       7.00
      2        1.38    5.72    3.757  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.78    5.72    3.757  0.20( 0.03) 0.14       2.9      14.00
      2       10.05    6.28    3.562  0.20( 0.03) 0.14       3.1      10.00
      3       10.07    6.45    3.507  0.20( 0.03) 0.14       3.2      12.00
      4        8.24   10.73    2.621  0.20( 0.03) 0.16       3.5       7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.07    Tc(MIN.) =     6.45
  EFFECTIVE AREA(ACRES) =       3.17   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.07
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    6.94
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.78    6.21    3.586  0.20( 0.03) 0.14       2.9      14.00
      2       10.05    6.76    3.414  0.20( 0.03) 0.14       3.1      10.00
      3       10.07    6.94    3.365  0.20( 0.03) 0.14       3.2      12.00
      4        8.24   11.23    2.554  0.20( 0.03) 0.16       3.5       7.00
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.48    8.30    3.036  0.20( 0.14) 0.71       4.3       1.00
      2       11.04   12.20    2.435  0.20( 0.14) 0.68       4.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.21    3.586  0.20( 0.09) 0.44       6.1      14.00
      2       21.54    6.76    3.414  0.20( 0.09) 0.44       6.6      10.00
      3       21.68    6.94    3.365  0.20( 0.09) 0.44       6.8      12.00
      4       21.96    8.30    3.036  0.20( 0.09) 0.47       7.6       1.00
      5       19.64   11.23    2.554  0.20( 0.09) 0.46       8.3       7.00
      6       18.89   12.20    2.435  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       21.96  Tc(MIN.) =    8.302
  EFFECTIVE AREA(ACRES) =      7.58  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.96
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   2.94
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.58
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.96

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.638
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    75    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   3.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.89    6.71    3.429  0.20( 0.09) 0.44       6.1      14.00
      1       21.54    7.27    3.277  0.20( 0.09) 0.44       6.6      10.00
      1       21.68    7.44    3.233  0.20( 0.09) 0.44       6.8      12.00
      1       21.96    8.80    2.936  0.20( 0.09) 0.47       7.6       1.00
      1       19.64   11.75    2.488  0.20( 0.09) 0.46       8.3       7.00
      1       18.89   12.73    2.377  0.20( 0.09) 0.46       8.4       4.00
      2        1.49    6.05    3.638  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.50    6.05    3.638  0.20( 0.08) 0.42       6.0      16.00
      2       22.29    6.71    3.429  0.20( 0.08) 0.42       6.6      14.00
      3       22.88    7.27    3.277  0.20( 0.09) 0.43       7.1      10.00
      4       23.00    7.44    3.233  0.20( 0.09) 0.43       7.2      12.00
      5       23.16    8.80    2.936  0.20( 0.09) 0.45       8.0       1.00
      6       20.65   11.75    2.488  0.20( 0.09) 0.45       8.7       7.00
      7       19.86   12.73    2.377  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.16    Tc(MIN.) =     8.80
  EFFECTIVE AREA(ACRES) =       8.04   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.64
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.16
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.571
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        0.34      0.20     0.200    75    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.08
 TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
 FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.09
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.08
 PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =    7.68
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.68
 RAINFALL INTENSITY(INCH/HR) =   3.17
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.34
 TOTAL STREAM AREA(ACRES) =       0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
```

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.165
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20     0.900    75    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.08    7.68    3.173  0.20( 0.04) 0.20       0.3      18.00
      2        0.78    7.72    3.165  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.86    7.68    3.173  0.20( 0.10) 0.52       0.6      18.00
      2        1.86    7.72    3.165  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.86    Tc(MIN.) =     7.68
  EFFECTIVE AREA(ACRES) =       0.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.86
  PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.63
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    75    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    6.26
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       7.32

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    4.05
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      11.37

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.38
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       4.35
  TOTAL STREAM AREA(ACRES) =       4.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.86    9.25    2.854  0.20( 0.10) 0.52       0.6      18.00
      1        1.86    9.28    2.848  0.20( 0.10) 0.52       0.6      18.00
      2       11.37    8.38    3.020  0.20( 0.12) 0.59       4.4      21.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.15    8.38    3.020  0.20( 0.12) 0.58       4.9      21.00
      2       12.57    9.25    2.854  0.20( 0.12) 0.58       5.0      18.00
      3       12.55    9.28    2.848  0.20( 0.12) 0.58       5.0      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.15    Tc(MIN.) =     8.38
  EFFECTIVE AREA(ACRES) =       4.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.15
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    9.33
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.33
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.92
  TOTAL STREAM AREA(ACRES) =       4.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.15
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.405
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    75    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.13
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.13

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   3.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.13

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.341
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.40      0.20     0.100    75    7.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   3.34
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.40
 TOTAL STREAM AREA(ACRES) =       0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.20

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.15    9.33    2.839  0.20( 0.12) 0.58       4.9      21.00
     1       12.57   10.21    2.697  0.20( 0.12) 0.58       5.0      18.00
     1       12.55   10.24    2.691  0.20( 0.12) 0.58       5.0      18.00
     2        1.13    6.80    3.405  0.20( 0.02) 0.10       0.4      26.00
     3        1.20    7.02    3.341  0.20( 0.02) 0.10       0.4      27.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.87    6.80    3.405  0.20( 0.10) 0.49       4.3      26.00
     2       14.02    7.02    3.341  0.20( 0.10) 0.50       4.5      27.00
     3       15.11    9.33    2.839  0.20( 0.10) 0.51       5.7      21.00
     4       14.43   10.21    2.697  0.20( 0.10) 0.51       5.7      18.00
     5       14.40   10.24    2.691  0.20( 0.10) 0.51       5.8      18.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.11    Tc(MIN.) =     9.33
 EFFECTIVE AREA(ACRES) =       5.69   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =        5.8
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.16
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.11
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.41
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.87    6.88    3.381  0.20( 0.10) 0.49       4.3      26.00
     2       14.02    7.11    3.319  0.20( 0.10) 0.50       4.5      27.00
     3       15.11    9.41    2.825  0.20( 0.10) 0.51       5.7      21.00
     4       14.43   10.29    2.684  0.20( 0.10) 0.51       5.7      18.00
     5       14.40   10.33    2.679  0.20( 0.10) 0.51       5.8      18.00
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.50    6.15    3.607  0.20( 0.08) 0.42       6.0      16.00
     2       22.29    6.80    3.403  0.20( 0.08) 0.42       6.6      14.00
     3       22.88    7.36    3.254  0.20( 0.09) 0.43       7.1      10.00
     4       23.00    7.53    3.211  0.20( 0.09) 0.43       7.2      12.00
     5       23.16    8.89    2.919  0.20( 0.09) 0.45       8.0       1.00
```

```
     6       20.65   11.84    2.477  0.20( 0.09) 0.45       8.7       7.00
     7       19.86   12.82    2.367  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.15    3.607  0.20( 0.09) 0.45       9.8      16.00
     2       36.10    6.80    3.403  0.20( 0.09) 0.45      10.8      14.00
     3       36.24    6.88    3.381  0.20( 0.09) 0.45      11.0      26.00
     4       36.63    7.11    3.319  0.20( 0.09) 0.45      11.3      27.00
     5       37.01    7.36    3.254  0.20( 0.09) 0.45      11.7      10.00
     6       37.22    7.53    3.211  0.20( 0.09) 0.46      11.9      12.00
     7       38.02    8.89    2.919  0.20( 0.09) 0.47      13.5       1.00
     8       37.82    9.41    2.825  0.20( 0.10) 0.48      13.9      21.00
     9       36.40   10.29    2.684  0.20( 0.10) 0.48      14.1      18.00
    10       36.34   10.33    2.679  0.20( 0.10) 0.48      14.1      18.00
    11       33.92   11.84    2.477  0.20( 0.09) 0.47      14.5       7.00
    12       32.51   12.82    2.367  0.20( 0.09) 0.47      14.6       4.00
   TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       38.02  Tc(MIN.) =    8.891
  EFFECTIVE AREA(ACRES) =     13.45  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    9.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.02
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.48
  RAINFALL INTENSITY(INCH/HR) =   2.81
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.45
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.02

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.03

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.03
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.03

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       34.75    6.75    3.419  0.20( 0.09) 0.45       9.8      16.00
      1       36.10    7.40    3.243  0.20( 0.09) 0.45      10.8      14.00
      1       36.24    7.48    3.224  0.20( 0.09) 0.45      11.0      26.00
      1       36.63    7.70    3.169  0.20( 0.09) 0.45      11.3      27.00
      1       37.01    7.95    3.112  0.20( 0.09) 0.45      11.7      10.00
      1       37.22    8.12    3.074  0.20( 0.09) 0.46      11.9      12.00
      1       38.02    9.48    2.813  0.20( 0.09) 0.47      13.5       1.00
```

```
     1       37.82   10.01    2.728  0.20( 0.10) 0.48      13.9      21.00
     1       36.40   10.89    2.599  0.20( 0.10) 0.48      14.1      18.00
     1       36.34   10.92    2.594  0.20( 0.10) 0.48      14.1      18.00
     1       33.92   12.45    2.407  0.20( 0.09) 0.47      14.5       7.00
     1       32.51   13.43    2.305  0.20( 0.09) 0.47      14.6       4.00
     2        2.03    5.29    3.929  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.47    5.29    3.929  0.20( 0.10) 0.48       8.3      31.00
      2       36.50    6.75    3.419  0.20( 0.10) 0.48      10.4      16.00
      3       37.75    7.40    3.243  0.20( 0.09) 0.47      11.4      14.00
      4       37.89    7.48    3.224  0.20( 0.09) 0.47      11.5      26.00
      5       38.25    7.70    3.169  0.20( 0.09) 0.47      11.9      27.00
      6       38.60    7.95    3.112  0.20( 0.10) 0.48      12.3      10.00
      7       38.78    8.12    3.074  0.20( 0.10) 0.48      12.5      12.00
      8       39.44    9.48    2.813  0.20( 0.10) 0.49      14.0       1.00
      9       39.20   10.01    2.728  0.20( 0.10) 0.49      14.4      21.00
     10       37.71   10.89    2.599  0.20( 0.10) 0.49      14.7      18.00
     11       37.65   10.92    2.594  0.20( 0.10) 0.49      14.7      18.00
     12       35.12   12.45    2.407  0.20( 0.10) 0.49      15.1       7.00
     13       33.66   13.43    2.305  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.44    Tc(MIN.) =     9.48
  EFFECTIVE AREA(ACRES) =      14.03   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.399
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        2.01      0.20     1.000    93   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.98
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      3.98

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.952
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
```

```
  "BARREN"                   D        3.51      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.57
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   5.42
  Tc(MIN.) =   17.94
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    5.53
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =       8.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.14
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.70
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   19.25
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.25
  RAINFALL INTENSITY(INCH/HR) =   1.87
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.70

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.23      0.20     0.100    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.15      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =    8.88
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =       9.56

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.331
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.40      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.75

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.75

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.70   19.25    1.875  0.20( 0.20) 1.00       5.5      37.00
      2       10.75    7.06    3.331  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.06    3.331  0.20( 0.18) 0.90       5.8      40.00
      2       14.50   19.25    1.875  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.72    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.80   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
```

```
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.72
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    7.63
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.63
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       5.80
  TOTAL STREAM AREA(ACRES) =       9.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.72

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.163
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.63      0.20     1.000    93    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.68
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.00      0.20     1.000    93
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.43
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.66
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   11.83
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      13.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   5.28
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.98
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.32
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.61
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       16.72    7.63    3.186  0.20( 0.18) 0.90       5.8      40.00
      1       14.50   19.84    1.843  0.20( 0.19) 0.94       9.3      37.00
      2       13.32    9.61    2.792  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.91    7.63    3.186  0.20( 0.19) 0.94      10.3      40.00
      2       29.69    9.61    2.792  0.20( 0.19) 0.95      12.0      42.00
      3       22.95   19.84    1.843  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.69    Tc(MIN.) =     9.61
  EFFECTIVE AREA(ACRES) =      12.00   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.69
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   2.65
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =      12.00
  TOTAL STREAM AREA(ACRES) =      14.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.69

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.252
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    75    7.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    8.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.934
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    3.59
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       4.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  13.64
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.81
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.58

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.096
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    75    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.04
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      2.04

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
```

```
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.48
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   14.11
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
 STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =    9.75
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.768
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        1.99      0.20     0.200    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    4.89
 EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       6.70

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  16.57
 FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.75
 RAINFALL INTENSITY(INCH/HR) =   2.77
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       2.73
 TOTAL STREAM AREA(ACRES) =       2.73
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.70

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.91    8.53    2.988  0.20( 0.19) 0.94      10.3      40.00
     1       29.69   10.51    2.652  0.20( 0.19) 0.95      12.0      42.00
     1       22.95   20.80    1.794  0.20( 0.19) 0.96      14.9      37.00
     2        4.58    8.81    2.934  0.20( 0.04) 0.20       1.8      46.00
     3        6.70    9.75    2.768  0.20( 0.04) 0.20       2.7      48.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       39.77    8.53    2.988  0.20( 0.15) 0.73      14.4      40.00
     2       40.03    8.81    2.934  0.20( 0.15) 0.73      14.7      46.00
```

```
     3       40.43    9.75    2.768  0.20( 0.15) 0.74      15.8      48.00
     4       40.24   10.51    2.652  0.20( 0.15) 0.75      16.5      42.00
     5       30.04   20.80    1.794  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      40.43    Tc(MIN.) =     9.75
  EFFECTIVE AREA(ACRES) =      15.83   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.43
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.108
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.64      0.20     0.200    75    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
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  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.12   Tc(MIN.) =    9.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.883
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    3.74
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  15.75
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.09
  RAINFALL INTENSITY(INCH/HR) =   2.88
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.289
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    75    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.89
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      3.89

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.188
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.19
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.40
  Tc(MIN.) =    7.62
  SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    4.25
  EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
  TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =       8.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   6.67
  LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.62
  RAINFALL INTENSITY(INCH/HR) =   3.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.83
  TOTAL STREAM AREA(ACRES) =       2.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.02

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.37    9.09    2.883  0.20( 0.04) 0.20       2.1      14.00
      2        8.02    7.62    3.188  0.20( 0.04) 0.20       2.8      52.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.01    7.62    3.188  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.09    2.883  0.20( 0.04) 0.20       4.9      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.01    Tc(MIN.) =     7.62
  EFFECTIVE AREA(ACRES) =       4.59   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
```

```
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.01
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.01    8.50    2.994  0.20( 0.04) 0.20       4.6      52.00
      2       12.61    9.97    2.733  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.77    8.60    2.975  0.20( 0.15) 0.73      14.4      40.00
      2       40.03    8.88    2.921  0.20( 0.15) 0.73      14.7      46.00
      3       40.43    9.82    2.757  0.20( 0.15) 0.74      15.8      48.00
      4       40.24   10.58    2.642  0.20( 0.15) 0.75      16.5      42.00
      5       30.04   20.87    1.790  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.50    2.994  0.20( 0.12) 0.60      18.8      52.00
      2       52.76    8.60    2.975  0.20( 0.12) 0.60      19.0      40.00
      3       52.94    8.88    2.921  0.20( 0.12) 0.60      19.4      46.00
      4       53.08    9.82    2.757  0.20( 0.12) 0.61      20.7      48.00
      5       53.01    9.97    2.733  0.20( 0.12) 0.61      20.9      14.00
      6       52.43   10.58    2.642  0.20( 0.12) 0.62      21.4      42.00
      7       38.24   20.87    1.790  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       53.08  Tc(MIN.) =    9.820
  EFFECTIVE AREA(ACRES) =     20.72  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.08
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.23
 RAINFALL INTENSITY(INCH/HR) =   2.69
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.61
 EFFECTIVE STREAM AREA(ACRES) =      20.72
 TOTAL STREAM AREA(ACRES) =      24.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.08

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.875
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        0.88      0.20     0.900    75    9.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      2.13
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.13

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.767
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D        0.25      0.20     0.500    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.43
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.22
 AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   0.63
 Tc(MIN.) =    9.76
 SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.60
 EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
 TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       2.65

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   4.34
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.65
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.65

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.60    8.91    2.915  0.20( 0.12) 0.60      18.8      52.00
      1       52.76    9.01    2.896  0.20( 0.12) 0.60      19.0      40.00
      1       52.94    9.29    2.846  0.20( 0.12) 0.60      19.4      46.00
      1       53.08   10.23    2.693  0.20( 0.12) 0.61      20.7      48.00
      1       53.01   10.38    2.671  0.20( 0.12) 0.61      20.9      14.00
      1       52.43   10.99    2.585  0.20( 0.12) 0.62      21.4      42.00
      1       38.24   21.31    1.769  0.20( 0.13) 0.67      24.4      37.00
      2        2.65   10.69    2.627  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.07    8.91    2.915  0.20( 0.12) 0.61      19.7      52.00
      2       55.24    9.01    2.896  0.20( 0.12) 0.61      19.9      40.00
      3       55.45    9.29    2.846  0.20( 0.12) 0.61      20.4      46.00
      4       55.69   10.23    2.693  0.20( 0.12) 0.62      21.8      48.00
      5       55.63   10.38    2.671  0.20( 0.12) 0.62      22.0      14.00
      6       55.37   10.69    2.627  0.20( 0.13) 0.63      22.3      56.00
      7       55.03   10.99    2.585  0.20( 0.13) 0.63      22.6      42.00
      8       39.96   21.31    1.769  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      55.69    Tc(MIN.) =    10.23
  EFFECTIVE AREA(ACRES) =      21.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.69
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   2.63
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      21.81
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.69

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.531
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.51      0.20     0.100    75    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.61

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.095
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    75    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.47
  STREET FLOW TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =    9.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.749
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.16      SUBAREA RUNOFF(CFS) =     0.39
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.18

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.61
  FLOW VELOCITY(FEET/SEC.) =  1.85   DEPTH*VELOCITY(FT*FT/SEC.) =   0.49
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   2.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.18
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.07    9.35    2.836  0.20( 0.12) 0.61      19.7      52.00
      1       55.24    9.45    2.819  0.20( 0.12) 0.61      19.9      40.00
      1       55.45    9.72    2.774  0.20( 0.12) 0.61      20.4      46.00
      1       55.69   10.66    2.631  0.20( 0.12) 0.62      21.8      48.00
      1       55.63   10.81    2.610  0.20( 0.12) 0.62      22.0      14.00
      1       55.37   11.12    2.567  0.20( 0.13) 0.63      22.3      56.00
      1       55.03   11.43    2.528  0.20( 0.13) 0.63      22.6      42.00
      1       39.96   21.77    1.747  0.20( 0.13) 0.67      25.5      37.00
      2        1.61    6.38    3.531  0.20( 0.02) 0.10       0.5      60.00
      3        1.18    9.87    2.749  0.20( 0.02) 0.10       0.5      58.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       49.78    6.38    3.531  0.20( 0.12) 0.58      14.3      60.00
      2       57.52    9.35    2.836  0.20( 0.12) 0.59      20.7      52.00
      3       57.68    9.45    2.819  0.20( 0.12) 0.59      20.9      40.00
      4       57.88    9.72    2.774  0.20( 0.12) 0.59      21.4      46.00
      5       57.92    9.87    2.749  0.20( 0.12) 0.59      21.6      58.00
      6       58.02   10.66    2.631  0.20( 0.12) 0.60      22.8      48.00
      7       57.93   10.81    2.610  0.20( 0.12) 0.60      23.0      14.00
      8       57.64   11.12    2.567  0.20( 0.12) 0.60      23.3      56.00
      9       57.27   11.43    2.528  0.20( 0.12) 0.61      23.5      42.00
     10       41.50   21.77    1.747  0.20( 0.13) 0.65      26.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.02    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =      22.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       26.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.02
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   10.88
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.88   RAINFALL INTENSITY(INCH/HR) =  2.60
  EFFECTIVE AREA(ACRES) =    11.01
  TOTAL AREA(ACRES) =    12.79        PEAK FLOW RATE(CFS) =     28.00
  AREA-AVERAGED Fm(INCH/HR) =   0.12  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.60
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   2.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      11.01
  TOTAL STREAM AREA(ACRES) =      12.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.00

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.79

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.79
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    5.29
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.29
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       28.00   10.91    2.596  0.20( 0.12) 0.60      11.0      37.00
      2        2.79    5.29    3.931  0.20( 0.18) 0.90       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.69    5.29    3.931  0.20( 0.13) 0.64       6.1      64.00
      2       29.80   10.91    2.596  0.20( 0.12) 0.62      11.8      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.80    Tc(MIN.) =    10.91
  EFFECTIVE AREA(ACRES) =      11.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       13.6
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.00  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.490
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.55      0.20     0.100    75    6.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.244
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.283
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        0.62      0.20     1.000    93    7.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

```
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.829
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.21
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.15
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   12.92
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1          PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   7.73
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.39
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      14.38
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 4

DETENTION BASIN CALCULATIONS

WEST - AREA ‘A’

10-YR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  WEST AREA - NODE 33
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         35.80       18.00            75.       0.200       0.838

    TOTAL AREA (Acres) =     35.80

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.036

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.162
==========================================================================
```

```
**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 33, WEST AREA                                                    *
 ************************************************************************

  FILE NAME: W-33-10.DAT
  TIME/DATE OF STUDY: 19:38 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      35.800 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.126 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.036
         LOW LOSS FRACTION = 0.162
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  66.190


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.769	33.638
2	48.524	176.451
3	86.696	165.269
4	97.295	45.889
5	99.144	8.004
6	99.658	2.224
7	99.914	1.112
8	100.000	0.371

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.3282
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 9.6447

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 22.5 45.0 67.5 90.0
14.000	3.3914	7.22	. Q . V . . .
14.083	3.4423	7.39	. Q . V . . .
14.167	3.4946	7.59	. Q . V . . .
14.250	3.5484	7.80	. Q . V . . .
14.333	3.6036	8.02	. Q . V . . .
14.417	3.6604	8.25	. Q . V . . .
14.500	3.7189	8.49	. Q . V . . .
14.583	3.7792	8.76	. Q . V . . .
14.667	3.8415	9.05	. Q . V . . .
14.750	3.9059	9.35	. Q . V . . .
14.833	3.9727	9.70	. Q . V . . .
14.917	4.0420	10.07	. Q . V . . .
15.000	4.1142	10.49	. Q . V . . .
15.083	4.1896	10.94	. Q . V . . .
15.167	4.2685	11.46	. Q . V . . .
15.250	4.3514	12.04	. Q . V . . .
15.333	4.4390	12.72	. Q . V . . .
15.417	4.5306	13.30	. Q . V . . .
15.500	4.6218	13.25	. Q . V. . .
15.583	4.7141	13.40	. Q . V. . .
15.667	4.8142	14.53	. Q . V. . .
15.750	4.9263	16.27	. Q . V . . .
15.833	5.0581	19.14	. Q . V . . .
15.917	5.2172	23.10	. Q .V . . .
16.000	5.4243	30.08	. Q . V . . .
16.083	5.7513	47.48	. .Q V . . .
16.167	6.3321	84.33	. . V . Q .
16.250	6.8459	74.61	. . V . Q . .
16.333	7.0947	36.12	. Q . V. . .
16.417	7.2334	20.14	. Q . V. . .
16.500	7.3421	15.78	. Q . V . . .
16.583	7.4387	14.04	. Q . V . . .
16.667	7.5245	12.46	. Q . .V . . .
16.750	7.6016	11.19	. Q . .V . . .
16.833	7.6722	10.26	. Q . .V . . .
16.917	7.7377	9.51	. Q . . V . . .
17.000	7.7989	8.88	. Q . . V . . .
17.083	7.8564	8.35	. Q . . V . . .
17.167	7.9107	7.88	. Q . . V . . .
17.250	7.9621	7.47	. Q . . . V . .
17.333	8.0112	7.12	. Q . . . V . .
17.417	8.0581	6.81	. Q . . . V . .
17.500	8.1032	6.56	. Q . . . V . .
17.583	8.1469	6.34	. Q . . . V . .
17.667	8.1892	6.14	. Q . . . V . .
17.750	8.2303	5.96	. Q . . . . V .
17.833	8.2702	5.80	. Q . . . . V .
17.917	8.3091	5.65	. Q . . . . V .
18.000	8.3470	5.50	. Q . . . . V .

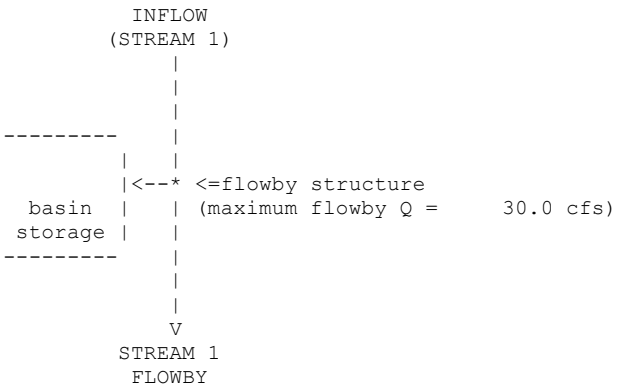
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	155.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

```
*****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-----------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
=============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
30.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.13	0.13	0.000
0.167	0.84	0.84	0.000
0.250	1.50	1.50	0.000
0.333	1.68	1.68	0.000
0.417	1.72	1.72	0.000
0.500	1.74	1.74	0.000
0.583	1.75	1.75	0.000
0.667	1.75	1.75	0.000
0.750	1.76	1.76	0.000
0.833	1.76	1.76	0.000
0.917	1.77	1.77	0.000
1.000	1.78	1.78	0.000
1.083	1.78	1.78	0.000
1.167	1.79	1.79	0.000
1.250	1.80	1.80	0.000
1.333	1.80	1.80	0.000
1.417	1.81	1.81	0.000
1.500	1.81	1.81	0.000
1.583	1.82	1.82	0.000
1.667	1.83	1.83	0.000
1.750	1.83	1.83	0.000

1.833	1.84	1.84	0.000
1.917	1.85	1.85	0.000
2.000	1.85	1.85	0.000
2.083	1.86	1.86	0.000
2.167	1.87	1.87	0.000
2.250	1.88	1.88	0.000
2.333	1.88	1.88	0.000
2.417	1.89	1.89	0.000
2.500	1.90	1.90	0.000
2.583	1.90	1.90	0.000
2.667	1.91	1.91	0.000
2.750	1.92	1.92	0.000
2.833	1.93	1.93	0.000
2.917	1.93	1.93	0.000
3.000	1.94	1.94	0.000
3.083	1.95	1.95	0.000
3.167	1.96	1.96	0.000
3.250	1.96	1.96	0.000
3.333	1.97	1.97	0.000
3.417	1.98	1.98	0.000
3.500	1.99	1.99	0.000
3.583	2.00	2.00	0.000
3.667	2.01	2.01	0.000
3.750	2.01	2.01	0.000
3.833	2.02	2.02	0.000
3.917	2.03	2.03	0.000
4.000	2.04	2.04	0.000
4.083	2.05	2.05	0.000
4.167	2.06	2.06	0.000
4.250	2.07	2.07	0.000
4.333	2.08	2.08	0.000
4.417	2.09	2.09	0.000
4.500	2.09	2.09	0.000
4.583	2.10	2.10	0.000
4.667	2.11	2.11	0.000
4.750	2.12	2.12	0.000
4.833	2.13	2.13	0.000
4.917	2.14	2.14	0.000
5.000	2.15	2.15	0.000
5.083	2.16	2.16	0.000
5.167	2.17	2.17	0.000
5.250	2.18	2.18	0.000
5.333	2.19	2.19	0.000
5.417	2.20	2.20	0.000
5.500	2.22	2.22	0.000
5.583	2.23	2.23	0.000
5.667	2.24	2.24	0.000
5.750	2.25	2.25	0.000
5.833	2.26	2.26	0.000
5.917	2.27	2.27	0.000
6.000	2.28	2.28	0.000
6.083	2.29	2.29	0.000
6.167	2.31	2.31	0.000
6.250	2.32	2.32	0.000
6.333	2.33	2.33	0.000
6.417	2.34	2.34	0.000
6.500	2.36	2.36	0.000
6.583	2.37	2.37	0.000
6.667	2.38	2.38	0.000
6.750	2.40	2.40	0.000
6.833	2.41	2.41	0.000
6.917	2.42	2.42	0.000
7.000	2.44	2.44	0.000
7.083	2.45	2.45	0.000
7.167	2.46	2.46	0.000
7.250	2.48	2.48	0.000
7.333	2.49	2.49	0.000
7.417	2.51	2.51	0.000
7.500	2.52	2.52	0.000
7.583	2.54	2.54	0.000
7.667	2.55	2.55	0.000

7.750	2.57	2.57	0.000
7.833	2.59	2.59	0.000
7.917	2.60	2.60	0.000
8.000	2.62	2.62	0.000
8.083	2.64	2.64	0.000
8.167	2.65	2.65	0.000
8.250	2.67	2.67	0.000
8.333	2.69	2.69	0.000
8.417	2.71	2.71	0.000
8.500	2.72	2.72	0.000
8.583	2.74	2.74	0.000
8.667	2.76	2.76	0.000
8.750	2.78	2.78	0.000
8.833	2.80	2.80	0.000
8.917	2.82	2.82	0.000
9.000	2.84	2.84	0.000
9.083	2.86	2.86	0.000
9.167	2.88	2.88	0.000
9.250	2.91	2.91	0.000
9.333	2.93	2.93	0.000
9.417	2.95	2.95	0.000
9.500	2.97	2.97	0.000
9.583	3.00	3.00	0.000
9.667	3.02	3.02	0.000
9.750	3.05	3.05	0.000
9.833	3.07	3.07	0.000
9.917	3.10	3.10	0.000
10.000	3.12	3.12	0.000
10.083	3.15	3.15	0.000
10.167	3.18	3.18	0.000
10.250	3.20	3.20	0.000
10.333	3.23	3.23	0.000
10.417	3.26	3.26	0.000
10.500	3.29	3.29	0.000
10.583	3.32	3.32	0.000
10.667	3.35	3.35	0.000
10.750	3.39	3.39	0.000
10.833	3.42	3.42	0.000
10.917	3.45	3.45	0.000
11.000	3.49	3.49	0.000
11.083	3.52	3.52	0.000
11.167	3.56	3.56	0.000
11.250	3.60	3.60	0.000
11.333	3.64	3.64	0.000
11.417	3.67	3.67	0.000
11.500	3.72	3.72	0.000
11.583	3.76	3.76	0.000
11.667	3.80	3.80	0.000
11.750	3.85	3.85	0.000
11.833	3.89	3.89	0.000
11.917	3.94	3.94	0.000
12.000	3.99	3.99	0.000
12.083	4.12	4.12	0.000
12.167	4.62	4.62	0.000
12.250	5.08	5.08	0.000
12.333	5.26	5.26	0.000
12.417	5.34	5.34	0.000
12.500	5.41	5.41	0.000
12.583	5.48	5.48	0.000
12.667	5.55	5.55	0.000
12.750	5.62	5.62	0.000
12.833	5.69	5.69	0.000
12.917	5.77	5.77	0.000
13.000	5.85	5.85	0.000
13.083	5.93	5.93	0.000
13.167	6.02	6.02	0.000
13.250	6.10	6.10	0.000
13.333	6.20	6.20	0.000
13.417	6.30	6.30	0.000
13.500	6.40	6.40	0.000
13.583	6.51	6.51	0.000

13.667	6.62	6.62	0.000
13.750	6.75	6.75	0.000
13.833	6.89	6.89	0.000
13.917	7.05	7.05	0.000
14.000	7.22	7.22	0.000
14.083	7.39	7.39	0.000
14.167	7.59	7.59	0.000
14.250	7.80	7.80	0.000
14.333	8.02	8.02	0.000
14.417	8.25	8.25	0.000
14.500	8.49	8.49	0.000
14.583	8.76	8.76	0.000
14.667	9.05	9.05	0.000
14.750	9.35	9.35	0.000
14.833	9.70	9.70	0.000
14.917	10.07	10.07	0.000
15.000	10.49	10.49	0.000
15.083	10.94	10.94	0.000
15.167	11.46	11.46	0.000
15.250	12.04	12.04	0.000
15.333	12.72	12.72	0.000
15.417	13.30	13.30	0.000
15.500	13.25	13.25	0.000
15.583	13.40	13.40	0.000
15.667	14.53	14.53	0.000
15.750	16.27	16.27	0.000
15.833	19.14	19.14	0.000
15.917	23.10	23.10	0.000
16.000	30.08	30.00	0.001
16.083	47.48	30.00	0.121
16.167	84.33	30.00	0.495
16.250	74.61	30.00	0.802
16.333	36.12	30.00	0.844
16.417	20.14	20.14	0.844
16.500	15.78	15.78	0.844
16.583	14.04	14.04	0.844
16.667	12.46	12.46	0.844
16.750	11.19	11.19	0.844
16.833	10.26	10.26	0.844
16.917	9.51	9.51	0.844
17.000	8.88	8.88	0.844
17.083	8.35	8.35	0.844
17.167	7.88	7.88	0.844
17.250	7.47	7.47	0.844
17.333	7.12	7.12	0.844
17.417	6.81	6.81	0.844
17.500	6.56	6.56	0.844
17.583	6.34	6.34	0.844
17.667	6.14	6.14	0.844
17.750	5.96	5.96	0.844
17.833	5.80	5.80	0.844
17.917	5.65	5.65	0.844
18.000	5.50	5.50	0.844
18.083	5.29	5.29	0.844
18.167	4.73	4.73	0.844
18.250	4.20	4.20	0.844
18.333	3.99	3.99	0.844
18.417	3.87	3.87	0.844
18.500	3.78	3.78	0.844
18.583	3.69	3.69	0.844
18.667	3.61	3.61	0.844
18.750	3.54	3.54	0.844
18.833	3.46	3.46	0.844
18.917	3.40	3.40	0.844
19.000	3.33	3.33	0.844
19.083	3.27	3.27	0.844
19.167	3.21	3.21	0.844
19.250	3.16	3.16	0.844
19.333	3.11	3.11	0.844
19.417	3.05	3.05	0.844
19.500	3.01	3.01	0.844

19.583	2.96	2.96	0.844
19.667	2.91	2.91	0.844
19.750	2.87	2.87	0.844
19.833	2.83	2.83	0.844
19.917	2.79	2.79	0.844
20.000	2.75	2.75	0.844
20.083	2.71	2.71	0.844
20.167	2.68	2.68	0.844
20.250	2.64	2.64	0.844
20.333	2.61	2.61	0.844
20.417	2.58	2.58	0.844
20.500	2.54	2.54	0.844
20.583	2.51	2.51	0.844
20.667	2.48	2.48	0.844
20.750	2.45	2.45	0.844
20.833	2.43	2.43	0.844
20.917	2.40	2.40	0.844
21.000	2.37	2.37	0.844
21.083	2.35	2.35	0.844
21.167	2.32	2.32	0.844
21.250	2.30	2.30	0.844
21.333	2.28	2.28	0.844
21.417	2.25	2.25	0.844
21.500	2.23	2.23	0.844
21.583	2.21	2.21	0.844
21.667	2.19	2.19	0.844
21.750	2.17	2.17	0.844
21.833	2.15	2.15	0.844
21.917	2.13	2.13	0.844
22.000	2.11	2.11	0.844
22.083	2.09	2.09	0.844
22.167	2.07	2.07	0.844
22.250	2.05	2.05	0.844
22.333	2.03	2.03	0.844
22.417	2.02	2.02	0.844
22.500	2.00	2.00	0.844
22.583	1.98	1.98	0.844
22.667	1.97	1.97	0.844
22.750	1.95	1.95	0.844
22.833	1.94	1.94	0.844
22.917	1.92	1.92	0.844
23.000	1.91	1.91	0.844
23.083	1.89	1.89	0.844
23.167	1.88	1.88	0.844
23.250	1.86	1.86	0.844
23.333	1.85	1.85	0.844
23.417	1.84	1.84	0.844
23.500	1.82	1.82	0.844
23.583	1.81	1.81	0.844
23.667	1.80	1.80	0.844
23.750	1.78	1.78	0.844
23.833	1.77	1.77	0.844
23.917	1.76	1.76	0.844
24.000	1.75	1.75	0.844

END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

EAST – AREA ‘A’

10-YR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  NODE 86 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         51.30       55.00            75.       0.200       0.635

    TOTAL AREA (Acres) =     51.30

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.110

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.365
==========================================================================
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```
**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 86, EAST AREA                                                    *
 ************************************************************************

  FILE NAME: E-86-10.DAT
  TIME/DATE OF STUDY: 16:36 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      51.300 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.129 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.110
         LOW LOSS FRACTION = 0.365
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  64.499


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.384	45.811
2	46.559	243.048
3	85.380	240.850
4	96.933	71.674
5	99.028	12.997
6	99.611	3.618
7	99.903	1.809
8	100.000	0.603

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 4.6322
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 11.0925

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	3.6791	7.74	.Q . V . . .
14.083	3.7335	7.90	.Q . V . . .
14.167	3.7892	8.09	.Q . V . . .
14.250	3.8462	8.28	.Q . V . . .
14.333	3.9046	8.48	.Q . V . . .
14.417	3.9644	8.68	.Q . V . . .
14.500	4.0258	8.91	.Q . V . . .
14.583	4.0888	9.15	.Q . V . . .
14.667	4.1536	9.41	.Q . V . . .
14.750	4.2204	9.70	.Q . V . . .
14.833	4.2901	10.11	. Q . V . . .
14.917	4.3631	10.60	. Q . V . . .
15.000	4.4401	11.19	. Q . V . . .
15.083	4.5217	11.83	. Q . V . . .
15.167	4.6083	12.58	. Q . V . . .
15.250	4.7006	13.40	. Q . V . . .
15.333	4.7996	14.37	. Q . V . . .
15.417	4.9043	15.20	. Q . V . . .
15.500	5.0087	15.17	. Q . V . . .
15.583	5.1145	15.35	. Q . V . . .
15.667	5.2309	16.90	. Q . V . . .
15.750	5.3643	19.37	. Q . V. . .
15.833	5.5254	23.40	. Q . V. . .
15.917	5.7253	29.02	. Q . V . .
16.000	5.9924	38.79	. Q . .V . .
16.083	6.4264	63.02	. . Q . V . .
16.167	7.2151	114.52	. . . Q V . .
16.250	7.9344	104.44	. . Q V . .
16.333	8.2779	49.88	. Q. . V. .
16.417	8.4553	25.75	. Q . . V .
16.500	8.5864	19.05	. Q . . V .
16.583	8.6997	16.45	. Q . . .V .
16.667	8.7971	14.14	. Q . . .V .
16.750	8.8817	12.29	. Q . . . V .
16.833	8.9572	10.96	. Q . . . V .
16.917	9.0261	10.00	.Q . . . V .
17.000	9.0904	9.33	.Q . . . V .
17.083	9.1511	8.82	.Q . . . V .
17.167	9.2088	8.38	.Q . . . V .
17.250	9.2639	8.00	.Q . . . V .
17.333	9.3167	7.67	.Q . . . V .
17.417	9.3676	7.38	.Q . . . V .
17.500	9.4166	7.12	.Q . . . V .
17.583	9.4641	6.89	.Q . . . V .
17.667	9.5101	6.68	.Q . . . V .
17.750	9.5547	6.48	.Q . . . V .
17.833	9.5981	6.30	.Q . . . V .
17.917	9.6404	6.14	.Q . . . V .
18.000	9.6816	5.98	.Q . . . V .

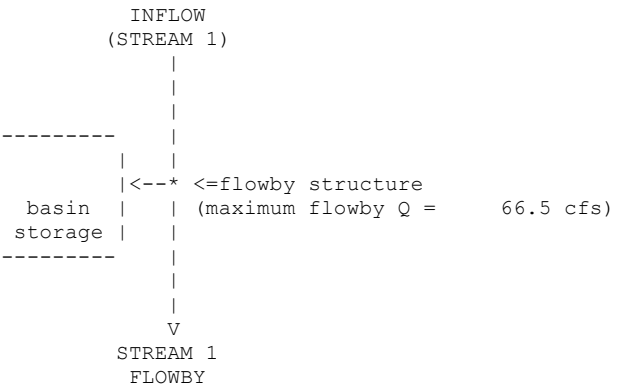
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	105.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

```
**************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
--------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
66.5 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.14	0.14	0.000
0.167	0.87	0.87	0.000
0.250	1.60	1.60	0.000
0.333	1.82	1.82	0.000
0.417	1.87	1.87	0.000
0.500	1.88	1.88	0.000
0.583	1.89	1.89	0.000
0.667	1.90	1.90	0.000
0.750	1.91	1.91	0.000
0.833	1.92	1.92	0.000
0.917	1.92	1.92	0.000
1.000	1.93	1.93	0.000
1.083	1.94	1.94	0.000
1.167	1.94	1.94	0.000
1.250	1.95	1.95	0.000
1.333	1.96	1.96	0.000
1.417	1.96	1.96	0.000
1.500	1.97	1.97	0.000
1.583	1.98	1.98	0.000
1.667	1.98	1.98	0.000
1.750	1.99	1.99	0.000

1.833	2.00	2.00	0.000
1.917	2.01	2.01	0.000
2.000	2.01	2.01	0.000
2.083	2.02	2.02	0.000
2.167	2.03	2.03	0.000
2.250	2.04	2.04	0.000
2.333	2.04	2.04	0.000
2.417	2.05	2.05	0.000
2.500	2.06	2.06	0.000
2.583	2.07	2.07	0.000
2.667	2.07	2.07	0.000
2.750	2.08	2.08	0.000
2.833	2.09	2.09	0.000
2.917	2.10	2.10	0.000
3.000	2.11	2.11	0.000
3.083	2.12	2.12	0.000
3.167	2.12	2.12	0.000
3.250	2.13	2.13	0.000
3.333	2.14	2.14	0.000
3.417	2.15	2.15	0.000
3.500	2.16	2.16	0.000
3.583	2.17	2.17	0.000
3.667	2.18	2.18	0.000
3.750	2.19	2.19	0.000
3.833	2.20	2.20	0.000
3.917	2.21	2.21	0.000
4.000	2.21	2.21	0.000
4.083	2.22	2.22	0.000
4.167	2.23	2.23	0.000
4.250	2.24	2.24	0.000
4.333	2.25	2.25	0.000
4.417	2.26	2.26	0.000
4.500	2.27	2.27	0.000
4.583	2.28	2.28	0.000
4.667	2.29	2.29	0.000
4.750	2.30	2.30	0.000
4.833	2.32	2.32	0.000
4.917	2.33	2.33	0.000
5.000	2.34	2.34	0.000
5.083	2.35	2.35	0.000
5.167	2.36	2.36	0.000
5.250	2.37	2.37	0.000
5.333	2.38	2.38	0.000
5.417	2.39	2.39	0.000
5.500	2.41	2.41	0.000
5.583	2.42	2.42	0.000
5.667	2.43	2.43	0.000
5.750	2.44	2.44	0.000
5.833	2.45	2.45	0.000
5.917	2.47	2.47	0.000
6.000	2.48	2.48	0.000
6.083	2.49	2.49	0.000
6.167	2.50	2.50	0.000
6.250	2.52	2.52	0.000
6.333	2.53	2.53	0.000
6.417	2.54	2.54	0.000
6.500	2.56	2.56	0.000
6.583	2.57	2.57	0.000
6.667	2.59	2.59	0.000
6.750	2.60	2.60	0.000
6.833	2.61	2.61	0.000
6.917	2.63	2.63	0.000
7.000	2.64	2.64	0.000
7.083	2.66	2.66	0.000
7.167	2.68	2.68	0.000
7.250	2.69	2.69	0.000
7.333	2.71	2.71	0.000
7.417	2.72	2.72	0.000
7.500	2.74	2.74	0.000
7.583	2.76	2.76	0.000
7.667	2.77	2.77	0.000

7.750	2.79	2.79	0.000
7.833	2.81	2.81	0.000
7.917	2.82	2.82	0.000
8.000	2.84	2.84	0.000
8.083	2.86	2.86	0.000
8.167	2.88	2.88	0.000
8.250	2.90	2.90	0.000
8.333	2.92	2.92	0.000
8.417	2.94	2.94	0.000
8.500	2.96	2.96	0.000
8.583	2.98	2.98	0.000
8.667	3.00	3.00	0.000
8.750	3.02	3.02	0.000
8.833	3.04	3.04	0.000
8.917	3.06	3.06	0.000
9.000	3.09	3.09	0.000
9.083	3.11	3.11	0.000
9.167	3.13	3.13	0.000
9.250	3.15	3.15	0.000
9.333	3.18	3.18	0.000
9.417	3.20	3.20	0.000
9.500	3.23	3.23	0.000
9.583	3.25	3.25	0.000
9.667	3.28	3.28	0.000
9.750	3.31	3.31	0.000
9.833	3.33	3.33	0.000
9.917	3.36	3.36	0.000
10.000	3.39	3.39	0.000
10.083	3.42	3.42	0.000
10.167	3.45	3.45	0.000
10.250	3.48	3.48	0.000
10.333	3.51	3.51	0.000
10.417	3.54	3.54	0.000
10.500	3.57	3.57	0.000
10.583	3.61	3.61	0.000
10.667	3.64	3.64	0.000
10.750	3.67	3.67	0.000
10.833	3.71	3.71	0.000
10.917	3.75	3.75	0.000
11.000	3.79	3.79	0.000
11.083	3.82	3.82	0.000
11.167	3.86	3.86	0.000
11.250	3.90	3.90	0.000
11.333	3.95	3.95	0.000
11.417	3.99	3.99	0.000
11.500	4.03	4.03	0.000
11.583	4.08	4.08	0.000
11.667	4.13	4.13	0.000
11.750	4.17	4.17	0.000
11.833	4.22	4.22	0.000
11.917	4.27	4.27	0.000
12.000	4.33	4.33	0.000
12.083	4.47	4.47	0.000
12.167	4.99	4.99	0.000
12.250	5.50	5.50	0.000
12.333	5.70	5.70	0.000
12.417	5.79	5.79	0.000
12.500	5.87	5.87	0.000
12.583	5.94	5.94	0.000
12.667	6.02	6.02	0.000
12.750	6.10	6.10	0.000
12.833	6.18	6.18	0.000
12.917	6.26	6.26	0.000
13.000	6.35	6.35	0.000
13.083	6.43	6.43	0.000
13.167	6.53	6.53	0.000
13.250	6.62	6.62	0.000
13.333	6.73	6.73	0.000
13.417	6.83	6.83	0.000
13.500	6.94	6.94	0.000
13.583	7.06	7.06	0.000

13.667	7.18	7.18	0.000
13.750	7.31	7.31	0.000
13.833	7.45	7.45	0.000
13.917	7.59	7.59	0.000
14.000	7.74	7.74	0.000
14.083	7.90	7.90	0.000
14.167	8.09	8.09	0.000
14.250	8.28	8.28	0.000
14.333	8.48	8.48	0.000
14.417	8.68	8.68	0.000
14.500	8.91	8.91	0.000
14.583	9.15	9.15	0.000
14.667	9.41	9.41	0.000
14.750	9.70	9.70	0.000
14.833	10.11	10.11	0.000
14.917	10.60	10.60	0.000
15.000	11.19	11.19	0.000
15.083	11.83	11.83	0.000
15.167	12.58	12.58	0.000
15.250	13.40	13.40	0.000
15.333	14.37	14.37	0.000
15.417	15.20	15.20	0.000
15.500	15.17	15.17	0.000
15.583	15.35	15.35	0.000
15.667	16.90	16.90	0.000
15.750	19.37	19.37	0.000
15.833	23.40	23.40	0.000
15.917	29.02	29.02	0.000
16.000	38.79	38.79	0.000
16.083	63.02	63.02	0.000
16.167	114.52	66.50	0.331
16.250	104.44	66.50	0.592
16.333	49.88	49.88	0.592
16.417	25.75	25.75	0.592
16.500	19.05	19.05	0.592
16.583	16.45	16.45	0.592
16.667	14.14	14.14	0.592
16.750	12.29	12.29	0.592
16.833	10.96	10.96	0.592
16.917	10.00	10.00	0.592
17.000	9.33	9.33	0.592
17.083	8.82	8.82	0.592
17.167	8.38	8.38	0.592
17.250	8.00	8.00	0.592
17.333	7.67	7.67	0.592
17.417	7.38	7.38	0.592
17.500	7.12	7.12	0.592
17.583	6.89	6.89	0.592
17.667	6.68	6.68	0.592
17.750	6.48	6.48	0.592
17.833	6.30	6.30	0.592
17.917	6.14	6.14	0.592
18.000	5.98	5.98	0.592
18.083	5.75	5.75	0.592
18.167	5.16	5.16	0.592
18.250	4.58	4.58	0.592
18.333	4.34	4.34	0.592
18.417	4.21	4.21	0.592
18.500	4.11	4.11	0.592
18.583	4.01	4.01	0.592
18.667	3.92	3.92	0.592
18.750	3.84	3.84	0.592
18.833	3.77	3.77	0.592
18.917	3.69	3.69	0.592
19.000	3.62	3.62	0.592
19.083	3.56	3.56	0.592
19.167	3.49	3.49	0.592
19.250	3.43	3.43	0.592
19.333	3.37	3.37	0.592
19.417	3.32	3.32	0.592
19.500	3.27	3.27	0.592

19.583	3.21	3.21	0.592
19.667	3.17	3.17	0.592
19.750	3.12	3.12	0.592
19.833	3.07	3.07	0.592
19.917	3.03	3.03	0.592
20.000	2.99	2.99	0.592
20.083	2.95	2.95	0.592
20.167	2.91	2.91	0.592
20.250	2.87	2.87	0.592
20.333	2.83	2.83	0.592
20.417	2.80	2.80	0.592
20.500	2.76	2.76	0.592
20.583	2.73	2.73	0.592
20.667	2.70	2.70	0.592
20.750	2.67	2.67	0.592
20.833	2.64	2.64	0.592
20.917	2.61	2.61	0.592
21.000	2.58	2.58	0.592
21.083	2.55	2.55	0.592
21.167	2.52	2.52	0.592
21.250	2.50	2.50	0.592
21.333	2.47	2.47	0.592
21.417	2.45	2.45	0.592
21.500	2.42	2.42	0.592
21.583	2.40	2.40	0.592
21.667	2.38	2.38	0.592
21.750	2.35	2.35	0.592
21.833	2.33	2.33	0.592
21.917	2.31	2.31	0.592
22.000	2.29	2.29	0.592
22.083	2.27	2.27	0.592
22.167	2.25	2.25	0.592
22.250	2.23	2.23	0.592
22.333	2.21	2.21	0.592
22.417	2.19	2.19	0.592
22.500	2.17	2.17	0.592
22.583	2.15	2.15	0.592
22.667	2.14	2.14	0.592
22.750	2.12	2.12	0.592
22.833	2.10	2.10	0.592
22.917	2.09	2.09	0.592
23.000	2.07	2.07	0.592
23.083	2.05	2.05	0.592
23.167	2.04	2.04	0.592
23.250	2.02	2.02	0.592
23.333	2.01	2.01	0.592
23.417	1.99	1.99	0.592
23.500	1.98	1.98	0.592
23.583	1.97	1.97	0.592
23.667	1.95	1.95	0.592
23.750	1.94	1.94	0.592
23.833	1.93	1.93	0.592
23.917	1.91	1.91	0.592
24.000	1.90	1.90	0.592

==========

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  NODE 193 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         25.40       49.00            75.       0.200       0.668

    TOTAL AREA (Acres) =     25.40

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.098

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.332
==========================================================================
```

```
**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 193, EAST AREA                                                   *
 ************************************************************************

  FILE NAME: E-193-10.DAT
  TIME/DATE OF STUDY: 17:05 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      25.400 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.126 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.098
         LOW LOSS FRACTION = 0.332
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  66.243


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.782	23.904
2	48.585	125.340
3	86.735	117.190
4	97.306	32.470
5	99.147	5.657
6	99.659	1.572
7	99.915	0.786
8	100.000	0.262

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.0766
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5.7094

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 15.0 30.0 45.0 60.0
14.000	1.9174	4.04	. Q . V . . .
14.083	1.9458	4.12	. Q . V . . .
14.167	1.9748	4.21	. Q . V . . .
14.250	2.0045	4.31	. Q . V . . .
14.333	2.0349	4.41	. Q . V . . .
14.417	2.0660	4.52	. Q . V . . .
14.500	2.0980	4.64	. Q . V . . .
14.583	2.1307	4.76	. Q . V . . .
14.667	2.1645	4.90	. Q . V . . .
14.750	2.1994	5.07	. Q . V . . .
14.833	2.2359	5.30	. Q . V . . .
14.917	2.2741	5.55	. Q . V . . .
15.000	2.3144	5.85	. Q . V . . .
15.083	2.3569	6.17	. Q . V . . .
15.167	2.4020	6.54	. Q . V . . .
15.250	2.4498	6.95	. Q . V . . .
15.333	2.5010	7.44	. Q . V . . .
15.417	2.5551	7.84	. Q . V . . .
15.500	2.6089	7.81	. Q . V . . .
15.583	2.6635	7.93	. Q . V . . .
15.667	2.7236	8.73	. Q . V. . .
15.750	2.7922	9.96	. Q . V. . .
15.833	2.8749	12.00	. Q . V . .
15.917	2.9769	14.82	. Q. V . .
16.000	3.1130	19.77	. . Q .V . .
16.083	3.3343	32.13	. . .Q V . .
16.167	3.7359	58.31	. . . V . Q .
16.250	4.0895	51.35	. . . V . Q .
16.333	4.2550	24.03	. . Q . V. .
16.417	4.3424	12.70	. Q . V . .
16.500	4.4086	9.61	. Q . V . .
16.583	4.4662	8.37	. Q . .V . .
16.667	4.5161	7.25	. Q . .V . .
16.750	4.5598	6.35	. Q . .V . .
16.833	4.5990	5.69	. Q . . V . .
16.917	4.6348	5.20	. Q . . V . .
17.000	4.6682	4.84	. Q . . V . .
17.083	4.6997	4.57	. Q . . V . .
17.167	4.7297	4.35	. Q . . . V . .
17.250	4.7583	4.16	. Q . . . V . .
17.333	4.7857	3.99	. Q . . . V . .
17.417	4.8122	3.84	. Q . . . V . .
17.500	4.8377	3.70	. Q . . . V . .
17.583	4.8624	3.58	. Q . . . V . .
17.667	4.8863	3.47	. Q . . . V . .
17.750	4.9095	3.37	. Q . . . V . .
17.833	4.9321	3.28	. Q . . . V . .
17.917	4.9541	3.19	. Q . . . V . .
18.000	4.9755	3.11	. Q . . . V . .

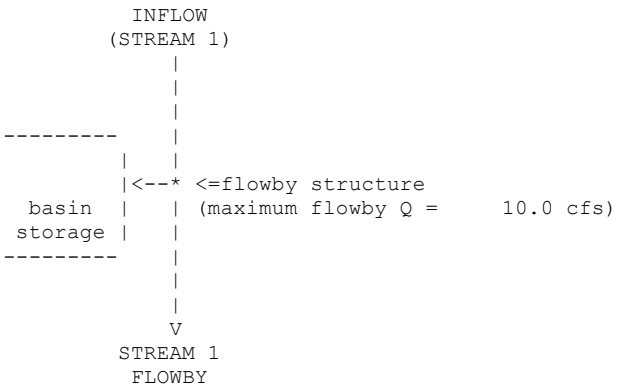
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	110.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

```
*******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-------------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
===============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
10.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.08	0.08	0.000
0.167	0.47	0.47	0.000
0.250	0.85	0.85	0.000
0.333	0.95	0.95	0.000
0.417	0.97	0.97	0.000
0.500	0.98	0.98	0.000
0.583	0.99	0.99	0.000
0.667	0.99	0.99	0.000
0.750	0.99	0.99	0.000
0.833	1.00	1.00	0.000
0.917	1.00	1.00	0.000
1.000	1.00	1.00	0.000
1.083	1.01	1.01	0.000
1.167	1.01	1.01	0.000
1.250	1.02	1.02	0.000
1.333	1.02	1.02	0.000
1.417	1.02	1.02	0.000
1.500	1.03	1.03	0.000
1.583	1.03	1.03	0.000
1.667	1.03	1.03	0.000
1.750	1.04	1.04	0.000

1.833	1.04	1.04	0.000
1.917	1.04	1.04	0.000
2.000	1.05	1.05	0.000
2.083	1.05	1.05	0.000
2.167	1.06	1.06	0.000
2.250	1.06	1.06	0.000
2.333	1.06	1.06	0.000
2.417	1.07	1.07	0.000
2.500	1.07	1.07	0.000
2.583	1.08	1.08	0.000
2.667	1.08	1.08	0.000
2.750	1.09	1.09	0.000
2.833	1.09	1.09	0.000
2.917	1.09	1.09	0.000
3.000	1.10	1.10	0.000
3.083	1.10	1.10	0.000
3.167	1.11	1.11	0.000
3.250	1.11	1.11	0.000
3.333	1.12	1.12	0.000
3.417	1.12	1.12	0.000
3.500	1.13	1.13	0.000
3.583	1.13	1.13	0.000
3.667	1.13	1.13	0.000
3.750	1.14	1.14	0.000
3.833	1.14	1.14	0.000
3.917	1.15	1.15	0.000
4.000	1.15	1.15	0.000
4.083	1.16	1.16	0.000
4.167	1.16	1.16	0.000
4.250	1.17	1.17	0.000
4.333	1.17	1.17	0.000
4.417	1.18	1.18	0.000
4.500	1.18	1.18	0.000
4.583	1.19	1.19	0.000
4.667	1.20	1.20	0.000
4.750	1.20	1.20	0.000
4.833	1.21	1.21	0.000
4.917	1.21	1.21	0.000
5.000	1.22	1.22	0.000
5.083	1.22	1.22	0.000
5.167	1.23	1.23	0.000
5.250	1.23	1.23	0.000
5.333	1.24	1.24	0.000
5.417	1.25	1.25	0.000
5.500	1.25	1.25	0.000
5.583	1.26	1.26	0.000
5.667	1.27	1.27	0.000
5.750	1.27	1.27	0.000
5.833	1.28	1.28	0.000
5.917	1.28	1.28	0.000
6.000	1.29	1.29	0.000
6.083	1.30	1.30	0.000
6.167	1.30	1.30	0.000
6.250	1.31	1.31	0.000
6.333	1.32	1.32	0.000
6.417	1.33	1.33	0.000
6.500	1.33	1.33	0.000
6.583	1.34	1.34	0.000
6.667	1.35	1.35	0.000
6.750	1.35	1.35	0.000
6.833	1.36	1.36	0.000
6.917	1.37	1.37	0.000
7.000	1.38	1.38	0.000
7.083	1.39	1.39	0.000
7.167	1.39	1.39	0.000
7.250	1.40	1.40	0.000
7.333	1.41	1.41	0.000
7.417	1.42	1.42	0.000
7.500	1.43	1.43	0.000
7.583	1.44	1.44	0.000
7.667	1.44	1.44	0.000

7.750	1.45	1.45	0.000
7.833	1.46	1.46	0.000
7.917	1.47	1.47	0.000
8.000	1.48	1.48	0.000
8.083	1.49	1.49	0.000
8.167	1.50	1.50	0.000
8.250	1.51	1.51	0.000
8.333	1.52	1.52	0.000
8.417	1.53	1.53	0.000
8.500	1.54	1.54	0.000
8.583	1.55	1.55	0.000
8.667	1.56	1.56	0.000
8.750	1.57	1.57	0.000
8.833	1.58	1.58	0.000
8.917	1.60	1.60	0.000
9.000	1.61	1.61	0.000
9.083	1.62	1.62	0.000
9.167	1.63	1.63	0.000
9.250	1.64	1.64	0.000
9.333	1.66	1.66	0.000
9.417	1.67	1.67	0.000
9.500	1.68	1.68	0.000
9.583	1.69	1.69	0.000
9.667	1.71	1.71	0.000
9.750	1.72	1.72	0.000
9.833	1.74	1.74	0.000
9.917	1.75	1.75	0.000
10.000	1.77	1.77	0.000
10.083	1.78	1.78	0.000
10.167	1.80	1.80	0.000
10.250	1.81	1.81	0.000
10.333	1.83	1.83	0.000
10.417	1.84	1.84	0.000
10.500	1.86	1.86	0.000
10.583	1.88	1.88	0.000
10.667	1.90	1.90	0.000
10.750	1.91	1.91	0.000
10.833	1.93	1.93	0.000
10.917	1.95	1.95	0.000
11.000	1.97	1.97	0.000
11.083	1.99	1.99	0.000
11.167	2.01	2.01	0.000
11.250	2.03	2.03	0.000
11.333	2.06	2.06	0.000
11.417	2.08	2.08	0.000
11.500	2.10	2.10	0.000
11.583	2.13	2.13	0.000
11.667	2.15	2.15	0.000
11.750	2.17	2.17	0.000
11.833	2.20	2.20	0.000
11.917	2.23	2.23	0.000
12.000	2.26	2.26	0.000
12.083	2.33	2.33	0.000
12.167	2.61	2.61	0.000
12.250	2.88	2.88	0.000
12.333	2.97	2.97	0.000
12.417	3.02	3.02	0.000
12.500	3.06	3.06	0.000
12.583	3.10	3.10	0.000
12.667	3.14	3.14	0.000
12.750	3.18	3.18	0.000
12.833	3.22	3.22	0.000
12.917	3.26	3.26	0.000
13.000	3.31	3.31	0.000
13.083	3.35	3.35	0.000
13.167	3.40	3.40	0.000
13.250	3.45	3.45	0.000
13.333	3.51	3.51	0.000
13.417	3.56	3.56	0.000
13.500	3.62	3.62	0.000
13.583	3.68	3.68	0.000

13.667	3.74	3.74	0.000
13.750	3.81	3.81	0.000
13.833	3.88	3.88	0.000
13.917	3.96	3.96	0.000
14.000	4.04	4.04	0.000
14.083	4.12	4.12	0.000
14.167	4.21	4.21	0.000
14.250	4.31	4.31	0.000
14.333	4.41	4.41	0.000
14.417	4.52	4.52	0.000
14.500	4.64	4.64	0.000
14.583	4.76	4.76	0.000
14.667	4.90	4.90	0.000
14.750	5.07	5.07	0.000
14.833	5.30	5.30	0.000
14.917	5.55	5.55	0.000
15.000	5.85	5.85	0.000
15.083	6.17	6.17	0.000
15.167	6.54	6.54	0.000
15.250	6.95	6.95	0.000
15.333	7.44	7.44	0.000
15.417	7.84	7.84	0.000
15.500	7.81	7.81	0.000
15.583	7.93	7.93	0.000
15.667	8.73	8.73	0.000
15.750	9.96	9.96	0.000
15.833	12.00	10.00	0.014
15.917	14.82	10.00	0.047
16.000	19.77	10.00	0.114
16.083	32.13	10.00	0.267
16.167	58.31	10.00	0.599
16.250	51.35	10.00	0.884
16.333	24.03	10.00	0.981
16.417	12.70	10.00	0.999
16.500	9.61	9.61	0.999
16.583	8.37	8.37	0.999
16.667	7.25	7.25	0.999
16.750	6.35	6.35	0.999
16.833	5.69	5.69	0.999
16.917	5.20	5.20	0.999
17.000	4.84	4.84	0.999
17.083	4.57	4.57	0.999
17.167	4.35	4.35	0.999
17.250	4.16	4.16	0.999
17.333	3.99	3.99	0.999
17.417	3.84	3.84	0.999
17.500	3.70	3.70	0.999
17.583	3.58	3.58	0.999
17.667	3.47	3.47	0.999
17.750	3.37	3.37	0.999
17.833	3.28	3.28	0.999
17.917	3.19	3.19	0.999
18.000	3.11	3.11	0.999
18.083	2.99	2.99	0.999
18.167	2.67	2.67	0.999
18.250	2.38	2.38	0.999
18.333	2.25	2.25	0.999
18.417	2.19	2.19	0.999
18.500	2.14	2.14	0.999
18.583	2.09	2.09	0.999
18.667	2.04	2.04	0.999
18.750	2.00	2.00	0.999
18.833	1.96	1.96	0.999
18.917	1.92	1.92	0.999
19.000	1.89	1.89	0.999
19.083	1.85	1.85	0.999
19.167	1.82	1.82	0.999
19.250	1.79	1.79	0.999
19.333	1.76	1.76	0.999
19.417	1.73	1.73	0.999
19.500	1.70	1.70	0.999

19.583	1.67	1.67	0.999
19.667	1.65	1.65	0.999
19.750	1.62	1.62	0.999
19.833	1.60	1.60	0.999
19.917	1.58	1.58	0.999
20.000	1.56	1.56	0.999
20.083	1.53	1.53	0.999
20.167	1.51	1.51	0.999
20.250	1.49	1.49	0.999
20.333	1.47	1.47	0.999
20.417	1.46	1.46	0.999
20.500	1.44	1.44	0.999
20.583	1.42	1.42	0.999
20.667	1.40	1.40	0.999
20.750	1.39	1.39	0.999
20.833	1.37	1.37	0.999
20.917	1.36	1.36	0.999
21.000	1.34	1.34	0.999
21.083	1.33	1.33	0.999
21.167	1.31	1.31	0.999
21.250	1.30	1.30	0.999
21.333	1.29	1.29	0.999
21.417	1.27	1.27	0.999
21.500	1.26	1.26	0.999
21.583	1.25	1.25	0.999
21.667	1.24	1.24	0.999
21.750	1.23	1.23	0.999
21.833	1.21	1.21	0.999
21.917	1.20	1.20	0.999
22.000	1.19	1.19	0.999
22.083	1.18	1.18	0.999
22.167	1.17	1.17	0.999
22.250	1.16	1.16	0.999
22.333	1.15	1.15	0.999
22.417	1.14	1.14	0.999
22.500	1.13	1.13	0.999
22.583	1.12	1.12	0.999
22.667	1.11	1.11	0.999
22.750	1.10	1.10	0.999
22.833	1.10	1.10	0.999
22.917	1.09	1.09	0.999
23.000	1.08	1.08	0.999
23.083	1.07	1.07	0.999
23.167	1.06	1.06	0.999
23.250	1.05	1.05	0.999
23.333	1.05	1.05	0.999
23.417	1.04	1.04	0.999
23.500	1.03	1.03	0.999
23.583	1.02	1.02	0.999
23.667	1.02	1.02	0.999
23.750	1.01	1.01	0.999
23.833	1.00	1.00	0.999
23.917	1.00	1.00	0.999
24.000	0.99	0.99	0.999

==========

END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

SOUTHEAST – AREA 'B'

10-YR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  10-YR STUDY
  SOUTHEAST - AREA 'B' - NODE 63
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.68 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         26.50       60.00            75.       0.200       0.608

    TOTAL AREA (Acres) =     26.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.120

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.392
==========================================================================
```

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**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 10-YR STUDY, FLOW-BY BASIN CALCS                                      *
* NODE 63, SOUTHEAST AREA                                               *
 ************************************************************************

  FILE NAME: SE-63-10.DAT
  TIME/DATE OF STUDY: 19:13 01/10/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      26.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.132 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =   10-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.120
         LOW LOSS FRACTION = 0.392
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.34
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.72
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.95
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  1.59
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  2.20
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  3.68

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  63.275


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.112	22.794
2	45.120	121.810
3	84.354	125.737
4	96.628	39.336
5	98.932	7.387
6	99.524	1.896
7	99.810	0.915
8	99.952	0.458
9	100.000	0.153

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.5780
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 5.5454

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 15.0 30.0 45.0 60.0
14.000	1.8187	3.83	. Q . V . . .
14.083	1.8456	3.91	. Q . V . . .
14.167	1.8731	3.99	. Q . V . . .
14.250	1.9013	4.09	. Q . V . . .
14.333	1.9301	4.18	. Q . V . . .
14.417	1.9596	4.29	. Q . V . . .
14.500	1.9899	4.40	. Q . V . . .
14.583	2.0210	4.51	. Q . V . . .
14.667	2.0529	4.64	. Q . V . . .
14.750	2.0859	4.79	. Q . V . . .
14.833	2.1201	4.97	. Q . V . . .
14.917	2.1559	5.20	. Q . V . . .
15.000	2.1938	5.49	. Q . V . . .
15.083	2.2339	5.83	. Q . V . . .
15.167	2.2767	6.21	. Q . V . . .
15.250	2.3223	6.63	. Q . V . . .
15.333	2.3714	7.13	. Q . V . . .
15.417	2.4235	7.57	. Q . V . . .
15.500	2.4757	7.57	. Q . V . . .
15.583	2.5285	7.66	. Q . V . . .
15.667	2.5867	8.45	. Q . V . . .
15.750	2.6535	9.71	. Q . V. . .
15.833	2.7346	11.76	. Q . V. . .
15.917	2.8355	14.65	. Q. V . .
16.000	2.9706	19.62	. . Q .V . .
16.083	3.1903	31.90	. . .Q V . .
16.167	3.5899	58.02	. . . V . Q .
16.250	3.9634	54.23	. . . V . Q .
16.333	4.1445	26.30	. . Q . V. .
16.417	4.2364	13.35	. Q . . V .
16.500	4.3028	9.64	. Q . . .V .
16.583	4.3597	8.27	. Q . . .V .
16.667	4.4087	7.11	. Q . . .V .
16.750	4.4511	6.15	. Q . . . V .
16.833	4.4884	5.42	. Q . . . V .
16.917	4.5224	4.94	. Q . . . V .
17.000	4.5542	4.61	. Q . . . V .
17.083	4.5842	4.36	. Q . . . V .
17.167	4.6128	4.15	. Q . . . V .
17.250	4.6401	3.96	. Q . . . V .
17.333	4.6663	3.80	. Q . . . V .
17.417	4.6914	3.66	. Q . . . V .
17.500	4.7157	3.53	. Q . . . V .
17.583	4.7392	3.41	. Q . . . V .
17.667	4.7620	3.31	. Q . . . V .
17.750	4.7841	3.21	. Q . . . V .
17.833	4.8056	3.12	. Q . . . V .
17.917	4.8265	3.04	. Q . . . V .
18.000	4.8469	2.96	.Q . . . V .

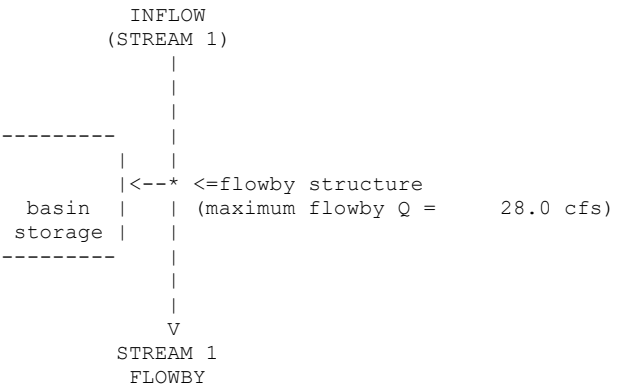
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	105.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

```
*******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-------------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
===============================================================================
```

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
28.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.07	0.07	0.000
0.167	0.42	0.42	0.000
0.250	0.78	0.78	0.000
0.333	0.90	0.90	0.000
0.417	0.92	0.92	0.000
0.500	0.93	0.93	0.000
0.583	0.94	0.94	0.000
0.667	0.94	0.94	0.000
0.750	0.94	0.94	0.000
0.833	0.95	0.95	0.000
0.917	0.95	0.95	0.000
1.000	0.95	0.95	0.000
1.083	0.96	0.96	0.000
1.167	0.96	0.96	0.000
1.250	0.96	0.96	0.000
1.333	0.97	0.97	0.000
1.417	0.97	0.97	0.000
1.500	0.97	0.97	0.000
1.583	0.98	0.98	0.000
1.667	0.98	0.98	0.000
1.750	0.98	0.98	0.000

1.833	0.99	0.99	0.000
1.917	0.99	0.99	0.000
2.000	1.00	1.00	0.000
2.083	1.00	1.00	0.000
2.167	1.00	1.00	0.000
2.250	1.01	1.01	0.000
2.333	1.01	1.01	0.000
2.417	1.01	1.01	0.000
2.500	1.02	1.02	0.000
2.583	1.02	1.02	0.000
2.667	1.03	1.03	0.000
2.750	1.03	1.03	0.000
2.833	1.03	1.03	0.000
2.917	1.04	1.04	0.000
3.000	1.04	1.04	0.000
3.083	1.05	1.05	0.000
3.167	1.05	1.05	0.000
3.250	1.05	1.05	0.000
3.333	1.06	1.06	0.000
3.417	1.06	1.06	0.000
3.500	1.07	1.07	0.000
3.583	1.07	1.07	0.000
3.667	1.08	1.08	0.000
3.750	1.08	1.08	0.000
3.833	1.09	1.09	0.000
3.917	1.09	1.09	0.000
4.000	1.10	1.10	0.000
4.083	1.10	1.10	0.000
4.167	1.10	1.10	0.000
4.250	1.11	1.11	0.000
4.333	1.11	1.11	0.000
4.417	1.12	1.12	0.000
4.500	1.12	1.12	0.000
4.583	1.13	1.13	0.000
4.667	1.13	1.13	0.000
4.750	1.14	1.14	0.000
4.833	1.15	1.15	0.000
4.917	1.15	1.15	0.000
5.000	1.16	1.16	0.000
5.083	1.16	1.16	0.000
5.167	1.17	1.17	0.000
5.250	1.17	1.17	0.000
5.333	1.18	1.18	0.000
5.417	1.18	1.18	0.000
5.500	1.19	1.19	0.000
5.583	1.20	1.20	0.000
5.667	1.20	1.20	0.000
5.750	1.21	1.21	0.000
5.833	1.21	1.21	0.000
5.917	1.22	1.22	0.000
6.000	1.23	1.23	0.000
6.083	1.23	1.23	0.000
6.167	1.24	1.24	0.000
6.250	1.24	1.24	0.000
6.333	1.25	1.25	0.000
6.417	1.26	1.26	0.000
6.500	1.27	1.27	0.000
6.583	1.27	1.27	0.000
6.667	1.28	1.28	0.000
6.750	1.29	1.29	0.000
6.833	1.29	1.29	0.000
6.917	1.30	1.30	0.000
7.000	1.31	1.31	0.000
7.083	1.32	1.32	0.000
7.167	1.32	1.32	0.000
7.250	1.33	1.33	0.000
7.333	1.34	1.34	0.000
7.417	1.35	1.35	0.000
7.500	1.35	1.35	0.000
7.583	1.36	1.36	0.000
7.667	1.37	1.37	0.000

7.750	1.38	1.38	0.000
7.833	1.39	1.39	0.000
7.917	1.40	1.40	0.000
8.000	1.41	1.41	0.000
8.083	1.41	1.41	0.000
8.167	1.42	1.42	0.000
8.250	1.43	1.43	0.000
8.333	1.44	1.44	0.000
8.417	1.45	1.45	0.000
8.500	1.46	1.46	0.000
8.583	1.47	1.47	0.000
8.667	1.48	1.48	0.000
8.750	1.49	1.49	0.000
8.833	1.50	1.50	0.000
8.917	1.51	1.51	0.000
9.000	1.53	1.53	0.000
9.083	1.54	1.54	0.000
9.167	1.55	1.55	0.000
9.250	1.56	1.56	0.000
9.333	1.57	1.57	0.000
9.417	1.58	1.58	0.000
9.500	1.60	1.60	0.000
9.583	1.61	1.61	0.000
9.667	1.62	1.62	0.000
9.750	1.63	1.63	0.000
9.833	1.65	1.65	0.000
9.917	1.66	1.66	0.000
10.000	1.68	1.68	0.000
10.083	1.69	1.69	0.000
10.167	1.70	1.70	0.000
10.250	1.72	1.72	0.000
10.333	1.73	1.73	0.000
10.417	1.75	1.75	0.000
10.500	1.77	1.77	0.000
10.583	1.78	1.78	0.000
10.667	1.80	1.80	0.000
10.750	1.82	1.82	0.000
10.833	1.83	1.83	0.000
10.917	1.85	1.85	0.000
11.000	1.87	1.87	0.000
11.083	1.89	1.89	0.000
11.167	1.91	1.91	0.000
11.250	1.93	1.93	0.000
11.333	1.95	1.95	0.000
11.417	1.97	1.97	0.000
11.500	1.99	1.99	0.000
11.583	2.02	2.02	0.000
11.667	2.04	2.04	0.000
11.750	2.06	2.06	0.000
11.833	2.09	2.09	0.000
11.917	2.11	2.11	0.000
12.000	2.14	2.14	0.000
12.083	2.21	2.21	0.000
12.167	2.46	2.46	0.000
12.250	2.71	2.71	0.000
12.333	2.82	2.82	0.000
12.417	2.86	2.86	0.000
12.500	2.90	2.90	0.000
12.583	2.94	2.94	0.000
12.667	2.98	2.98	0.000
12.750	3.01	3.01	0.000
12.833	3.05	3.05	0.000
12.917	3.09	3.09	0.000
13.000	3.14	3.14	0.000
13.083	3.18	3.18	0.000
13.167	3.23	3.23	0.000
13.250	3.27	3.27	0.000
13.333	3.33	3.33	0.000
13.417	3.38	3.38	0.000
13.500	3.43	3.43	0.000
13.583	3.49	3.49	0.000

13.667	3.55	3.55	0.000
13.750	3.61	3.61	0.000
13.833	3.68	3.68	0.000
13.917	3.75	3.75	0.000
14.000	3.83	3.83	0.000
14.083	3.91	3.91	0.000
14.167	3.99	3.99	0.000
14.250	4.09	4.09	0.000
14.333	4.18	4.18	0.000
14.417	4.29	4.29	0.000
14.500	4.40	4.40	0.000
14.583	4.51	4.51	0.000
14.667	4.64	4.64	0.000
14.750	4.79	4.79	0.000
14.833	4.97	4.97	0.000
14.917	5.20	5.20	0.000
15.000	5.49	5.49	0.000
15.083	5.83	5.83	0.000
15.167	6.21	6.21	0.000
15.250	6.63	6.63	0.000
15.333	7.13	7.13	0.000
15.417	7.57	7.57	0.000
15.500	7.57	7.57	0.000
15.583	7.66	7.66	0.000
15.667	8.45	8.45	0.000
15.750	9.71	9.71	0.000
15.833	11.76	11.76	0.000
15.917	14.65	14.65	0.000
16.000	19.62	19.62	0.000
16.083	31.90	28.00	0.027
16.167	58.02	28.00	0.234
16.250	54.23	28.00	0.414
16.333	26.30	26.30	0.414
16.417	13.35	13.35	0.414
16.500	9.64	9.64	0.414
16.583	8.27	8.27	0.414
16.667	7.11	7.11	0.414
16.750	6.15	6.15	0.414
16.833	5.42	5.42	0.414
16.917	4.94	4.94	0.414
17.000	4.61	4.61	0.414
17.083	4.36	4.36	0.414
17.167	4.15	4.15	0.414
17.250	3.96	3.96	0.414
17.333	3.80	3.80	0.414
17.417	3.66	3.66	0.414
17.500	3.53	3.53	0.414
17.583	3.41	3.41	0.414
17.667	3.31	3.31	0.414
17.750	3.21	3.21	0.414
17.833	3.12	3.12	0.414
17.917	3.04	3.04	0.414
18.000	2.96	2.96	0.414
18.083	2.85	2.85	0.414
18.167	2.56	2.56	0.414
18.250	2.28	2.28	0.414
18.333	2.15	2.15	0.414
18.417	2.08	2.08	0.414
18.500	2.03	2.03	0.414
18.583	1.99	1.99	0.414
18.667	1.94	1.94	0.414
18.750	1.90	1.90	0.414
18.833	1.86	1.86	0.414
18.917	1.83	1.83	0.414
19.000	1.79	1.79	0.414
19.083	1.76	1.76	0.414
19.167	1.73	1.73	0.414
19.250	1.70	1.70	0.414
19.333	1.67	1.67	0.414
19.417	1.64	1.64	0.414
19.500	1.62	1.62	0.414

19.583	1.59	1.59	0.414
19.667	1.57	1.57	0.414
19.750	1.54	1.54	0.414
19.833	1.52	1.52	0.414
19.917	1.50	1.50	0.414
20.000	1.48	1.48	0.414
20.083	1.46	1.46	0.414
20.167	1.44	1.44	0.414
20.250	1.42	1.42	0.414
20.333	1.40	1.40	0.414
20.417	1.38	1.38	0.414
20.500	1.37	1.37	0.414
20.583	1.35	1.35	0.414
20.667	1.34	1.34	0.414
20.750	1.32	1.32	0.414
20.833	1.30	1.30	0.414
20.917	1.29	1.29	0.414
21.000	1.28	1.28	0.414
21.083	1.26	1.26	0.414
21.167	1.25	1.25	0.414
21.250	1.24	1.24	0.414
21.333	1.22	1.22	0.414
21.417	1.21	1.21	0.414
21.500	1.20	1.20	0.414
21.583	1.19	1.19	0.414
21.667	1.18	1.18	0.414
21.750	1.16	1.16	0.414
21.833	1.15	1.15	0.414
21.917	1.14	1.14	0.414
22.000	1.13	1.13	0.414
22.083	1.12	1.12	0.414
22.167	1.11	1.11	0.414
22.250	1.10	1.10	0.414
22.333	1.09	1.09	0.414
22.417	1.08	1.08	0.414
22.500	1.07	1.07	0.414
22.583	1.07	1.07	0.414
22.667	1.06	1.06	0.414
22.750	1.05	1.05	0.414
22.833	1.04	1.04	0.414
22.917	1.03	1.03	0.414
23.000	1.02	1.02	0.414
23.083	1.02	1.02	0.414
23.167	1.01	1.01	0.414
23.250	1.00	1.00	0.414
23.333	0.99	0.99	0.414
23.417	0.99	0.99	0.414
23.500	0.98	0.98	0.414
23.583	0.97	0.97	0.414
23.667	0.97	0.97	0.414
23.750	0.96	0.96	0.414
23.833	0.95	0.95	0.414
23.917	0.95	0.95	0.414
24.000	0.94	0.94	0.414

==========

END OF FLOODSCx ROUTING ANALYSIS

SECTION 5

HYDROLOGY CALCULATIONS

EXISTING CONDITION

WEST – AREAS ‘A’, ‘B’ & ‘C’

100-YR STUDY

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                        Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* EXISTING - WEST - AREAS 'A', 'B' & 'C'                                *
 ***********************************************************************

  FILE NAME: WEST-E.DAT
  TIME/DATE OF STUDY: 18:35 11/06/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    514.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.241
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.890
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.11      0.20     1.000    98   11.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.69
  TOTAL AREA(ACRES) =      1.11   PEAK FLOW RATE(CFS) =      3.69

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    497.30
 CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0269
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.634
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        6.99      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.50
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.31
 AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   1.41
 Tc(MIN.) =   12.65
 SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =   21.61
 EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      25.04

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.48   FLOW VELOCITY(FEET/SEC.) =   8.80
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     920.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.30  DOWNSTREAM(FEET) =   492.00
 FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN 132.0 INCH PIPE IS   7.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.74
 GIVEN PIPE DIAMETER(INCH) = 132.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.04
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   12.85
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1055.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    479.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0255
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.475
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.16      0.20     1.000    98
 COMMERCIAL                  D        1.06      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.915
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.15
 AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   0.84
 Tc(MIN.) =   13.68
 SUBAREA AREA(ACRES) =    11.22       SUBAREA RUNOFF(CFS) =   33.24
 EFFECTIVE AREA(ACRES) =     19.32     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.95
```

```
  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      57.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =  11.25
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    479.00  DOWNSTREAM(FEET) =    453.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0261
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.297
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D       40.34      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     113.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.38
  AVERAGE FLOW DEPTH(FEET) =   0.79   TRAVEL TIME(MIN.) =   1.32
  Tc(MIN.) =   15.00
  SUBAREA AREA(ACRES) =    40.34       SUBAREA RUNOFF(CFS) =  112.42
  EFFECTIVE AREA(ACRES) =     59.66     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.98
  TOTAL AREA(ACRES) =       59.7         PEAK FLOW RATE(CFS) =     166.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =  14.05
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    524.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.414
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.25      0.20     0.100    91    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  497.50
  STREET LENGTH(FEET) =   980.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   18.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   3.96   Tc(MIN.) =   10.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.097
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.69      0.20     0.100    91
  NATURAL POOR COVER
  "BARREN"                   D        5.71      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.903
  SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =   22.56
  EFFECTIVE AREA(ACRES) =      6.65    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      23.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  25.32
  FLOW VELOCITY(FEET/SEC.) =  4.78   DEPTH*VELOCITY(FT*FT/SEC.) =   2.55
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  980.0 FT WITH ELEVATION-DROP =  19.5 FT, IS   22.3 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE     13.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.47
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.981
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    91
  NATURAL POOR COVER
  "BARREN"                   D        2.51      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.962
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    8.93
  EFFECTIVE AREA(ACRES) =      9.27   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3       PEAK FLOW RATE(CFS) =      31.71

****************************************************************************
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 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.97
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.71
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   11.33
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =    1960.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.33
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.873
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.19      0.20     0.100    91
 NATURAL POOR COVER
 "BARREN"                   D        8.58      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.981
 SUBAREA AREA(ACRES) =    8.77      SUBAREA RUNOFF(CFS) =   29.02
 EFFECTIVE AREA(ACRES) =     18.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
 TOTAL AREA(ACRES) =       18.0       PEAK FLOW RATE(CFS) =      59.84

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
 FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      59.84
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   11.75
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =    2160.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.75
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.793
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                   D        2.69      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    2.69      SUBAREA RUNOFF(CFS) =    8.70
 EFFECTIVE AREA(ACRES) =     20.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =       20.7       PEAK FLOW RATE(CFS) =      67.23

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.50  DOWNSTREAM(FEET) =    503.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.337
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.402
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    91    6.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.40

********************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  61
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  503.50  DOWNSTREAM ELEVATION(FEET) =  498.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.93
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =    8.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.698
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.25      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    1.05
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.27
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     540.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.50  DOWNSTREAM(FEET) =    484.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   590.00   CHANNEL SLOPE =  0.0246
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.060
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        2.57      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
 AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   2.34
 Tc(MIN.) =   10.43
 SUBAREA AREA(ACRES) =     2.57       SUBAREA RUNOFF(CFS) =    8.93
 EFFECTIVE AREA(ACRES) =      3.11     AREA-AVERAGED Fm(INCH/HR) =   0.17
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.84
 TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =      10.89

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.85   FLOW VELOCITY(FEET/SEC.) =   4.75
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1130.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    465.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0194
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.416
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       12.90      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.45
 AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   3.67
 Tc(MIN.) =   14.10
 SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   37.34
 EFFECTIVE AREA(ACRES) =     16.01     AREA-AVERAGED Fm(INCH/HR) =   0.19
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.97
 TOTAL AREA(ACRES) =       16.0         PEAK FLOW RATE(CFS) =      46.43

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.94   FLOW VELOCITY(FEET/SEC.) =   5.07
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =    2110.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       16.0  TC(MIN.) =     14.10
 EFFECTIVE AREA(ACRES) =     16.01  AREA-AVERAGED Fm(INCH/HR)=  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.970
 PEAK FLOW RATE(CFS)   =      46.43
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

EAST – AREA 'A'

100-YR STUDY

```
******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                            *
* 100-YR STUDY                                                           *
* EXISTING - EAST - AREA 'A'                                             *
 ***********************************************************************

  FILE NAME: EAST-E.DAT
  TIME/DATE OF STUDY: 11:00 10/30/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    523.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.149
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.124
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.00      0.20     1.000    98   10.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.53
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      3.53

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    499.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   460.00   CHANNEL SLOPE =  0.0304
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.916
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        2.55      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.80
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.98
 AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.96
 Tc(MIN.) =   11.11
 SUBAREA AREA(ACRES) =     2.55       SUBAREA RUNOFF(CFS) =    8.53
 EFFECTIVE AREA(ACRES) =      3.55     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =      11.87

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =   8.84
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   805.00   CHANNEL SLOPE =  0.0484
 CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.570
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D        4.63      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.90
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.89
 AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   1.95
 Tc(MIN.) =   13.06
 SUBAREA AREA(ACRES) =     4.63       SUBAREA RUNOFF(CFS) =   14.04
 EFFECTIVE AREA(ACRES) =      8.18     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =        8.2         PEAK FLOW RATE(CFS) =      24.81

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =   7.40
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1565.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    396.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1695.00   CHANNEL SLOPE =  0.0378
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   5.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.111
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       74.55      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     122.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.98
  AVERAGE FLOW DEPTH(FEET) =   1.02   TRAVEL TIME(MIN.) =   3.54
  Tc(MIN.) =   16.60
  SUBAREA AREA(ACRES) =    74.55       SUBAREA RUNOFF(CFS) =  195.33
  EFFECTIVE AREA(ACRES) =     82.73     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       82.7         PEAK FLOW RATE(CFS) =     216.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.37   FLOW VELOCITY(FEET/SEC.) =   9.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.60
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.111
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       51.42      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =   51.42      SUBAREA RUNOFF(CFS) =  134.73
  EFFECTIVE AREA(ACRES) =    134.15   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      134.1       PEAK FLOW RATE(CFS) =     351.49
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      134.1  TC(MIN.) =     16.60
  EFFECTIVE AREA(ACRES) =    134.15  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =     351.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

EXISTING CONDITION

SOUTHEAST – AREA 'B'

100-YR STUDY

```
******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* EXISTING - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: S-EAST-E.DAT
  TIME/DATE OF STUDY: 12:43 11/04/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.217
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.014
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        0.63      0.20     1.000    98    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.73

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    391.70
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1275.00   CHANNEL SLOPE =  0.0418
 CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.253
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       13.35      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      27.27
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.85
 AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.40
 Tc(MIN.) =    9.62
 SUBAREA AREA(ACRES) =    13.35       SUBAREA RUNOFF(CFS) =   48.70
 EFFECTIVE AREA(ACRES) =     13.98     AREA-AVERAGED Fm(INCH/HR) =   0.20
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       14.0          PEAK FLOW RATE(CFS) =      51.00

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =  11.26
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1575.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.912
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.593
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "BARREN"                    D        2.21      0.20     1.000    98   12.91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      6.75
 TOTAL AREA(ACRES) =      2.21   PEAK FLOW RATE(CFS) =      6.75

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    404.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.0094
 CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.032
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL POOR COVER
 "BARREN"                    D       10.49      0.20     1.000    98
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.19
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.58
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   4.45
  Tc(MIN.) =   17.36
  SUBAREA AREA(ACRES) =    10.49       SUBAREA RUNOFF(CFS) =   26.74
  EFFECTIVE AREA(ACRES) =     12.70     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       12.7         PEAK FLOW RATE(CFS) =      32.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   4.12
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1255.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    404.00  DOWNSTREAM(FEET) =    388.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   710.00   CHANNEL SLOPE =  0.0225
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.851
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        7.61      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      41.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.02
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   1.97
  Tc(MIN.) =   19.33
  SUBAREA AREA(ACRES) =     7.61       SUBAREA RUNOFF(CFS) =   18.16
  EFFECTIVE AREA(ACRES) =     20.31     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       20.3         PEAK FLOW RATE(CFS) =      48.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =   6.32
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.820
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.53      0.20     1.000    98    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.20
  TOTAL AREA(ACRES) =      0.53   PEAK FLOW RATE(CFS) =      2.20

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    401.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1430.00   CHANNEL SLOPE =  0.0413
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.597
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       14.88      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.62
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   5.15
  Tc(MIN.) =   12.89
  SUBAREA AREA(ACRES) =    14.88       SUBAREA RUNOFF(CFS) =   45.49
  EFFECTIVE AREA(ACRES) =     15.41     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       15.4         PEAK FLOW RATE(CFS) =      47.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   5.50
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1730.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.4  TC(MIN.) =     12.89
  EFFECTIVE AREA(ACRES) =     15.41  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      47.11
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 6

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

WEST

Areas “A”, “B” & “C”

100-YEAR STUDY

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3, BREA CENTRAL                                           *
* 100-YR STUDY                                                         *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                             *
 ************************************************************************

  FILE NAME: WEST-A.DAT
  TIME/DATE OF STUDY: 18:21 01/09/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.851
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20      0.200    91    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.06
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      6.06

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.06
 PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =    8.81
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.81
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.472
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   17.35
 EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      22.93

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.93
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    9.48
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.48
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.289
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   17.44
 EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      39.42

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.82
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.42
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.069
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.18
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.37
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.75
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.01
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.48

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.32
  RAINFALL INTENSITY(INCH/HR) =   4.62
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.42   10.19    4.114  0.20( 0.04) 0.20      10.3       1.00
      2        3.48    8.32    4.621  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.67    8.32    4.621  0.20( 0.04) 0.19       9.3       5.00
      2       42.52   10.19    4.114  0.20( 0.04) 0.19      11.1       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      42.52    Tc(MIN.) =    10.19
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.10
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.52
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.29
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.29
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      42.52

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.414
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20      0.100    91    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.45
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      3.45

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.55
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
 STREET FLOW TRAVEL TIME(MIN.) =   3.53   Tc(MIN.) =    9.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.197
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    6.17
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.68
 FLOW VELOCITY(FEET/SEC.) =  3.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       39.67    8.42    4.589  0.20( 0.04) 0.19       9.3       5.00
     1       42.52   10.29    4.091  0.20( 0.04) 0.19      11.1       1.00
     2        8.83    9.84    4.197  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       47.94    8.42    4.589  0.20( 0.03) 0.17      11.3       5.00
     2       50.67    9.84    4.197  0.20( 0.04) 0.18      13.0       8.00
     3       51.13   10.29    4.091  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      51.13    Tc(MIN.) =    10.29
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.13
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      51.13

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.96
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      2.96

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   3.50   Tc(MIN.) =   10.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.032
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.62
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   4.03
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       47.94    8.57    4.542  0.20( 0.03) 0.17      11.3       5.00
      1       50.67    9.99    4.161  0.20( 0.04) 0.18      13.0       8.00
      1       51.13   10.44    4.057  0.20( 0.04) 0.18      13.5       1.00
      2        7.62   10.56    4.032  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    8.57    4.542  0.20( 0.03) 0.16      13.0       5.00
      2       58.11    9.99    4.161  0.20( 0.03) 0.17      15.0       8.00
      3       58.71   10.44    4.057  0.20( 0.03) 0.17      15.6       1.00
      4       58.42   10.56    4.032  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.71    Tc(MIN.) =    10.44
  EFFECTIVE AREA(ACRES) =      15.59   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.62
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.71
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.59
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.71

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.908
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.64
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.64

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.31
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       5.25

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   5.18
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    9.33    4.328  0.20( 0.03) 0.16      13.0       5.00
      1       58.11   10.74    3.992  0.20( 0.03) 0.17      15.0       8.00
      1       58.71   11.19    3.900  0.20( 0.03) 0.17      15.6       1.00
      1       58.42   11.31    3.877  0.20( 0.03) 0.17      15.6      11.00
      2        5.25    6.82    5.181  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    6.82    5.181  0.20( 0.03) 0.16      10.6      14.00
```

```
      2       59.30    9.33    4.328  0.20( 0.03) 0.16      14.1        5.00
      3       62.15   10.74    3.992  0.20( 0.03) 0.16      16.2        8.00
      4       62.66   11.19    3.900  0.20( 0.03) 0.16      16.7        1.00
      5       62.34   11.31    3.877  0.20( 0.03) 0.16      16.7       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.72   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.66
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.45
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.72
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      62.66

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    91    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.33
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   5.12
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    7.08    5.071  0.20( 0.03) 0.16      10.6      14.00
      1       59.30    9.59    4.261  0.20( 0.03) 0.16      14.1       5.00
      1       62.15   11.00    3.939  0.20( 0.03) 0.16      16.2       8.00
      1       62.66   11.45    3.849  0.20( 0.03) 0.16      16.7       1.00
      1       62.34   11.56    3.827  0.20( 0.03) 0.16      16.7      11.00
      2        2.85    6.96    5.120  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    6.96    5.120  0.20( 0.03) 0.15      11.1      17.00
      2       56.15    7.08    5.071  0.20( 0.03) 0.15      11.2      14.00
      3       61.66    9.59    4.261  0.20( 0.03) 0.16      14.7       5.00
      4       64.34   11.00    3.939  0.20( 0.03) 0.16      16.8       8.00
      5       64.79   11.45    3.849  0.20( 0.03) 0.16      17.3       1.00
      6       64.47   11.56    3.827  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.79    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =      17.34   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.79
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.52
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.52
  RAINFALL INTENSITY(INCH/HR) =   3.84
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.34
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      64.79

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    91    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.96
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      6.96

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.96
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    8.10
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.692
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   15.66
```

```
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      22.23

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.10
  RAINFALL INTENSITY(INCH/HR) =   4.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    7.03    5.089  0.20( 0.03) 0.15      11.1      17.00
      1       56.15    7.15    5.041  0.20( 0.03) 0.15      11.2      14.00
      1       61.66    9.66    4.242  0.20( 0.03) 0.16      14.7       5.00
      1       64.34   11.07    3.924  0.20( 0.03) 0.16      16.8       8.00
      1       64.79   11.52    3.835  0.20( 0.03) 0.16      17.3       1.00
      1       64.47   11.64    3.813  0.20( 0.03) 0.16      17.4      11.00
      2       22.23    8.10    4.692  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       76.74    7.03    5.089  0.20( 0.03) 0.17      15.7      17.00
      2       77.24    7.15    5.041  0.20( 0.03) 0.17      15.9      14.00
      3       80.47    8.10    4.692  0.20( 0.03) 0.17      17.9      19.00
      4       81.75    9.66    4.242  0.20( 0.03) 0.17      20.0       5.00
      5       82.90   11.07    3.924  0.20( 0.03) 0.17      22.1       8.00
      6       82.93   11.52    3.835  0.20( 0.03) 0.17      22.6       1.00
      7       82.50   11.64    3.813  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      82.93    Tc(MIN.) =    11.52
  EFFECTIVE AREA(ACRES) =      22.65   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      82.93
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.67
  RAINFALL INTENSITY(INCH/HR) =   3.63
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.65
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      82.93

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.232
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20     0.100    91    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   5.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.392
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.26
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.26
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.36
 RAINFALL INTENSITY(INCH/HR) =   5.39
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.26
 TOTAL STREAM AREA(ACRES) =       0.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.26

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       76.74    8.19    4.663  0.20( 0.03) 0.17      15.7      17.00
     1       77.24    8.31    4.625  0.20( 0.03) 0.17      15.9      14.00
     1       80.47    9.26    4.348  0.20( 0.03) 0.17      17.9      19.00
     1       81.75   10.81    3.977  0.20( 0.03) 0.17      20.0       5.00
     1       82.90   12.22    3.707  0.20( 0.03) 0.17      22.1       8.00
     1       82.93   12.67    3.631  0.20( 0.03) 0.17      22.6       1.00
     1       82.50   12.79    3.613  0.20( 0.03) 0.17      22.7      11.00
     2        1.31    6.70    5.232  0.20( 0.02) 0.10       0.3      22.00
     3        1.26    6.36    5.392  0.20( 0.02) 0.10       0.3      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       71.48    6.36    5.392  0.20( 0.03) 0.17      12.7      40.00
     2       73.02    6.70    5.232  0.20( 0.03) 0.17      13.4      22.00
     3       79.00    8.19    4.663  0.20( 0.03) 0.17      16.2      17.00
     4       79.48    8.31    4.625  0.20( 0.03) 0.17      16.5      14.00
     5       82.58    9.26    4.348  0.20( 0.03) 0.17      18.4      19.00
     6       83.67   10.81    3.977  0.20( 0.03) 0.17      20.6       5.00
     7       84.69   12.22    3.707  0.20( 0.03) 0.17      22.6       8.00
     8       84.69   12.67    3.631  0.20( 0.03) 0.17      23.2       1.00
     9       84.25   12.79    3.613  0.20( 0.03) 0.17      23.2      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      84.69    Tc(MIN.) =    12.22
 EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
 TOTAL AREA(ACRES) =       23.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      84.69
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   12.34
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.34
  RAINFALL INTENSITY(INCH/HR) =   3.69
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.69

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.78
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.805
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       3.07

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.07
  PIPE TRAVEL TIME(MIN.) =   3.04    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.527
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        7.43      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   30.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      32.40

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.40
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.64
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.64
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       71.48    6.48    5.332  0.20( 0.03) 0.17      12.7      40.00
      1       73.02    6.82    5.177  0.20( 0.03) 0.17      13.4      22.00
      1       79.00    8.32    4.623  0.20( 0.03) 0.17      16.2      17.00
      1       79.48    8.43    4.586  0.20( 0.03) 0.17      16.5      14.00
```

```
     1       82.58    9.38    4.316  0.20( 0.03) 0.17      18.4       19.00
     1       83.67   10.93    3.952  0.20( 0.03) 0.17      20.6        5.00
     1       84.69   12.34    3.687  0.20( 0.03) 0.17      22.6        8.00
     1       84.69   12.79    3.612  0.20( 0.03) 0.17      23.2        1.00
     1       84.25   12.91    3.593  0.20( 0.03) 0.17      23.2       11.00
     2       32.40    8.64    4.523  0.20( 0.04) 0.19       8.0       24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      100.18    6.48    5.332  0.20( 0.03) 0.17      18.7       40.00
      2      102.35    6.82    5.177  0.20( 0.03) 0.17      19.7       22.00
      3      110.88    8.32    4.623  0.20( 0.03) 0.17      23.9       17.00
      4      111.56    8.43    4.586  0.20( 0.03) 0.17      24.3       14.00
      5      112.56    8.64    4.523  0.20( 0.03) 0.17      24.9       24.00
      6      113.48    9.38    4.316  0.20( 0.03) 0.17      26.4       19.00
      7      111.94   10.93    3.952  0.20( 0.03) 0.17      28.6        5.00
      8      111.05   12.34    3.687  0.20( 0.03) 0.17      30.7        8.00
      9      110.50   12.79    3.612  0.20( 0.03) 0.17      31.2        1.00
     10      109.93   12.91    3.593  0.20( 0.03) 0.17      31.2       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     113.48    Tc(MIN.) =     9.38
  EFFECTIVE AREA(ACRES) =      26.43   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.48
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.80
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.43
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     113.48

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20      0.200    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.67
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      6.67

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.67
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    7.89
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.765
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20      0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =   13.05
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      19.31

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.31
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    8.49
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      100.18    6.92    5.135  0.20( 0.03) 0.17      18.7      40.00
      1      102.35    7.26    4.995  0.20( 0.03) 0.17      19.7      22.00
      1      110.88    8.74    4.492  0.20( 0.03) 0.17      23.9      17.00
      1      111.56    8.86    4.458  0.20( 0.03) 0.17      24.3      14.00
      1      112.56    9.06    4.400  0.20( 0.03) 0.17      24.9      24.00
      1      113.48    9.80    4.207  0.20( 0.03) 0.17      26.4      19.00
      1      111.94   11.36    3.866  0.20( 0.03) 0.17      28.6       5.00
      1      111.05   12.77    3.616  0.20( 0.03) 0.17      30.7       8.00
      1      110.50   13.22    3.545  0.20( 0.03) 0.17      31.2       1.00
      1      109.93   13.33    3.527  0.20( 0.03) 0.17      31.2      11.00
      2       19.31    8.49    4.567  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      117.88    6.92    5.135  0.20( 0.04) 0.18      22.4      40.00
      2      120.42    7.26    4.995  0.20( 0.04) 0.18      23.6      22.00
      3      128.75    8.49    4.567  0.20( 0.04) 0.18      27.8      29.00
      4      129.87    8.74    4.492  0.20( 0.04) 0.18      28.5      17.00
      5      130.40    8.86    4.458  0.20( 0.04) 0.18      28.8      14.00
      6      131.15    9.06    4.400  0.20( 0.04) 0.18      29.4      24.00
      7      131.25    9.80    4.207  0.20( 0.04) 0.18      31.0      19.00
      8      128.26   11.36    3.866  0.20( 0.04) 0.18      33.1       5.00
      9      126.29   12.77    3.616  0.20( 0.04) 0.18      35.2       8.00
     10      125.45   13.22    3.545  0.20( 0.04) 0.18      35.7       1.00
     11      124.80   13.33    3.527  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     131.25    Tc(MIN.) =     9.80
  EFFECTIVE AREA(ACRES) =      30.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.39
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.25
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
```

```
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.25
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.93
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.93
  RAINFALL INTENSITY(INCH/HR) =   4.18
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      30.97
  TOTAL STREAM AREA(ACRES) =      35.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     131.25

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.38
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    5.40
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.40
  RAINFALL INTENSITY(INCH/HR) =   5.92
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      117.88    7.05    5.081  0.20( 0.04) 0.18      22.4      40.00
     1      120.42    7.39    4.945  0.20( 0.04) 0.18      23.6      22.00
     1      128.75    8.62    4.529  0.20( 0.04) 0.18      27.8      29.00
     1      129.87    8.87    4.456  0.20( 0.04) 0.18      28.5      17.00
     1      130.40    8.99    4.422  0.20( 0.04) 0.18      28.8      14.00
     1      131.15    9.19    4.366  0.20( 0.04) 0.18      29.4      24.00
     1      131.25    9.93    4.177  0.20( 0.04) 0.18      31.0      19.00
     1      128.26   11.48    3.842  0.20( 0.04) 0.18      33.1       5.00
     1      126.29   12.89    3.595  0.20( 0.04) 0.18      35.2       8.00
     1      125.45   13.34    3.526  0.20( 0.04) 0.18      35.7       1.00
     1      124.80   13.46    3.508  0.20( 0.04) 0.18      35.8      11.00
     2        4.38    5.40    5.922  0.20( 0.18) 0.90       0.8      34.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      109.65    5.40    5.922  0.20( 0.04) 0.21      18.0      34.00
     2      121.62    7.05    5.081  0.20( 0.04) 0.20      23.2      40.00
     3      124.05    7.39    4.945  0.20( 0.04) 0.20      24.4      22.00
     4      132.07    8.62    4.529  0.20( 0.04) 0.20      28.6      29.00
     5      133.13    8.87    4.456  0.20( 0.04) 0.20      29.3      17.00
     6      133.63    8.99    4.422  0.20( 0.04) 0.20      29.6      14.00
     7      134.34    9.19    4.366  0.20( 0.04) 0.20      30.3      24.00
     8      134.30    9.93    4.177  0.20( 0.04) 0.20      31.8      19.00
     9      131.05   11.48    3.842  0.20( 0.04) 0.19      34.0       5.00
    10      128.90   12.89    3.595  0.20( 0.04) 0.19      36.0       8.00
    11      128.00   13.34    3.526  0.20( 0.04) 0.19      36.6       1.00
    12      127.34   13.46    3.508  0.20( 0.04) 0.19      36.6      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     134.34    Tc(MIN.) =     9.19
 EFFECTIVE AREA(ACRES) =      30.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       36.6
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     134.34
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.22
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.22
 RAINFALL INTENSITY(INCH/HR) =   4.36
 AREA-AVERAGED Fm(INCH/HR) =  0.04
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      30.25
  TOTAL STREAM AREA(ACRES) =      36.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     134.34

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    91    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.00
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      9.00

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.00
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   4.84
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      109.65    5.43    5.900  0.20( 0.04) 0.21      18.0      34.00
      1      121.62    7.09    5.067  0.20( 0.04) 0.20      23.2      40.00
      1      124.05    7.43    4.932  0.20( 0.04) 0.20      24.4      22.00
      1      132.07    8.65    4.518  0.20( 0.04) 0.20      28.6      29.00
      1      133.13    8.90    4.446  0.20( 0.04) 0.20      29.3      17.00
      1      133.63    9.02    4.413  0.20( 0.04) 0.20      29.6      14.00
      1      134.34    9.22    4.356  0.20( 0.04) 0.20      30.3      24.00
```

```
     1      134.30    9.96    4.168  0.20( 0.04) 0.20      31.8      19.00
     1      131.05   11.52    3.835  0.20( 0.04) 0.19      34.0       5.00
     1      128.90   12.93    3.590  0.20( 0.04) 0.19      36.0       8.00
     1      128.00   13.38    3.520  0.20( 0.04) 0.19      36.6       1.00
     1      127.34   13.50    3.503  0.20( 0.04) 0.19      36.6      11.00
     2        9.00    7.68    4.838  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      117.43    5.43    5.900  0.20( 0.04) 0.21      19.4      34.00
     2      130.32    7.09    5.067  0.20( 0.04) 0.20      25.1      40.00
     3      132.93    7.43    4.932  0.20( 0.04) 0.20      26.4      22.00
     4      134.70    7.68    4.838  0.20( 0.04) 0.20      27.3      37.00
     5      140.47    8.65    4.518  0.20( 0.04) 0.20      30.6      29.00
     6      141.40    8.90    4.446  0.20( 0.04) 0.20      31.3      17.00
     7      141.84    9.02    4.413  0.20( 0.04) 0.20      31.7      14.00
     8      142.44    9.22    4.356  0.20( 0.04) 0.20      32.3      24.00
     9      142.04    9.96    4.168  0.20( 0.04) 0.20      33.8      19.00
    10      138.17   11.52    3.835  0.20( 0.04) 0.20      36.0       5.00
    11      135.56   12.93    3.590  0.20( 0.04) 0.19      38.1       8.00
    12      134.53   13.38    3.520  0.20( 0.04) 0.19      38.6       1.00
    13      133.84   13.50    3.503  0.20( 0.04) 0.19      38.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     142.44    Tc(MIN.) =     9.22
  EFFECTIVE AREA(ACRES) =      32.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       38.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  50.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.32
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     142.44
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    9.82
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.82
  RAINFALL INTENSITY(INCH/HR) =   4.20
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      32.31
  TOTAL STREAM AREA(ACRES) =      38.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     142.44

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.26      0.20     0.100    91    7.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.18
 TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.06
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  D        0.55      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    2.50
 EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.69

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.06
 RAINFALL INTENSITY(INCH/HR) =   5.08
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      117.43    6.06    5.541  0.20( 0.04) 0.21      19.4      34.00
     1      130.32    7.70    4.833  0.20( 0.04) 0.20      25.1      40.00
     1      132.93    8.04    4.714  0.20( 0.04) 0.20      26.4      22.00
     1      134.70    8.29    4.631  0.20( 0.04) 0.20      27.3      37.00
     1      140.47    9.25    4.350  0.20( 0.04) 0.20      30.6      29.00
     1      141.40    9.49    4.285  0.20( 0.04) 0.20      31.3      17.00
     1      141.84    9.61    4.255  0.20( 0.04) 0.20      31.7      14.00
     1      142.44    9.82    4.204  0.20( 0.04) 0.20      32.3      24.00
     1      142.04   10.55    4.033  0.20( 0.04) 0.20      33.8      19.00
     1      138.17   12.11    3.726  0.20( 0.04) 0.20      36.0       5.00
     1      135.56   13.53    3.498  0.20( 0.04) 0.19      38.1       8.00
     1      134.53   13.99    3.432  0.20( 0.04) 0.19      38.6       1.00
     1      133.84   14.10    3.415  0.20( 0.04) 0.19      38.6      11.00
     2        3.69    7.06    5.078  0.20( 0.02) 0.10       0.8      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      120.88    6.06    5.541  0.20( 0.04) 0.21      20.1      34.00
      2      128.98    7.06    5.078  0.20( 0.04) 0.20      23.7      40.00
      3      133.83    7.70    4.833  0.20( 0.04) 0.20      25.9      40.00
      4      136.35    8.04    4.714  0.20( 0.04) 0.20      27.2      22.00
      5      138.07    8.29    4.631  0.20( 0.04) 0.20      28.1      37.00
      6      143.63    9.25    4.350  0.20( 0.04) 0.20      31.4      29.00
      7      144.51    9.49    4.285  0.20( 0.04) 0.20      32.1      17.00
      8      144.92    9.61    4.255  0.20( 0.04) 0.20      32.5      14.00
      9      145.49    9.82    4.204  0.20( 0.04) 0.20      33.1      24.00
     10      144.97   10.55    4.033  0.20( 0.04) 0.19      34.6      19.00
     11      140.88   12.11    3.726  0.20( 0.04) 0.19      36.8       5.00
     12      138.09   13.53    3.498  0.20( 0.04) 0.19      38.9       8.00
     13      137.02   13.99    3.432  0.20( 0.04) 0.19      39.4       1.00
     14      136.31   14.10    3.415  0.20( 0.04) 0.19      39.5      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     145.49    Tc(MIN.) =     9.82
  EFFECTIVE AREA(ACRES) =      33.12   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       39.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  46.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.49
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     145.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.87
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.87
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      33.12
  TOTAL STREAM AREA(ACRES) =      39.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     145.49

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.173
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
 COMMERCIAL                 D        0.43      0.20     0.100    91    6.83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.99
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.99

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   5.17
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      120.88    6.12    5.508  0.20( 0.04) 0.21      20.1      34.00
     1      128.98    7.12    5.053  0.20( 0.04) 0.20      23.7      40.00
     1      133.83    7.76    4.811  0.20( 0.04) 0.20      25.9      40.00
     1      136.35    8.10    4.694  0.20( 0.04) 0.20      27.2      22.00
     1      138.07    8.35    4.612  0.20( 0.04) 0.20      28.1      37.00
     1      143.63    9.31    4.334  0.20( 0.04) 0.20      31.4      29.00
     1      144.51    9.55    4.269  0.20( 0.04) 0.20      32.1      17.00
     1      144.92    9.67    4.240  0.20( 0.04) 0.20      32.5      14.00
     1      145.49    9.87    4.189  0.20( 0.04) 0.20      33.1      24.00
     1      144.97   10.61    4.020  0.20( 0.04) 0.19      34.6      19.00
     1      140.88   12.17    3.716  0.20( 0.04) 0.19      36.8       5.00
     1      138.09   13.59    3.489  0.20( 0.04) 0.19      38.9       8.00
     1      137.02   14.05    3.423  0.20( 0.04) 0.19      39.4       1.00
     1      136.31   14.16    3.407  0.20( 0.04) 0.19      39.5      11.00
     2        1.99    6.83    5.173  0.20( 0.02) 0.10       0.4      42.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      122.79    6.12    5.508  0.20( 0.04) 0.20      20.5      34.00
     2      128.66    6.83    5.173  0.20( 0.04) 0.20      23.1      42.00
     3      130.93    7.12    5.053  0.20( 0.04) 0.20      24.1      40.00
     4      135.69    7.76    4.811  0.20( 0.04) 0.20      26.4      40.00
     5      138.16    8.10    4.694  0.20( 0.04) 0.20      27.6      22.00
     6      139.84    8.35    4.612  0.20( 0.04) 0.20      28.5      37.00
     7      145.30    9.31    4.334  0.20( 0.04) 0.20      31.9      29.00
     8      146.15    9.55    4.269  0.20( 0.04) 0.19      32.6      17.00
     9      146.56    9.67    4.240  0.20( 0.04) 0.19      32.9      14.00
    10      147.10    9.87    4.189  0.20( 0.04) 0.19      33.6      24.00
    11      146.52   10.61    4.020  0.20( 0.04) 0.19      35.1      19.00
    12      142.31   12.17    3.716  0.20( 0.04) 0.19      37.3       5.00
    13      139.44   13.59    3.489  0.20( 0.04) 0.19      39.3       8.00
    14      138.34   14.05    3.423  0.20( 0.04) 0.19      39.9       1.00
    15      137.62   14.16    3.407  0.20( 0.04) 0.19      39.9      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     147.10    Tc(MIN.) =     9.87
 EFFECTIVE AREA(ACRES) =      33.55   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =       39.9
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  53.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     147.10
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   10.20
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.20
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      33.55
  TOTAL STREAM AREA(ACRES) =      39.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     147.10

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.218
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    91    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.73
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.73

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.750
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.54
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.36

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
```

```
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.41
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.87
 LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.87
 RAINFALL INTENSITY(INCH/HR) =   5.16
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.73
 TOTAL STREAM AREA(ACRES) =       0.73
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.41

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      122.79    6.47    5.340  0.20( 0.04) 0.20      20.5      34.00
     1      128.66    7.17    5.031  0.20( 0.04) 0.20      23.1      42.00
     1      130.93    7.45    4.922  0.20( 0.04) 0.20      24.1      40.00
     1      135.69    8.09    4.697  0.20( 0.04) 0.20      26.4      40.00
     1      138.16    8.43    4.588  0.20( 0.04) 0.20      27.6      22.00
     1      139.84    8.68    4.511  0.20( 0.04) 0.20      28.5      37.00
     1      145.30    9.64    4.249  0.20( 0.04) 0.20      31.9      29.00
     1      146.15    9.88    4.187  0.20( 0.04) 0.19      32.6      17.00
     1      146.56   10.00    4.159  0.20( 0.04) 0.19      32.9      14.00
     1      147.10   10.20    4.111  0.20( 0.04) 0.19      33.6      24.00
     1      146.52   10.94    3.950  0.20( 0.04) 0.19      35.1      19.00
     1      142.31   12.50    3.659  0.20( 0.04) 0.19      37.3       5.00
     1      139.44   13.92    3.442  0.20( 0.04) 0.19      39.3       8.00
     1      138.34   14.38    3.378  0.20( 0.04) 0.19      39.9       1.00
     1      137.62   14.50    3.362  0.20( 0.04) 0.19      39.9      11.00
     2        3.36    7.93    4.750  0.20( 0.02) 0.10       0.8      44.00
     3        3.41    6.87    5.159  0.20( 0.02) 0.10       0.7      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      129.19    6.47    5.340  0.20( 0.04) 0.20      21.8      34.00
     2      132.68    6.87    5.159  0.20( 0.04) 0.20      23.4      40.00
     3      135.21    7.17    5.031  0.20( 0.04) 0.20      24.5      42.00
     4      137.46    7.45    4.922  0.20( 0.04) 0.19      25.6      40.00
     5      141.02    7.93    4.750  0.20( 0.04) 0.19      27.3      44.00
     6      142.11    8.09    4.697  0.20( 0.04) 0.19      27.9      40.00
     7      144.44    8.43    4.588  0.20( 0.04) 0.19      29.1      22.00
     8      146.01    8.68    4.511  0.20( 0.04) 0.19      30.1      37.00
     9      151.11    9.64    4.249  0.20( 0.04) 0.19      33.4      29.00
    10      151.88    9.88    4.187  0.20( 0.04) 0.19      34.1      17.00
    11      152.25   10.00    4.159  0.20( 0.04) 0.19      34.5      14.00
    12      152.73   10.20    4.111  0.20( 0.04) 0.19      35.1      24.00
    13      151.92   10.94    3.950  0.20( 0.04) 0.19      36.6      19.00
    14      147.31   12.50    3.659  0.20( 0.04) 0.19      38.8       5.00
    15      144.14   13.92    3.442  0.20( 0.04) 0.19      40.8       8.00
    16      142.95   14.38    3.378  0.20( 0.04) 0.19      41.4       1.00
    17      142.22   14.50    3.362  0.20( 0.04) 0.19      41.4      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     152.73    Tc(MIN.) =    10.20
 EFFECTIVE AREA(ACRES) =      35.07   AREA-AVERAGED Fm(INCH/HR) =  0.04
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       41.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  46.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.90
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     152.73
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   11.43
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.72
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     152.73
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   11.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    91    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.99
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      6.99

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.99
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        9.31      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   37.46
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.22
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.90
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =    9.64
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.64
  RAINFALL INTENSITY(INCH/HR) =   4.25
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.424
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.20      0.20     0.100    91    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.97
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.97

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.22      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.94
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.13
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.96
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.76

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.06
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       43.90    9.64    4.248  0.20( 0.04) 0.20      10.9      48.00
      2        3.76    8.06    4.708  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.46    8.06    4.708  0.20( 0.04) 0.19      10.0      51.00
      2       47.29    9.64    4.248  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.29    Tc(MIN.) =     9.64
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.29
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.99
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.99
  RAINFALL INTENSITY(INCH/HR) =   4.16
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.79
  TOTAL STREAM AREA(ACRES) =      11.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.29

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.796
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    91    5.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.88
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.88

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.60
  RAINFALL INTENSITY(INCH/HR) =   5.80
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       44.46    8.41    4.595  0.20( 0.04) 0.19      10.0      51.00
      1       47.29    9.99    4.162  0.20( 0.04) 0.19      11.8      48.00
      2        0.88    5.60    5.796  0.20( 0.02) 0.10       0.2      53.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       38.34    5.60    5.796  0.20( 0.04) 0.19       6.8      53.00
      2       45.15    8.41    4.595  0.20( 0.04) 0.19      10.2      51.00
      3       47.92    9.99    4.162  0.20( 0.04) 0.19      12.0      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.92    Tc(MIN.) =     9.99
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
```

```
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.92
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.92

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20      0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.18
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   17.10
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =    8.28
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =   14.35
 EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =      15.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  20.00
 FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.28
 RAINFALL INTENSITY(INCH/HR) =   4.63
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =       3.68
 TOTAL STREAM AREA(ACRES) =       3.68
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.22

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       38.34    6.05    5.545  0.20( 0.04) 0.19       6.8      53.00
     1       45.15    8.85    4.462  0.20( 0.04) 0.19      10.2      51.00
     1       47.92   10.41    4.064  0.20( 0.04) 0.19      12.0      48.00
     2       15.22    8.28    4.634  0.20( 0.04) 0.19       3.7      56.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       51.67    6.05    5.545  0.20( 0.04) 0.19       9.5      53.00
     2       59.00    8.28    4.634  0.20( 0.04) 0.19      13.2      56.00
     3       59.80    8.85    4.462  0.20( 0.04) 0.19      13.8      51.00
     4       61.25   10.41    4.064  0.20( 0.04) 0.19      15.6      48.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      61.25    Tc(MIN.) =    10.41
 EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =       15.6
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.45
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.25
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   4.03
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.25

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.790
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        1.10      0.20     0.850    91   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      3.58
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.58

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.58
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   13.95
  LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
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```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   13.95
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.436
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        8.75      0.20     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =   25.72
  EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      28.96

********************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.95
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       9.85
  TOTAL STREAM AREA(ACRES) =       9.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.67    6.21    5.465  0.20( 0.04) 0.19       9.5      53.00
      1       59.00    8.43    4.585  0.20( 0.04) 0.19      13.2      56.00
      1       59.80    9.00    4.419  0.20( 0.04) 0.19      13.8      51.00
      1       61.25   10.56    4.031  0.20( 0.04) 0.19      15.6      48.00
      2       28.96   13.95    3.436  0.20( 0.17) 0.85       9.9      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.56    6.21    5.465  0.20( 0.08) 0.40      13.9      53.00
      2       82.65    8.43    4.585  0.20( 0.08) 0.40      19.1      56.00
      3       84.09    9.00    4.419  0.20( 0.08) 0.40      20.2      51.00
      4       87.16   10.56    4.031  0.20( 0.08) 0.40      23.1      48.00
      5       81.09   13.95    3.436  0.20( 0.09) 0.45      25.5      59.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.16    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      23.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =      87.16
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.75
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       72.56    6.41    5.368  0.20( 0.08) 0.40      13.9      53.00
     2       82.65    8.63    4.526  0.20( 0.08) 0.40      19.1      56.00
     3       84.09    9.19    4.365  0.20( 0.08) 0.40      20.2      51.00
     4       87.16   10.75    3.990  0.20( 0.08) 0.40      23.1      48.00
     5       81.09   14.15    3.409  0.20( 0.09) 0.45      25.5      59.00
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      129.19    8.15    4.677  0.20( 0.04) 0.20      21.8      34.00
     2      132.68    8.52    4.560  0.20( 0.04) 0.20      23.4      40.00
     3      135.21    8.82    4.469  0.20( 0.04) 0.20      24.5      42.00
     4      137.46    9.10    4.391  0.20( 0.04) 0.19      25.6      40.00
     5      141.02    9.57    4.265  0.20( 0.04) 0.19      27.3      44.00
     6      142.11    9.73    4.226  0.20( 0.04) 0.19      27.9      40.00
     7      144.44   10.06    4.144  0.20( 0.04) 0.19      29.1      22.00
     8      146.01   10.32    4.086  0.20( 0.04) 0.19      30.1      37.00
     9      151.11   11.23    3.891  0.20( 0.04) 0.19      33.4      29.00
    10      151.88   11.48    3.843  0.20( 0.04) 0.19      34.1      17.00
    11      152.25   11.60    3.821  0.20( 0.04) 0.19      34.5      14.00
    12      152.73   11.80    3.783  0.20( 0.04) 0.19      35.1      24.00
    13      151.92   12.54    3.654  0.20( 0.04) 0.19      36.6      19.00
    14      147.31   14.13    3.411  0.20( 0.04) 0.19      38.8       5.00
    15      144.14   15.55    3.229  0.20( 0.04) 0.19      40.8       8.00
    16      142.95   16.02    3.175  0.20( 0.04) 0.19      41.4       1.00
    17      142.22   16.13    3.162  0.20( 0.04) 0.19      41.4      11.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      189.26    6.41    5.368  0.20( 0.06) 0.29      31.1      53.00
     2      209.67    8.15    4.677  0.20( 0.06) 0.29      39.8      34.00
     3      214.83    8.52    4.560  0.20( 0.06) 0.29      42.3      40.00
     4      216.26    8.63    4.526  0.20( 0.06) 0.29      42.9      56.00
     5      218.35    8.82    4.469  0.20( 0.06) 0.28      44.0      42.00
     6      221.30    9.10    4.391  0.20( 0.06) 0.28      45.6      40.00
     7      222.27    9.19    4.365  0.20( 0.06) 0.28      46.2      51.00
     8      225.86    9.57    4.265  0.20( 0.06) 0.28      48.2      44.00
     9      227.25    9.73    4.226  0.20( 0.06) 0.28      49.1      40.00
    10      230.24   10.06    4.144  0.20( 0.06) 0.28      51.0      22.00
    11      232.32   10.32    4.086  0.20( 0.06) 0.28      52.3      37.00
    12      235.60   10.75    3.990  0.20( 0.06) 0.28      54.7      48.00
    13      237.41   11.23    3.891  0.20( 0.06) 0.28      56.8      29.00
    14      237.74   11.48    3.843  0.20( 0.06) 0.28      57.7      17.00
    15      237.89   11.60    3.821  0.20( 0.06) 0.28      58.2      14.00
    16      238.01   11.80    3.783  0.20( 0.06) 0.28      58.9      24.00
    17      235.88   12.54    3.654  0.20( 0.06) 0.28      61.0      19.00
    18      228.43   14.13    3.411  0.20( 0.06) 0.29      64.3       5.00
    19      228.36   14.15    3.409  0.20( 0.06) 0.29      64.3      59.00
    20      220.83   15.55    3.229  0.20( 0.06) 0.29      66.3       8.00
    21      218.33   16.02    3.175  0.20( 0.06) 0.29      66.9       1.00
    22      217.27   16.13    3.162  0.20( 0.06) 0.29      66.9      11.00
   TOTAL AREA(ACRES) =        66.9

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      238.01  Tc(MIN.) =   11.800
```

```
  EFFECTIVE AREA(ACRES) =     58.91  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =       66.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       66.9  TC(MIN.) =     11.80
  EFFECTIVE AREA(ACRES) =     58.91  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.282
  PEAK FLOW RATE(CFS)   =     238.01

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      189.26    6.41    5.368  0.20( 0.06) 0.29      31.1      53.00
      2      209.67    8.15    4.677  0.20( 0.06) 0.29      39.8      34.00
      3      214.83    8.52    4.560  0.20( 0.06) 0.29      42.3      40.00
      4      216.26    8.63    4.526  0.20( 0.06) 0.29      42.9      56.00
      5      218.35    8.82    4.469  0.20( 0.06) 0.28      44.0      42.00
      6      221.30    9.10    4.391  0.20( 0.06) 0.28      45.6      40.00
      7      222.27    9.19    4.365  0.20( 0.06) 0.28      46.2      51.00
      8      225.86    9.57    4.265  0.20( 0.06) 0.28      48.2      44.00
      9      227.25    9.73    4.226  0.20( 0.06) 0.28      49.1      40.00
     10      230.24   10.06    4.144  0.20( 0.06) 0.28      51.0      22.00
     11      232.32   10.32    4.086  0.20( 0.06) 0.28      52.3      37.00
     12      235.60   10.75    3.990  0.20( 0.06) 0.28      54.7      48.00
     13      237.41   11.23    3.891  0.20( 0.06) 0.28      56.8      29.00
     14      237.74   11.48    3.843  0.20( 0.06) 0.28      57.7      17.00
     15      237.89   11.60    3.821  0.20( 0.06) 0.28      58.2      14.00
     16      238.01   11.80    3.783  0.20( 0.06) 0.28      58.9      24.00
     17      235.88   12.54    3.654  0.20( 0.06) 0.28      61.0      19.00
     18      228.43   14.13    3.411  0.20( 0.06) 0.29      64.3       5.00
     19      228.36   14.15    3.409  0.20( 0.06) 0.29      64.3      59.00
     20      220.83   15.55    3.229  0.20( 0.06) 0.29      66.3       8.00
     21      218.33   16.02    3.175  0.20( 0.06) 0.29      66.9       1.00
     22      217.27   16.13    3.162  0.20( 0.06) 0.29      66.9      11.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3, BREA CENTRAL                                           *
* 100-YR STUDY WITH A FLOW-BY DETENTION BASIN                          *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                             *
 ************************************************************************

  FILE NAME: WEST-AB.DAT
  TIME/DATE OF STUDY: 18:25 01/09/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.851
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    91    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.06
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      6.06

**************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.06
 PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =    8.81
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.81
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.472
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =   17.35
 EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      22.93

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
 FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.24
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.93
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    9.48
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.48
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.289
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =   17.44
 EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      39.42

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.82
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.42
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.42

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.069
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.18
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.37
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.58
  STREET FLOW TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.75
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.01
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.32
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.621
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.48

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.32
  RAINFALL INTENSITY(INCH/HR) =   4.62
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.48

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.42   10.19    4.114  0.20( 0.04) 0.20      10.3       1.00
      2        3.48    8.32    4.621  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       39.67    8.32    4.621  0.20( 0.04) 0.19       9.3       5.00
      2       42.52   10.19    4.114  0.20( 0.04) 0.19      11.1       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      42.52    Tc(MIN.) =    10.19
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.10
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.52
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.29
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.29
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      42.52

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.414
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20      0.100    91    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.45
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      3.45

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.55
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.40
   HALFSTREET FLOOD WIDTH(FEET) =   13.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
 STREET FLOW TRAVEL TIME(MIN.) =   3.53   Tc(MIN.) =    9.84
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.197
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        1.64      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    6.17
 EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.68
 FLOW VELOCITY(FEET/SEC.) =  3.87   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       2.35
 TOTAL STREAM AREA(ACRES) =       2.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       39.67    8.42    4.589  0.20( 0.04) 0.19       9.3       5.00
     1       42.52   10.29    4.091  0.20( 0.04) 0.19      11.1       1.00
     2        8.83    9.84    4.197  0.20( 0.02) 0.10       2.3       8.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       47.94    8.42    4.589  0.20( 0.03) 0.17      11.3       5.00
     2       50.67    9.84    4.197  0.20( 0.04) 0.18      13.0       8.00
     3       51.13   10.29    4.091  0.20( 0.04) 0.18      13.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      51.13    Tc(MIN.) =    10.29
 EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =       13.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.13
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      51.13

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20      0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.96
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      2.96

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   3.50   Tc(MIN.) =   10.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.032
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.62
  FLOW VELOCITY(FEET/SEC.) =  3.78   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   4.03
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.62

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       47.94    8.57    4.542  0.20( 0.03) 0.17      11.3       5.00
      1       50.67    9.99    4.161  0.20( 0.04) 0.18      13.0       8.00
      1       51.13   10.44    4.057  0.20( 0.04) 0.18      13.5       1.00
      2        7.62   10.56    4.032  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    8.57    4.542  0.20( 0.03) 0.16      13.0       5.00
      2       58.11    9.99    4.161  0.20( 0.03) 0.17      15.0       8.00
      3       58.71   10.44    4.057  0.20( 0.03) 0.17      15.6       1.00
      4       58.42   10.56    4.032  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.71    Tc(MIN.) =    10.44
  EFFECTIVE AREA(ACRES) =      15.59   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.62
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.71
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.59
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.71

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.908
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.64
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.64

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.31
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.52
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  3.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.181
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.90
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       5.25

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.82
  RAINFALL INTENSITY(INCH/HR) =   5.18
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.91    9.33    4.328  0.20( 0.03) 0.16      13.0       5.00
      1       58.11   10.74    3.992  0.20( 0.03) 0.17      15.0       8.00
      1       58.71   11.19    3.900  0.20( 0.03) 0.17      15.6       1.00
      1       58.42   11.31    3.877  0.20( 0.03) 0.17      15.6      11.00
      2        5.25    6.82    5.181  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    6.82    5.181  0.20( 0.03) 0.16      10.6      14.00
```

```
      2       59.30    9.33    4.328  0.20( 0.03) 0.16      14.1        5.00
      3       62.15   10.74    3.992  0.20( 0.03) 0.16      16.2        8.00
      4       62.66   11.19    3.900  0.20( 0.03) 0.16      16.7        1.00
      5       62.34   11.31    3.877  0.20( 0.03) 0.16      16.7       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.72   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.66
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.45
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.72
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      62.66

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    91    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.51

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.96
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.120
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.33
  EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.96
  RAINFALL INTENSITY(INCH/HR) =   5.12
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       53.33    7.08    5.071  0.20( 0.03) 0.16      10.6      14.00
      1       59.30    9.59    4.261  0.20( 0.03) 0.16      14.1       5.00
      1       62.15   11.00    3.939  0.20( 0.03) 0.16      16.2       8.00
      1       62.66   11.45    3.849  0.20( 0.03) 0.16      16.7       1.00
      1       62.34   11.56    3.827  0.20( 0.03) 0.16      16.7      11.00
      2        2.85    6.96    5.120  0.20( 0.02) 0.10       0.6      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    6.96    5.120  0.20( 0.03) 0.15      11.1      17.00
      2       56.15    7.08    5.071  0.20( 0.03) 0.15      11.2      14.00
      3       61.66    9.59    4.261  0.20( 0.03) 0.16      14.7       5.00
      4       64.34   11.00    3.939  0.20( 0.03) 0.16      16.8       8.00
      5       64.79   11.45    3.849  0.20( 0.03) 0.16      17.3       1.00
      6       64.47   11.56    3.827  0.20( 0.03) 0.16      17.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.79    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =      17.34   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       17.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  36.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.84
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.79
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.52
```

```
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.52
 RAINFALL INTENSITY(INCH/HR) =   3.84
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.16
 EFFECTIVE STREAM AREA(ACRES) =      17.34
 TOTAL STREAM AREA(ACRES) =      17.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      64.79

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    91    7.35
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      6.96
 TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      6.96

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
 FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.96
 PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    8.10
 LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.10
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.692
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =   15.66
```

```
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      22.23

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.10
  RAINFALL INTENSITY(INCH/HR) =   4.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       55.80    7.03    5.089  0.20( 0.03) 0.15      11.1      17.00
      1       56.15    7.15    5.041  0.20( 0.03) 0.15      11.2      14.00
      1       61.66    9.66    4.242  0.20( 0.03) 0.16      14.7       5.00
      1       64.34   11.07    3.924  0.20( 0.03) 0.16      16.8       8.00
      1       64.79   11.52    3.835  0.20( 0.03) 0.16      17.3       1.00
      1       64.47   11.64    3.813  0.20( 0.03) 0.16      17.4      11.00
      2       22.23    8.10    4.692  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       76.74    7.03    5.089  0.20( 0.03) 0.17      15.7      17.00
      2       77.24    7.15    5.041  0.20( 0.03) 0.17      15.9      14.00
      3       80.47    8.10    4.692  0.20( 0.03) 0.17      17.9      19.00
      4       81.75    9.66    4.242  0.20( 0.03) 0.17      20.0       5.00
      5       82.90   11.07    3.924  0.20( 0.03) 0.17      22.1       8.00
      6       82.93   11.52    3.835  0.20( 0.03) 0.17      22.6       1.00
      7       82.50   11.64    3.813  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      82.93    Tc(MIN.) =    11.52
  EFFECTIVE AREA(ACRES) =      22.65   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      82.93
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   12.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.67
  RAINFALL INTENSITY(INCH/HR) =   3.63
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.65
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      82.93

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.232
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20     0.100    91    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.31

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   5.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.31

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.392
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.26
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.26
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.36
 RAINFALL INTENSITY(INCH/HR) =   5.39
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.26
 TOTAL STREAM AREA(ACRES) =       0.26
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.26

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       76.74    8.19    4.663  0.20( 0.03) 0.17      15.7      17.00
     1       77.24    8.31    4.625  0.20( 0.03) 0.17      15.9      14.00
     1       80.47    9.26    4.348  0.20( 0.03) 0.17      17.9      19.00
     1       81.75   10.81    3.977  0.20( 0.03) 0.17      20.0       5.00
     1       82.90   12.22    3.707  0.20( 0.03) 0.17      22.1       8.00
     1       82.93   12.67    3.631  0.20( 0.03) 0.17      22.6       1.00
     1       82.50   12.79    3.613  0.20( 0.03) 0.17      22.7      11.00
     2        1.31    6.70    5.232  0.20( 0.02) 0.10       0.3      22.00
     3        1.26    6.36    5.392  0.20( 0.02) 0.10       0.3      40.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       71.48    6.36    5.392  0.20( 0.03) 0.17      12.7      40.00
     2       73.02    6.70    5.232  0.20( 0.03) 0.17      13.4      22.00
     3       79.00    8.19    4.663  0.20( 0.03) 0.17      16.2      17.00
     4       79.48    8.31    4.625  0.20( 0.03) 0.17      16.5      14.00
     5       82.58    9.26    4.348  0.20( 0.03) 0.17      18.4      19.00
     6       83.67   10.81    3.977  0.20( 0.03) 0.17      20.6       5.00
     7       84.69   12.22    3.707  0.20( 0.03) 0.17      22.6       8.00
     8       84.69   12.67    3.631  0.20( 0.03) 0.17      23.2       1.00
     9       84.25   12.79    3.613  0.20( 0.03) 0.17      23.2      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      84.69    Tc(MIN.) =    12.22
 EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
 TOTAL AREA(ACRES) =       23.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
 FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      84.69
 PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   12.34
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.34
  RAINFALL INTENSITY(INCH/HR) =   3.69
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      84.69

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.78
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.805
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    1.41
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       3.07

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.07
  PIPE TRAVEL TIME(MIN.) =   3.04    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.527
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        7.43      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =   30.01
  EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      32.40

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.40
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.64
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.64
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       8.02
  TOTAL STREAM AREA(ACRES) =       8.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       71.48    6.48    5.332  0.20( 0.03) 0.17      12.7      40.00
      1       73.02    6.82    5.177  0.20( 0.03) 0.17      13.4      22.00
      1       79.00    8.32    4.623  0.20( 0.03) 0.17      16.2      17.00
      1       79.48    8.43    4.586  0.20( 0.03) 0.17      16.5      14.00
```

```
     1       82.58    9.38    4.316  0.20( 0.03) 0.17      18.4       19.00
     1       83.67   10.93    3.952  0.20( 0.03) 0.17      20.6        5.00
     1       84.69   12.34    3.687  0.20( 0.03) 0.17      22.6        8.00
     1       84.69   12.79    3.612  0.20( 0.03) 0.17      23.2        1.00
     1       84.25   12.91    3.593  0.20( 0.03) 0.17      23.2       11.00
     2       32.40    8.64    4.523  0.20( 0.04) 0.19       8.0       24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      100.18    6.48    5.332  0.20( 0.03) 0.17      18.7       40.00
      2      102.35    6.82    5.177  0.20( 0.03) 0.17      19.7       22.00
      3      110.88    8.32    4.623  0.20( 0.03) 0.17      23.9       17.00
      4      111.56    8.43    4.586  0.20( 0.03) 0.17      24.3       14.00
      5      112.56    8.64    4.523  0.20( 0.03) 0.17      24.9       24.00
      6      113.48    9.38    4.316  0.20( 0.03) 0.17      26.4       19.00
      7      111.94   10.93    3.952  0.20( 0.03) 0.17      28.6        5.00
      8      111.05   12.34    3.687  0.20( 0.03) 0.17      30.7        8.00
      9      110.50   12.79    3.612  0.20( 0.03) 0.17      31.2        1.00
     10      109.93   12.91    3.593  0.20( 0.03) 0.17      31.2       11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     113.48    Tc(MIN.) =     9.38
  EFFECTIVE AREA(ACRES) =      26.43   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  60.0 INCH PIPE IS  47.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.48
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.80
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      26.43
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     113.48

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20      0.200    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.67
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      6.67

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.67
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    7.89
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.765
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20      0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =   13.05
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      19.31

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.31
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    8.49
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      100.18    6.92    5.135  0.20( 0.03) 0.17      18.7      40.00
      1      102.35    7.26    4.995  0.20( 0.03) 0.17      19.7      22.00
      1      110.88    8.74    4.492  0.20( 0.03) 0.17      23.9      17.00
      1      111.56    8.86    4.458  0.20( 0.03) 0.17      24.3      14.00
      1      112.56    9.06    4.400  0.20( 0.03) 0.17      24.9      24.00
      1      113.48    9.80    4.207  0.20( 0.03) 0.17      26.4      19.00
      1      111.94   11.36    3.866  0.20( 0.03) 0.17      28.6       5.00
      1      111.05   12.77    3.616  0.20( 0.03) 0.17      30.7       8.00
      1      110.50   13.22    3.545  0.20( 0.03) 0.17      31.2       1.00
      1      109.93   13.33    3.527  0.20( 0.03) 0.17      31.2      11.00
      2       19.31    8.49    4.567  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      117.88    6.92    5.135  0.20( 0.04) 0.18      22.4      40.00
      2      120.42    7.26    4.995  0.20( 0.04) 0.18      23.6      22.00
      3      128.75    8.49    4.567  0.20( 0.04) 0.18      27.8      29.00
      4      129.87    8.74    4.492  0.20( 0.04) 0.18      28.5      17.00
      5      130.40    8.86    4.458  0.20( 0.04) 0.18      28.8      14.00
      6      131.15    9.06    4.400  0.20( 0.04) 0.18      29.4      24.00
      7      131.25    9.80    4.207  0.20( 0.04) 0.18      31.0      19.00
      8      128.26   11.36    3.866  0.20( 0.04) 0.18      33.1       5.00
      9      126.29   12.77    3.616  0.20( 0.04) 0.18      35.2       8.00
     10      125.45   13.22    3.545  0.20( 0.04) 0.18      35.7       1.00
     11      124.80   13.33    3.527  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     131.25    Tc(MIN.) =     9.80
  EFFECTIVE AREA(ACRES) =      30.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  48.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.39
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.25
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =    9.90   RAINFALL INTENSITY(INCH/HR) =  4.18
```

```
  EFFECTIVE AREA(ACRES) =    14.16
  TOTAL AREA(ACRES) =    16.37        PEAK FLOW RATE(CFS) =     60.00
  AREA-AVERAGED Fm(INCH/HR) =   0.04  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.18
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.91
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.00
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.94
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.94
  RAINFALL INTENSITY(INCH/HR) =   4.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      14.16
  TOTAL STREAM AREA(ACRES) =      16.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      60.00

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.81      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.38
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.38
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    5.40
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.40
  RAINFALL INTENSITY(INCH/HR) =   5.92
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       60.00    9.94    4.173  0.20( 0.04) 0.18      14.2       1.00
      2        4.38    5.40    5.922  0.20( 0.18) 0.90       0.8      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       50.72    5.40    5.922  0.20( 0.05) 0.25       8.5      34.00
      2       63.05    9.94    4.173  0.20( 0.04) 0.22      15.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.05    Tc(MIN.) =     9.94
  EFFECTIVE AREA(ACRES) =      14.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =       17.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.05
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.98
  RAINFALL INTENSITY(INCH/HR) =   4.16
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =      14.97
  TOTAL STREAM AREA(ACRES) =      17.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      63.05
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    91    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      9.00
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      9.00

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.00
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.68
  RAINFALL INTENSITY(INCH/HR) =   4.84
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       50.72    5.44    5.895  0.20( 0.05) 0.25       8.5      34.00
      1       63.05    9.98    4.163  0.20( 0.04) 0.22      15.0       1.00
      2        9.00    7.68    4.838  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       58.50    5.44    5.895  0.20( 0.05) 0.24      10.0      34.00
      2       65.80    7.68    4.838  0.20( 0.05) 0.23      13.7      37.00
      3       70.78    9.98    4.163  0.20( 0.04) 0.22      17.0       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      70.78    Tc(MIN.) =     9.98
  EFFECTIVE AREA(ACRES) =      17.03   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.22
  TOTAL AREA(ACRES) =       19.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  38.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.78
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   4.00
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =      17.03
  TOTAL STREAM AREA(ACRES) =      19.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      70.78

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.18
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.18

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.078
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.55      0.20     0.100    91
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.69

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   5.08
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       58.50    6.18    5.482  0.20( 0.05) 0.24      10.0      34.00
      1       65.80    8.39    4.599  0.20( 0.05) 0.23      13.7      37.00
      1       70.78   10.69    4.004  0.20( 0.04) 0.22      17.0       1.00
      2        3.69    7.06    5.078  0.20( 0.02) 0.10       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.99    6.18    5.482  0.20( 0.05) 0.23      10.7      34.00
      2       65.10    7.06    5.078  0.20( 0.05) 0.23      12.3      40.00
      3       69.14    8.39    4.599  0.20( 0.04) 0.22      14.6      37.00
      4       73.69   10.69    4.004  0.20( 0.04) 0.21      17.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      73.69    Tc(MIN.) =    10.69
  EFFECTIVE AREA(ACRES) =      17.84   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       20.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.12
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.69
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.76
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =      17.84
  TOTAL STREAM AREA(ACRES) =      20.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      73.69

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.173
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.43      0.20     0.100    91    6.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.99
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      1.99

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.99

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.99    6.25    5.445  0.20( 0.05) 0.23      10.7      34.00
      1       65.10    7.13    5.048  0.20( 0.05) 0.23      12.3      40.00
      1       69.14    8.46    4.577  0.20( 0.04) 0.22      14.6      37.00
      1       73.69   10.76    3.989  0.20( 0.04) 0.21      17.8       1.00
      2        1.99    6.83    5.173  0.20( 0.02) 0.10       0.4      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.91    6.25    5.445  0.20( 0.05) 0.23      11.1      34.00
      2       66.04    6.83    5.173  0.20( 0.04) 0.22      12.2      42.00
      3       67.04    7.13    5.048  0.20( 0.04) 0.22      12.7      40.00
      4       70.90    8.46    4.577  0.20( 0.04) 0.22      15.0      37.00
      5       75.22   10.76    3.989  0.20( 0.04) 0.21      18.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      75.22    Tc(MIN.) =    10.76
```

```
  EFFECTIVE AREA(ACRES) =      18.27   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =       20.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.22
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =      18.27
  TOTAL STREAM AREA(ACRES) =      20.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      75.22

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.218
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20      0.100    91    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.73
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.73

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.750
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.54
  FLOW VELOCITY(FEET/SEC.) =  3.02   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.36

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.41
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.87
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.87
  RAINFALL INTENSITY(INCH/HR) =   5.16
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       63.91    6.65    5.256  0.20( 0.05) 0.23      11.1      34.00
      1       66.04    7.23    5.009  0.20( 0.04) 0.22      12.2      42.00
      1       67.04    7.53    4.895  0.20( 0.04) 0.22      12.7      40.00
      1       70.90    8.85    4.460  0.20( 0.04) 0.22      15.0      37.00
      1       75.22   11.14    3.910  0.20( 0.04) 0.21      18.3       1.00
      2        3.36    7.93    4.750  0.20( 0.02) 0.10       0.8      44.00
      3        3.41    6.87    5.159  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       70.39    6.65    5.256  0.20( 0.04) 0.21      12.4      34.00
      2       71.29    6.87    5.159  0.20( 0.04) 0.21      12.9      40.00
      3       72.59    7.23    5.009  0.20( 0.04) 0.21      13.6      42.00
      4       73.57    7.53    4.895  0.20( 0.04) 0.21      14.2      40.00
      5       74.72    7.93    4.750  0.20( 0.04) 0.21      14.9      44.00
      6       77.00    8.85    4.460  0.20( 0.04) 0.21      16.5      37.00
      7       80.57   11.14    3.910  0.20( 0.04) 0.20      19.8       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      80.57    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =      19.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       22.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      80.57
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   12.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      80.57
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.03
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.896
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    91    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      6.99
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      6.99

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.99
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =    8.68
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        9.31      0.20      0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     9.31      SUBAREA RUNOFF(CFS) =   37.46
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  32.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.22
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.90
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =    9.64
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.64
  RAINFALL INTENSITY(INCH/HR) =   4.25
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.90

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.424
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.20      0.20      0.100    91    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.97
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.97

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.55
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.22      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.94
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.13
  FLOW VELOCITY(FEET/SEC.) =  2.07   DEPTH*VELOCITY(FT*FT/SEC.) =   0.61
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.89
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.764
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.46      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.96
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.76

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    8.06
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.06
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       43.90    9.64    4.248  0.20( 0.04) 0.20      10.9      48.00
      2        3.76    8.06    4.708  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.46    8.06    4.708  0.20( 0.04) 0.19      10.0      51.00
      2       47.29    9.64    4.248  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.29    Tc(MIN.) =     9.64
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.29
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    9.99
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.99
  RAINFALL INTENSITY(INCH/HR) =   4.16
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.79
  TOTAL STREAM AREA(ACRES) =      11.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.29

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.796
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20      0.100    91    5.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.88
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.88

********************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.60
  RAINFALL INTENSITY(INCH/HR) =   5.80
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.46    8.41    4.595  0.20( 0.04) 0.19      10.0      51.00
      1       47.29    9.99    4.162  0.20( 0.04) 0.19      11.8      48.00
      2        0.88    5.60    5.796  0.20( 0.02) 0.10       0.2      53.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.34    5.60    5.796  0.20( 0.04) 0.19       6.8      53.00
      2       45.15    8.41    4.595  0.20( 0.04) 0.19      10.2      51.00
      3       47.92    9.99    4.162  0.20( 0.04) 0.19      12.0      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.92    Tc(MIN.) =     9.99
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.92
```

```
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.41
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.41
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.92

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    91    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   17.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.99
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =    8.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

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  "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =   14.35
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =      15.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  20.00
  FLOW VELOCITY(FEET/SEC.) =  3.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.28
  RAINFALL INTENSITY(INCH/HR) =   4.63
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.34    6.05    5.545  0.20( 0.04) 0.19       6.8      53.00
      1       45.15    8.85    4.462  0.20( 0.04) 0.19      10.2      51.00
      1       47.92   10.41    4.064  0.20( 0.04) 0.19      12.0      48.00
      2       15.22    8.28    4.634  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.67    6.05    5.545  0.20( 0.04) 0.19       9.5      53.00
      2       59.00    8.28    4.634  0.20( 0.04) 0.19      13.2      56.00
      3       59.80    8.85    4.462  0.20( 0.04) 0.19      13.8      51.00
      4       61.25   10.41    4.064  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.25    Tc(MIN.) =    10.41
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.45
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.25
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.56
 RAINFALL INTENSITY(INCH/HR) =   4.03
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =      15.64
 TOTAL STREAM AREA(ACRES) =      15.64
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.25

****************************************************************************
 FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
 ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.790
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 PUBLIC PARK                 D        1.10      0.20      0.850    91   11.76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA RUNOFF(CFS) =      3.58
 TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.58

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
 FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.58
 PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   13.95
 LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.95
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.436
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                 D        8.75      0.20      0.850    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =     8.75      SUBAREA RUNOFF(CFS) =   25.72
 EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =      28.96
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.95
  RAINFALL INTENSITY(INCH/HR) =   3.44
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       9.85
  TOTAL STREAM AREA(ACRES) =       9.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.67    6.21    5.465  0.20( 0.04) 0.19       9.5      53.00
      1       59.00    8.43    4.585  0.20( 0.04) 0.19      13.2      56.00
      1       59.80    9.00    4.419  0.20( 0.04) 0.19      13.8      51.00
      1       61.25   10.56    4.031  0.20( 0.04) 0.19      15.6      48.00
      2       28.96   13.95    3.436  0.20( 0.17) 0.85       9.9      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.56    6.21    5.465  0.20( 0.08) 0.40      13.9      53.00
      2       82.65    8.43    4.585  0.20( 0.08) 0.40      19.1      56.00
      3       84.09    9.00    4.419  0.20( 0.08) 0.40      20.2      51.00
      4       87.16   10.56    4.031  0.20( 0.08) 0.40      23.1      48.00
      5       81.09   13.95    3.436  0.20( 0.09) 0.45      25.5      59.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.16    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      23.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.16
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   10.75
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.56    6.41    5.368  0.20( 0.08) 0.40      13.9      53.00
      2       82.65    8.63    4.526  0.20( 0.08) 0.40      19.1      56.00
```

```
     3       84.09    9.19    4.365  0.20( 0.08) 0.40      20.2      51.00
     4       87.16   10.75    3.990  0.20( 0.08) 0.40      23.1      48.00
     5       81.09   14.15    3.409  0.20( 0.09) 0.45      25.5      59.00
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       70.39    8.57    4.542  0.20( 0.04) 0.21      12.4      34.00
     2       71.29    8.79    4.478  0.20( 0.04) 0.21      12.9      40.00
     3       72.59    9.15    4.377  0.20( 0.04) 0.21      13.6      42.00
     4       73.57    9.44    4.298  0.20( 0.04) 0.21      14.2      40.00
     5       74.72    9.84    4.197  0.20( 0.04) 0.21      14.9      44.00
     6       77.00   10.76    3.988  0.20( 0.04) 0.21      16.5      37.00
     7       80.57   13.03    3.574  0.20( 0.04) 0.20      19.8       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      134.80    6.41    5.368  0.20( 0.06) 0.32      23.2      53.00
     2      152.80    8.57    4.542  0.20( 0.06) 0.32      31.4      34.00
     3      153.27    8.63    4.526  0.20( 0.06) 0.32      31.7      56.00
     4      154.35    8.79    4.478  0.20( 0.06) 0.32      32.3      40.00
     5      156.57    9.15    4.377  0.20( 0.06) 0.32      33.7      42.00
     6      156.82    9.19    4.365  0.20( 0.06) 0.32      33.9      51.00
     7      158.15    9.44    4.298  0.20( 0.06) 0.32      34.9      40.00
     8      160.10    9.84    4.197  0.20( 0.06) 0.32      36.3      44.00
     9      164.14   10.75    3.990  0.20( 0.06) 0.32      39.6      48.00
    10      164.14   10.76    3.988  0.20( 0.06) 0.32      39.6      37.00
    11      163.66   13.03    3.574  0.20( 0.07) 0.33      44.5       1.00
    12      157.89   14.15    3.409  0.20( 0.07) 0.34      45.3      59.00
    TOTAL AREA(ACRES) =        47.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      164.14  Tc(MIN.) =   10.761
  EFFECTIVE AREA(ACRES) =     39.61  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       47.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       47.5  TC(MIN.) =     10.76
  EFFECTIVE AREA(ACRES) =     39.61  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.322
  PEAK FLOW RATE(CFS)   =     164.14

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      134.80    6.41    5.368  0.20( 0.06) 0.32      23.2      53.00
     2      152.80    8.57    4.542  0.20( 0.06) 0.32      31.4      34.00
     3      153.27    8.63    4.526  0.20( 0.06) 0.32      31.7      56.00
     4      154.35    8.79    4.478  0.20( 0.06) 0.32      32.3      40.00
     5      156.57    9.15    4.377  0.20( 0.06) 0.32      33.7      42.00
     6      156.82    9.19    4.365  0.20( 0.06) 0.32      33.9      51.00
     7      158.15    9.44    4.298  0.20( 0.06) 0.32      34.9      40.00
     8      160.10    9.84    4.197  0.20( 0.06) 0.32      36.3      44.00
     9      164.14   10.75    3.990  0.20( 0.06) 0.32      39.6      48.00
    10      164.14   10.76    3.988  0.20( 0.06) 0.32      39.6      37.00
    11      163.66   13.03    3.574  0.20( 0.07) 0.33      44.5       1.00
    12      157.89   14.15    3.409  0.20( 0.07) 0.34      45.3      59.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                            *
* 100-YR STUDY                                                           *
* PROPOSED - WEST AREA - DRAINAGE AREA 'B'                               *
 ***********************************************************************

  FILE NAME: WEST-B.DAT
  TIME/DATE OF STUDY: 12:50 11/07/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    505.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.266
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.00      0.20     0.500    91    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.75
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      3.75

******************************************************************************
```

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   505.00  DOWNSTREAM(FEET) =   497.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.75
  PIPE TRAVEL TIME(MIN.) =   2.12    Tc(MIN.) =   11.69
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.804
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D       10.02      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =   10.02      SUBAREA RUNOFF(CFS) =   33.40
  EFFECTIVE AREA(ACRES) =     11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      36.74

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.76
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.74
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.50  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.209
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.60      0.20     0.100    91    6.75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.80
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.80

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   720.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   13.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   3.58   Tc(MIN.) =   10.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.081
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.57      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.57      SUBAREA RUNOFF(CFS) =    5.74
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       7.93

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  15.33
  FLOW VELOCITY(FEET/SEC.) =  3.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.17
  TOTAL STREAM AREA(ACRES) =       2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.93

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
```

```
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.03      0.20      0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      5.57
  TOTAL AREA(ACRES) =      1.03   PEAK FLOW RATE(CFS) =      5.57

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.57
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.21
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.21
  RAINFALL INTENSITY(INCH/HR) =   6.04
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.03
  TOTAL STREAM AREA(ACRES) =       1.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.57

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.93   10.34    4.081  0.20( 0.02) 0.10       2.2       4.00
      2        5.57    5.21    6.042  0.20( 0.18) 0.90       1.0       6.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.50    5.21    6.042  0.20( 0.10) 0.49       2.1       6.00
      2       11.64   10.34    4.081  0.20( 0.07) 0.36       3.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.64    Tc(MIN.) =    10.34
  EFFECTIVE AREA(ACRES) =       3.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        3.2
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.64
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.50    5.39    5.929  0.20( 0.10) 0.49       2.1       6.00
      2       11.64   10.51    4.042  0.20( 0.07) 0.36       3.2       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.74   12.27    3.700  0.20( 0.10) 0.50      11.0       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       37.62    5.39    5.929  0.20( 0.10) 0.50       7.0       6.00
      2       46.11   10.51    4.042  0.20( 0.09) 0.46      12.6       4.00
      3       47.37   12.27    3.700  0.20( 0.09) 0.47      14.2       1.00
    TOTAL AREA(ACRES) =        14.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       47.37  Tc(MIN.) =   12.268
  EFFECTIVE AREA(ACRES) =     14.22  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.27
  RAINFALL INTENSITY(INCH/HR) =   3.70
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      14.22
  TOTAL STREAM AREA(ACRES) =      14.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.37

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.225
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.457
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    91    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  482.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.28
  STREET FLOW TRAVEL TIME(MIN.) =   3.96   Tc(MIN.) =   10.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.117
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.43      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    5.27
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.62
  FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.49
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1095.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.02
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       1.97
 TOTAL STREAM AREA(ACRES) =       1.97
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.26

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       37.62    5.39    5.929  0.20( 0.10) 0.50       7.0       6.00
     1       46.11   10.51    4.042  0.20( 0.09) 0.46      12.6       4.00
     1       47.37   12.27    3.700  0.20( 0.09) 0.47      14.2       1.00
     2        7.26   10.18    4.117  0.20( 0.02) 0.10       2.0       9.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       43.16    5.39    5.929  0.20( 0.09) 0.44       8.0       6.00
     2       52.83   10.18    4.117  0.20( 0.08) 0.42      14.2       9.00
     3       53.24   10.51    4.042  0.20( 0.08) 0.41      14.6       4.00
     4       53.89   12.27    3.700  0.20( 0.08) 0.42      16.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      53.89    Tc(MIN.) =    12.27
 EFFECTIVE AREA(ACRES) =      16.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
 TOTAL AREA(ACRES) =       16.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       16.2  TC(MIN.) =     12.27
 EFFECTIVE AREA(ACRES) =     16.19  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.423
 PEAK FLOW RATE(CFS)   =      53.89

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       43.16    5.39    5.929  0.20( 0.09) 0.44       8.0       6.00
     2       52.83   10.18    4.117  0.20( 0.08) 0.42      14.2       9.00
     3       53.24   10.51    4.042  0.20( 0.08) 0.41      14.6       4.00
     4       53.89   12.27    3.700  0.20( 0.08) 0.42      16.2       1.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - WEST AREA - DRAINAGE AREA 'C'                              *
 ***********************************************************************

  FILE NAME: WEST-C.DAT
  TIME/DATE OF STUDY: 18:14 01/09/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.60  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.617
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.270
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.24      0.20      0.200    91    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.84
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      5.84

******************************************************************************
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```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   470.00
 FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.84
 PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =    8.23
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.652
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        5.21      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    5.21      SUBAREA RUNOFF(CFS) =   21.63
 EFFECTIVE AREA(ACRES) =      6.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =      26.77

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.23
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.652
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        D        4.09      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.09      SUBAREA RUNOFF(CFS) =   16.98
 EFFECTIVE AREA(ACRES) =     10.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      43.75
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =      8.23
 EFFECTIVE AREA(ACRES) =     10.54  AREA-AVERAGED Fm(INCH/HR)=  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
 PEAK FLOW RATE(CFS)   =      43.75
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

EAST – AREA ‘A’

100-YR STUDY

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******************************************************************************
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                           Analysis prepared by:

                           HUNSAKER & ASSOCIATES
                                 Irvine,Inc
                        Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A'                                            *
 ***********************************************************************

  FILE NAME: EAST.DAT
  TIME/DATE OF STUDY: 10:57 10/31/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.940
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.77      0.20      0.600    91   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.65
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   12.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.633
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  15.84
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.16
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.97
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.95
  TOTAL STREAM AREA(ACRES) =       1.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.16

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    91    9.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.81
  TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      3.81

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.14
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =   11.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.857
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       6.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.66
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.41
  RAINFALL INTENSITY(INCH/HR) =   3.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.16   12.97    3.583  0.20( 0.12) 0.60       1.9       1.00
      2        6.96   11.41    3.857  0.20( 0.12) 0.60       2.1       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.81   11.41    3.857  0.20( 0.12) 0.60       3.8       4.00
      2       12.62   12.97    3.583  0.20( 0.12) 0.60       4.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.81    Tc(MIN.) =    11.41
  EFFECTIVE AREA(ACRES) =       3.79   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.81
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.45
  RAINFALL INTENSITY(INCH/HR) =   3.85
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       3.79
  TOTAL STREAM AREA(ACRES) =       4.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.81

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    91    8.94
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.77
 TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.77

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   14.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
 STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   10.46
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.053
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.48
 EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.01

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.43
 FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.81   11.45    3.848  0.20( 0.12) 0.60       3.8       4.00
      1       12.62   13.02    3.576  0.20( 0.12) 0.60       4.0       1.00
      2        7.01   10.46    4.053  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.36   10.46    4.053  0.20( 0.11) 0.56       5.4       7.00
      2       19.46   11.45    3.848  0.20( 0.11) 0.57       5.8       4.00
      3       18.78   13.02    3.576  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.46    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =       5.76   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.46
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   3.84
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.76
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.46

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.356
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    91    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =   10.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.096
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    2.68
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  3.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   4.10
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36   10.48    4.048  0.20( 0.11) 0.56       5.4       7.00
      1       19.46   11.47    3.844  0.20( 0.11) 0.57       5.8       4.00
      1       18.78   13.04    3.573  0.20( 0.11) 0.57       6.0       1.00
      2        5.17   10.27    4.096  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.36   10.27    4.096  0.20( 0.11) 0.56       6.8      10.00
      2       24.46   10.48    4.048  0.20( 0.11) 0.56       6.9       7.00
      3       24.30   11.47    3.844  0.20( 0.11) 0.56       7.2       4.00
      4       23.27   13.04    3.573  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.46    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.46
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.46

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20     0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.94
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.20      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.11
 EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.05

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.37
 TOTAL STREAM AREA(ACRES) =       0.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.36   10.53    4.039  0.20( 0.11) 0.56       6.8       10.00
     1       24.46   10.74    3.993  0.20( 0.11) 0.56       6.9        7.00
     1       24.30   11.73    3.796  0.20( 0.11) 0.56       7.2        4.00
     1       23.27   13.29    3.533  0.20( 0.11) 0.56       7.4        1.00
     2        2.05    5.00    6.187  0.20( 0.02) 0.10       0.4        6.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.96    5.00    6.187  0.20( 0.10) 0.51       3.6        6.00
     2       25.70   10.53    4.039  0.20( 0.11) 0.54       7.1       10.00
     3       25.78   10.74    3.993  0.20( 0.11) 0.54       7.2        7.00
     4       25.55   11.73    3.796  0.20( 0.11) 0.54       7.6        4.00
     5       24.44   13.29    3.533  0.20( 0.11) 0.54       7.8        1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.78    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.89
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.78
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.107
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20      0.100    91    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.39
  TOTAL STREAM AREA(ACRES) =       0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.96    5.03    6.166  0.20( 0.10) 0.51       3.6       6.00
      1       25.70   10.55    4.033  0.20( 0.11) 0.54       7.1      10.00
      1       25.78   10.77    3.987  0.20( 0.11) 0.54       7.2       7.00
      1       25.55   11.76    3.791  0.20( 0.11) 0.54       7.6       4.00
      1       24.44   13.32    3.529  0.20( 0.11) 0.54       7.8       1.00
      2        1.79    6.99    5.107  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.51    5.03    6.166  0.20( 0.10) 0.48       3.9       6.00
      2       23.78    6.99    5.107  0.20( 0.10) 0.49       5.2      14.00
      3       27.11   10.55    4.033  0.20( 0.10) 0.51       7.5      10.00
      4       27.17   10.77    3.987  0.20( 0.10) 0.52       7.6       7.00
      5       26.88   11.76    3.791  0.20( 0.10) 0.52       8.0       4.00
      6       25.67   13.32    3.529  0.20( 0.10) 0.52       8.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.17    Tc(MIN.) =    10.77
  EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.17
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.409
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.324
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    91    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.52
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.52

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.71    9.03    4.409  0.20( 0.10) 0.50       0.7      16.00
      2        3.52    9.34    4.324  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
   STREAM        Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
      1         6.18    9.03    4.409  0.20( 0.11) 0.56        1.6      16.00
      2         6.18    9.34    4.324  0.20( 0.11) 0.56        1.6      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.18    Tc(MIN.) =     9.03
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.18
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.31
  RAINFALL INTENSITY(INCH/HR) =   4.33
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.18

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.861
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.22      0.20     0.100    91    7.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.96

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
```

```
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    8.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.612
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.58
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.17
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.35
  RAINFALL INTENSITY(INCH/HR) =   4.61
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.18    9.31    4.332  0.20( 0.11) 0.56       1.6      16.00
      1        6.18    9.62    4.251  0.20( 0.11) 0.56       1.6      17.00
      2        1.49    8.35    4.612  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.35    4.612  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.31    4.332  0.20( 0.09) 0.47       2.0      16.00
      3        7.55    9.62    4.251  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       7.58    Tc(MIN.) =     9.31
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.58
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.77    4.483  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.74    4.224  0.20( 0.09) 0.47       2.0      16.00
      3        7.55   10.05    4.148  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.51    5.07    6.139  0.20( 0.10) 0.48       3.9       6.00
      2       23.78    7.03    5.091  0.20( 0.10) 0.49       5.2      14.00
      3       27.11   10.59    4.025  0.20( 0.10) 0.51       7.5      10.00
      4       27.17   10.80    3.979  0.20( 0.10) 0.52       7.6       7.00
      5       26.88   11.79    3.784  0.20( 0.10) 0.52       8.0       4.00
      6       25.67   13.36    3.523  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.40    5.07    6.139  0.20( 0.10) 0.48       4.9       6.00
      2       30.52    7.03    5.091  0.20( 0.10) 0.48       6.7      14.00
      3       32.81    8.77    4.483  0.20( 0.10) 0.49       8.1      19.00
      4       33.89    9.74    4.224  0.20( 0.10) 0.50       8.9      16.00
      5       34.15   10.05    4.148  0.20( 0.10) 0.50       9.2      17.00
      6       34.43   10.59    4.025  0.20( 0.10) 0.51       9.5      10.00
      7       34.41   10.80    3.979  0.20( 0.10) 0.51       9.6       7.00
      8       33.75   11.79    3.784  0.20( 0.10) 0.51       9.9       4.00
      9       32.06   13.36    3.523  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.43  Tc(MIN.) =   10.589
  EFFECTIVE AREA(ACRES) =      9.51  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.88
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.43
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.51
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.43

**************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.727
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    91    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.69

**************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =   10.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
 STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.22
 EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.75

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
 FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
 LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.47
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.40      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.54
 EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       4.29

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.47
 RAINFALL INTENSITY(INCH/HR) =   4.29
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.16
 EFFECTIVE STREAM AREA(ACRES) =       1.12
 TOTAL STREAM AREA(ACRES) =       1.12
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.29

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       27.40    6.23    5.455  0.20( 0.10) 0.48       4.9       6.00
     1       30.52    8.13    4.682  0.20( 0.10) 0.48       6.7      14.00
     1       32.81    9.87    4.191  0.20( 0.10) 0.49       8.1      19.00
     1       33.89   10.83    3.974  0.20( 0.10) 0.50       8.9      16.00
     1       34.15   11.14    3.910  0.20( 0.10) 0.50       9.2      17.00
```

```
     1       34.43   11.68    3.805  0.20( 0.10) 0.51       9.5       10.00
     1       34.41   11.89    3.766  0.20( 0.10) 0.51       9.6        7.00
     1       33.75   12.88    3.597  0.20( 0.10) 0.51       9.9        4.00
     1       32.06   14.46    3.368  0.20( 0.10) 0.51      10.2        1.00
     2        4.29    9.47    4.290  0.20( 0.03) 0.16       1.1       13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.99    6.23    5.455  0.20( 0.09) 0.44       5.6        6.00
      2       34.55    8.13    4.682  0.20( 0.09) 0.44       7.6       14.00
      3       36.58    9.47    4.290  0.20( 0.09) 0.45       8.9       13.00
      4       37.00    9.87    4.191  0.20( 0.09) 0.45       9.3       19.00
      5       37.86   10.83    3.974  0.20( 0.09) 0.46      10.0       16.00
      6       38.06   11.14    3.910  0.20( 0.09) 0.47      10.3       17.00
      7       38.23   11.68    3.805  0.20( 0.09) 0.47      10.6       10.00
      8       38.17   11.89    3.766  0.20( 0.09) 0.47      10.7        7.00
      9       37.34   12.88    3.597  0.20( 0.09) 0.47      11.1        4.00
     10       35.42   14.46    3.368  0.20( 0.10) 0.48      11.3        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.23    Tc(MIN.) =    11.68
  EFFECTIVE AREA(ACRES) =      10.63   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.81
  RAINFALL INTENSITY(INCH/HR) =   3.78
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.63
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.23

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.14      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.670
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.64      0.20      0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.64
  AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   0.82
  Tc(MIN.) =    5.82
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   4.14
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.87
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.87

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.99    6.36    5.390  0.20( 0.09) 0.44       5.6       6.00
     1       34.55    8.26    4.640  0.20( 0.09) 0.44       7.6      14.00
     1       36.58    9.60    4.257  0.20( 0.09) 0.45       8.9      13.00
     1       37.00   10.00    4.160  0.20( 0.09) 0.45       9.3      19.00
     1       37.86   10.96    3.947  0.20( 0.09) 0.46      10.0      16.00
     1       38.06   11.27    3.884  0.20( 0.09) 0.47      10.3      17.00
     1       38.23   11.81    3.781  0.20( 0.09) 0.47      10.6      10.00
     1       38.17   12.02    3.743  0.20( 0.09) 0.47      10.7       7.00
     1       37.34   13.01    3.577  0.20( 0.09) 0.47      11.1       4.00
     1       35.42   14.59    3.350  0.20( 0.10) 0.48      11.3       1.00
     2        3.87    6.83    5.174  0.20( 0.15) 0.76       0.8      25.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.36    5.390  0.20( 0.09) 0.47       6.4       6.00
     2       35.74    6.83    5.174  0.20( 0.10) 0.48       6.9      25.00
     3       38.01    8.26    4.640  0.20( 0.09) 0.47       8.4      14.00
     4       39.75    9.60    4.257  0.20( 0.10) 0.48       9.7      13.00
     5       40.09   10.00    4.160  0.20( 0.10) 0.48      10.0      19.00
     6       40.79   10.96    3.947  0.20( 0.10) 0.48      10.8      16.00
     7       40.94   11.27    3.884  0.20( 0.10) 0.49      11.1      17.00
     8       41.03   11.81    3.781  0.20( 0.10) 0.49      11.4      10.00
     9       40.94   12.02    3.743  0.20( 0.10) 0.49      11.5       7.00
    10       39.99   13.01    3.577  0.20( 0.10) 0.49      11.8       4.00
    11       37.89   14.59    3.350  0.20( 0.10) 0.50      12.1       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      41.03    Tc(MIN.) =    11.81
 EFFECTIVE AREA(ACRES) =      11.41   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       12.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      41.03
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.88
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.88
 RAINFALL INTENSITY(INCH/HR) =   3.77
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.49
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  EFFECTIVE STREAM AREA(ACRES) =      11.41
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.03

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   10.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.123
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.26
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       7.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   4.12
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.44    5.354  0.20( 0.09) 0.47       6.4       6.00
     1       35.74    6.91    5.142  0.20( 0.10) 0.48       6.9      25.00
     1       38.01    8.34    4.616  0.20( 0.09) 0.47       8.4      14.00
     1       39.75    9.67    4.239  0.20( 0.10) 0.48       9.7      13.00
     1       40.09   10.07    4.143  0.20( 0.10) 0.48      10.0      19.00
     1       40.79   11.03    3.933  0.20( 0.10) 0.48      10.8      16.00
     1       40.94   11.34    3.870  0.20( 0.10) 0.49      11.1      17.00
     1       41.03   11.88    3.768  0.20( 0.10) 0.49      11.4      10.00
     1       40.94   12.09    3.730  0.20( 0.10) 0.49      11.5       7.00
     1       39.99   13.08    3.565  0.20( 0.10) 0.49      11.8       4.00
     1       37.89   14.66    3.341  0.20( 0.10) 0.50      12.1       1.00
     2        7.82   10.15    4.123  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       41.23    6.44    5.354  0.20( 0.10) 0.50       7.7       6.00
     2       42.42    6.91    5.142  0.20( 0.10) 0.50       8.4      25.00
     3       45.22    8.34    4.616  0.20( 0.10) 0.50      10.2      14.00
     4       47.41    9.67    4.239  0.20( 0.10) 0.50      11.8      13.00
     5       47.88   10.07    4.143  0.20( 0.10) 0.50      12.2      19.00
     6       47.97   10.15    4.123  0.20( 0.10) 0.50      12.3      29.00
     7       48.24   11.03    3.933  0.20( 0.10) 0.50      13.0      16.00
     8       48.26   11.34    3.870  0.20( 0.10) 0.51      13.2      17.00
     9       48.15   11.88    3.768  0.20( 0.10) 0.51      13.6      10.00
    10       47.99   12.09    3.730  0.20( 0.10) 0.51      13.7       7.00
    11       46.71   13.08    3.565  0.20( 0.10) 0.51      14.0       4.00
    12       44.18   14.66    3.341  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      48.26    Tc(MIN.) =    11.34
 EFFECTIVE AREA(ACRES) =      13.23   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.74
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      48.26
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.65
```

```
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.65
 RAINFALL INTENSITY(INCH/HR) =   3.81
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.51
 EFFECTIVE STREAM AREA(ACRES) =      13.23
 TOTAL STREAM AREA(ACRES) =      14.25
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.26

****************************************************************************
 FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
 ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.001
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.24      0.20     0.100    91    7.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.08
 TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
 FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.25
 RAINFALL INTENSITY(INCH/HR) =   5.00
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.24
 TOTAL STREAM AREA(ACRES) =       0.24
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
 ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.439
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.25      0.20     0.100    91    6.26
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   5.44
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.23    6.76    5.205  0.20( 0.10) 0.50       7.7       6.00
      1       42.42    7.23    5.009  0.20( 0.10) 0.50       8.4      25.00
      1       45.22    8.66    4.518  0.20( 0.10) 0.50      10.2      14.00
      1       47.41    9.99    4.162  0.20( 0.10) 0.50      11.8      13.00
      1       47.88   10.39    4.070  0.20( 0.10) 0.50      12.2      19.00
      1       47.97   10.47    4.051  0.20( 0.10) 0.50      12.3      29.00
      1       48.24   11.34    3.869  0.20( 0.10) 0.50      13.0      16.00
      1       48.26   11.65    3.810  0.20( 0.10) 0.51      13.2      17.00
      1       48.15   12.20    3.712  0.20( 0.10) 0.51      13.6      10.00
      1       47.99   12.41    3.675  0.20( 0.10) 0.51      13.7       7.00
      1       46.71   13.40    3.517  0.20( 0.10) 0.51      14.0       4.00
      1       44.18   14.98    3.300  0.20( 0.10) 0.51      14.2       1.00
      2        1.08    7.25    5.001  0.20( 0.02) 0.10       0.2      24.00
      3        1.22    6.26    5.439  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.26    5.439  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.76    5.205  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.23    5.009  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.25    5.001  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.66    4.518  0.20( 0.10) 0.48      10.7      14.00
      6       49.24    9.99    4.162  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.39    4.070  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.47    4.051  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.34    3.869  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.65    3.810  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.20    3.712  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.41    3.675  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.40    3.517  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   14.98    3.300  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      49.93    Tc(MIN.) =    11.34
  EFFECTIVE AREA(ACRES) =      13.49   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.93
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.578
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.20      0.20     0.600    91    8.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.81
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.81

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    9.16
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.372
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  6.26   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   4.37
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.236
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.73      0.20     0.600    91    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.36
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.36

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.32
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   0.39   Tc(MIN.) =    7.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.070
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.92
  EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  5.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.08
  RAINFALL INTENSITY(INCH/HR) =   5.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.16
  TOTAL STREAM AREA(ACRES) =       1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.38    9.16    4.372  0.20( 0.12) 0.60       2.2      33.00
      2        5.17    7.08    5.070  0.20( 0.12) 0.60       1.2      35.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.70    7.08    5.070  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.16    4.372  0.20( 0.12) 0.60       3.4      33.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.82    Tc(MIN.) =     9.16
  EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.82
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.70    7.22    5.012  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.31    4.334  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.34    5.401  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.84    5.172  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.30    4.980  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.33    4.971  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.73    4.496  0.20( 0.10) 0.48      10.7      14.00
      6       49.24   10.06    4.144  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.46    4.053  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.54    4.035  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.42    3.855  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.73    3.796  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.27    3.699  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.48    3.663  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.48    3.506  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   15.05    3.290  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.21    6.34    5.401  0.20( 0.10) 0.50      10.1      31.00
      2       55.86    6.84    5.172  0.20( 0.10) 0.51      10.9       6.00
      3       57.11    7.22    5.012  0.20( 0.10) 0.51      11.6      35.00
      4       57.32    7.30    4.980  0.20( 0.10) 0.51      11.7      25.00
      5       57.36    7.33    4.971  0.20( 0.10) 0.51      11.8      24.00
      6       59.99    8.73    4.496  0.20( 0.10) 0.51      13.9      14.00
      7       60.90    9.31    4.334  0.20( 0.10) 0.51      14.7      33.00
      8       61.48   10.06    4.144  0.20( 0.10) 0.51      15.6      13.00
      9       61.64   10.46    4.053  0.20( 0.10) 0.51      16.0      19.00
     10       61.66   10.54    4.035  0.20( 0.10) 0.51      16.1      29.00
     11       61.30   11.42    3.855  0.20( 0.10) 0.51      16.8      16.00
     12       61.12   11.73    3.796  0.20( 0.10) 0.51      17.1      17.00
     13       60.67   12.27    3.699  0.20( 0.10) 0.51      17.4      10.00
     14       60.39   12.48    3.663  0.20( 0.10) 0.51      17.5       7.00
     15       58.56   13.48    3.506  0.20( 0.10) 0.52      17.9       4.00
     16       55.27   15.05    3.290  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       61.66  Tc(MIN.) =   10.545
  EFFECTIVE AREA(ACRES) =     16.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.06
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.66
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.12
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.66

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.776
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    91    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.76

******************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    7.33
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.971
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.52      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.32
  EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.51
  FLOW VELOCITY(FEET/SEC.) =  4.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
  LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.33
  RAINFALL INTENSITY(INCH/HR) =   4.97
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.86
  TOTAL STREAM AREA(ACRES) =       0.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.21    7.01    5.099  0.20( 0.10) 0.50      10.1      31.00
      1       55.86    7.50    4.903  0.20( 0.10) 0.51      10.9       6.00
      1       57.11    7.89    4.765  0.20( 0.10) 0.51      11.6      35.00
      1       57.32    7.97    4.737  0.20( 0.10) 0.51      11.7      25.00
      1       57.36    7.99    4.729  0.20( 0.10) 0.51      11.8      24.00
      1       59.99    9.39    4.311  0.20( 0.10) 0.51      13.9      14.00
      1       60.90    9.95    4.171  0.20( 0.10) 0.51      14.7      33.00
      1       61.48   10.71    4.000  0.20( 0.10) 0.51      15.6      13.00
      1       61.64   11.10    3.918  0.20( 0.10) 0.51      16.0      19.00
      1       61.66   11.19    3.900  0.20( 0.10) 0.51      16.1      29.00
      1       61.30   12.06    3.736  0.20( 0.10) 0.51      16.8      16.00
      1       61.12   12.37    3.682  0.20( 0.10) 0.51      17.1      17.00
      1       60.67   12.94    3.589  0.20( 0.10) 0.51      17.4      10.00
      1       60.39   13.15    3.555  0.20( 0.10) 0.51      17.5       7.00
      1       58.56   14.14    3.410  0.20( 0.10) 0.52      17.9       4.00
      1       55.27   15.72    3.209  0.20( 0.10) 0.52      18.1       1.00
      2        3.83    7.33    4.971  0.20( 0.02) 0.10       0.9      38.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       57.97    7.01    5.099  0.20( 0.09) 0.47      10.9      31.00
```

```
      2       59.10    7.33    4.971  0.20( 0.09) 0.47      11.5       38.00
      3       59.64    7.50    4.903  0.20( 0.10) 0.48      11.8        6.00
      4       60.78    7.89    4.765  0.20( 0.10) 0.48      12.5       35.00
      5       60.97    7.97    4.737  0.20( 0.10) 0.48      12.6       25.00
      6       61.01    7.99    4.729  0.20( 0.10) 0.48      12.6       24.00
      7       63.31    9.39    4.311  0.20( 0.10) 0.48      14.7       14.00
      8       64.12    9.95    4.171  0.20( 0.10) 0.48      15.6       33.00
      9       64.56   10.71    4.000  0.20( 0.10) 0.49      16.5       13.00
     10       64.65   11.10    3.918  0.20( 0.10) 0.49      16.9       19.00
     11       64.66   11.19    3.900  0.20( 0.10) 0.49      17.0       29.00
     12       64.17   12.06    3.736  0.20( 0.10) 0.49      17.7       16.00
     13       63.95   12.37    3.682  0.20( 0.10) 0.49      17.9       17.00
     14       63.43   12.94    3.589  0.20( 0.10) 0.49      18.3       10.00
     15       63.12   13.15    3.555  0.20( 0.10) 0.49      18.4        7.00
     16       61.18   14.14    3.410  0.20( 0.10) 0.50      18.7        4.00
     17       57.73   15.72    3.209  0.20( 0.10) 0.50      18.9        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.98   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.66
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.649
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"         D        0.84      0.20     0.700    91    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.232
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    6.77
  EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       9.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  4.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.67
  TOTAL STREAM AREA(ACRES) =       2.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.87

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      5.02
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      5.02

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =    9.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.284
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    3.65
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   4.28
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1        9.87    9.70    4.232  0.20( 0.13) 0.63       2.7      41.00
     2        8.37    9.50    4.284  0.20( 0.11) 0.56       2.2      43.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.16    9.50    4.284  0.20( 0.12) 0.60       4.8      43.00
      2       18.14    9.70    4.232  0.20( 0.12) 0.60       4.9      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.16    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       4.84   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.16
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.84
  TOTAL STREAM AREA(ACRES) =       4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.16

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.21      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      1.17
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.21
 TOTAL STREAM AREA(ACRES) =       0.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

****************************************************************************
 FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.682
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.45      0.20     0.600    91    8.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      5.95
 TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.13
 RAINFALL INTENSITY(INCH/HR) =   4.68
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.45
 TOTAL STREAM AREA(ACRES) =       1.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.95

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       18.16    9.85    4.194  0.20( 0.12) 0.60       4.8      43.00
     1       18.14   10.06    4.146  0.20( 0.12) 0.60       4.9      41.00
     2        1.17    5.00    6.187  0.20( 0.02) 0.10       0.2      45.00
     3        5.95    8.13    4.682  0.20( 0.12) 0.60       1.5      46.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       19.75    5.00    6.187  0.20( 0.11) 0.57       3.6      45.00
     2       23.46    8.13    4.682  0.20( 0.12) 0.58       5.7      46.00
```

```
     3       24.26    9.85    4.194  0.20( 0.12) 0.58       6.5      43.00
     4       24.17   10.06    4.146  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.26    Tc(MIN.) =     9.85
  EFFECTIVE AREA(ACRES) =       6.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.26
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.92
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.75    5.07    6.139  0.20( 0.11) 0.57       3.6      45.00
      2       23.46    8.20    4.660  0.20( 0.12) 0.58       5.7      46.00
      3       24.26    9.92    4.178  0.20( 0.12) 0.58       6.5      43.00
      4       24.17   10.12    4.130  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       57.97    7.07    5.075  0.20( 0.09) 0.47      10.9      31.00
      2       59.10    7.38    4.949  0.20( 0.09) 0.47      11.5      38.00
      3       59.64    7.56    4.882  0.20( 0.10) 0.48      11.8       6.00
      4       60.78    7.94    4.745  0.20( 0.10) 0.48      12.5      35.00
      5       60.97    8.03    4.717  0.20( 0.10) 0.48      12.6      25.00
      6       61.01    8.05    4.710  0.20( 0.10) 0.48      12.6      24.00
      7       63.31    9.45    4.296  0.20( 0.10) 0.48      14.7      14.00
      8       64.12   10.00    4.158  0.20( 0.10) 0.48      15.6      33.00
      9       64.56   10.76    3.988  0.20( 0.10) 0.49      16.5      13.00
     10       64.65   11.16    3.907  0.20( 0.10) 0.49      16.9      19.00
     11       64.66   11.24    3.890  0.20( 0.10) 0.49      17.0      29.00
     12       64.17   12.11    3.726  0.20( 0.10) 0.49      17.7      16.00
     13       63.95   12.43    3.673  0.20( 0.10) 0.49      17.9      17.00
     14       63.43   12.99    3.580  0.20( 0.10) 0.49      18.3      10.00
     15       63.12   13.20    3.547  0.20( 0.10) 0.49      18.4       7.00
     16       61.18   14.20    3.403  0.20( 0.10) 0.50      18.7       4.00
     17       57.73   15.78    3.202  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       70.22    5.07    6.139  0.20( 0.10) 0.50      11.4      45.00
      2       80.08    7.07    5.075  0.20( 0.10) 0.51      15.8      31.00
      3       81.59    7.38    4.949  0.20( 0.10) 0.51      16.6      38.00
      4       82.34    7.56    4.882  0.20( 0.10) 0.51      17.0       6.00
      5       83.94    7.94    4.745  0.20( 0.10) 0.51      18.0      35.00
      6       84.23    8.03    4.717  0.20( 0.10) 0.51      18.1      25.00
```

```
      7       84.29    8.05    4.710  0.20( 0.10) 0.51      18.2      24.00
      8       84.72    8.20    4.660  0.20( 0.10) 0.51      18.5      46.00
      9       87.35    9.45    4.296  0.20( 0.10) 0.51      21.0      14.00
     10       88.26    9.92    4.178  0.20( 0.10) 0.51      22.0      43.00
     11       88.34   10.00    4.158  0.20( 0.10) 0.51      22.1      33.00
     12       88.36   10.12    4.130  0.20( 0.10) 0.51      22.3      41.00
     13       87.87   10.76    3.988  0.20( 0.10) 0.51      23.0      13.00
     14       87.48   11.16    3.907  0.20( 0.10) 0.51      23.5      19.00
     15       87.39   11.24    3.890  0.20( 0.10) 0.51      23.5      29.00
     16       85.91   12.11    3.726  0.20( 0.10) 0.52      24.3      16.00
     17       85.37   12.43    3.673  0.20( 0.10) 0.52      24.5      17.00
     18       84.29   12.99    3.580  0.20( 0.10) 0.52      24.8      10.00
     19       83.78   13.20    3.547  0.20( 0.10) 0.52      24.9       7.00
     20       80.97   14.20    3.403  0.20( 0.10) 0.52      25.3       4.00
     21       76.32   15.78    3.202  0.20( 0.10) 0.52      25.5       1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       88.36  Tc(MIN.) =   10.123
  EFFECTIVE AREA(ACRES) =     22.27  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.36
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.23
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.27
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      88.36

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.468
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.27      0.20     0.200    91    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.32
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      1.32

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.60   Tc(MIN.) =    8.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.476
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.58      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    2.32
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  4.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	70.22	5.18	6.063	0.20(0.10)	0.50	11.4	45.00
1	80.08	7.18	5.030	0.20(0.10)	0.51	15.8	31.00
1	81.59	7.49	4.908	0.20(0.10)	0.51	16.6	38.00
1	82.34	7.67	4.843	0.20(0.10)	0.51	17.0	6.00
1	83.94	8.05	4.709	0.20(0.10)	0.51	18.0	35.00
1	84.23	8.13	4.682	0.20(0.10)	0.51	18.1	25.00
1	84.29	8.16	4.675	0.20(0.10)	0.51	18.2	24.00
1	84.72	8.31	4.626	0.20(0.10)	0.51	18.5	46.00
1	87.35	9.56	4.269	0.20(0.10)	0.51	21.0	14.00
1	88.26	10.03	4.153	0.20(0.10)	0.51	22.0	43.00
1	88.34	10.11	4.133	0.20(0.10)	0.51	22.1	33.00
1	88.36	10.23	4.106	0.20(0.10)	0.51	22.3	41.00
1	87.87	10.87	3.966	0.20(0.10)	0.51	23.0	13.00
1	87.48	11.26	3.885	0.20(0.10)	0.51	23.5	19.00
1	87.39	11.35	3.869	0.20(0.10)	0.51	23.5	29.00
1	85.91	12.22	3.708	0.20(0.10)	0.52	24.3	16.00
1	85.37	12.53	3.655	0.20(0.10)	0.52	24.5	17.00
1	84.29	13.10	3.563	0.20(0.10)	0.52	24.8	10.00
1	83.78	13.31	3.531	0.20(0.10)	0.52	24.9	7.00
1	80.97	14.30	3.388	0.20(0.10)	0.52	25.3	4.00
1	76.32	15.89	3.190	0.20(0.10)	0.52	25.5	1.00
2	3.39	8.80	4.476	0.20(0.04)	0.20	0.9	32.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.93	5.18	6.063	0.20(0.10)	0.49	11.9	45.00
2	83.20	7.18	5.030	0.20(0.10)	0.49	16.5	31.00
3	84.76	7.49	4.908	0.20(0.10)	0.49	17.3	38.00
4	85.54	7.67	4.843	0.20(0.10)	0.49	17.7	6.00
5	87.21	8.05	4.709	0.20(0.10)	0.50	18.7	35.00
6	87.51	8.13	4.682	0.20(0.10)	0.50	18.9	25.00
7	87.58	8.16	4.675	0.20(0.10)	0.50	19.0	24.00
8	88.03	8.31	4.626	0.20(0.10)	0.50	19.3	46.00
9	89.15	8.80	4.476	0.20(0.10)	0.50	20.4	32.00
10	90.59	9.56	4.269	0.20(0.10)	0.50	21.9	14.00
11	91.40	10.03	4.153	0.20(0.10)	0.50	22.8	43.00
12	91.47	10.11	4.133	0.20(0.10)	0.50	22.9	33.00
13	91.47	10.23	4.106	0.20(0.10)	0.50	23.1	41.00
14	90.88	10.87	3.966	0.20(0.10)	0.50	23.9	13.00
15	90.42	11.26	3.885	0.20(0.10)	0.50	24.3	19.00
16	90.31	11.35	3.869	0.20(0.10)	0.50	24.4	29.00
17	88.72	12.22	3.708	0.20(0.10)	0.51	25.1	16.00
18	88.13	12.53	3.655	0.20(0.10)	0.51	25.3	17.00
19	86.99	13.10	3.563	0.20(0.10)	0.51	25.7	10.00
20	86.45	13.31	3.531	0.20(0.10)	0.51	25.8	7.00
21	83.53	14.30	3.388	0.20(0.10)	0.51	26.1	4.00
22	78.73	15.89	3.190	0.20(0.10)	0.51	26.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 91.47 Tc(MIN.) = 10.11
EFFECTIVE AREA(ACRES) = 22.95 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 26.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 50.00 = 2585.00 FEET.

****
FLOW PROCESS FROM NODE 50.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 457.00 DOWNSTREAM(FEET) = 454.50

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.49
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.47
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    4.08
```

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  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.31
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    5.60
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.10
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.592
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.70
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.70

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =    9.14
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.380
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.80
  FLOW VELOCITY(FEET/SEC.) =  4.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   4.38
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.34
  TOTAL STREAM AREA(ACRES) =       1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.14
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.10   12.20    3.711  0.20( 0.10) 0.50       3.6      22.00
     2        5.14    9.14    4.380  0.20( 0.12) 0.60       1.3      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.88    9.14    4.380  0.20( 0.11) 0.53       4.0      53.00
     2       16.43   12.20    3.711  0.20( 0.11) 0.53       4.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.43    Tc(MIN.) =    12.20
 EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.43
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.23
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.23
 RAINFALL INTENSITY(INCH/HR) =   3.71
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.53
 EFFECTIVE STREAM AREA(ACRES) =       4.93
 TOTAL STREAM AREA(ACRES) =       4.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.43

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.602
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91    8.38
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.15
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.15

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   10.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.47
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    9.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.322
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  5.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.88    9.16    4.373  0.20( 0.11) 0.53       4.0      53.00
      1       16.43   12.23    3.707  0.20( 0.11) 0.53       4.9      22.00
```

```
     2        7.19    9.35    4.322  0.20( 0.12) 0.60       1.9      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.00    9.16    4.373  0.20( 0.11) 0.55       5.9      53.00
      2       23.10    9.35    4.322  0.20( 0.11) 0.55       6.0      56.00
      3       22.57   12.23    3.707  0.20( 0.11) 0.55       6.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.10    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       5.98   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.10
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.40
  RAINFALL INTENSITY(INCH/HR) =   4.31
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       5.98
  TOTAL STREAM AREA(ACRES) =       6.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.10

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.11      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.11
 TOTAL STREAM AREA(ACRES) =       0.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.61

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       23.00    9.22    4.359  0.20( 0.11) 0.55       5.9      53.00
     1       23.10    9.40    4.308  0.20( 0.11) 0.55       6.0      56.00
     1       22.57   12.28    3.698  0.20( 0.11) 0.55       6.8      22.00
     2        0.61    5.00    6.187  0.20( 0.02) 0.10       0.1      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       18.47    5.00    6.187  0.20( 0.11) 0.54       3.3      59.00
     2       23.43    9.22    4.359  0.20( 0.11) 0.55       6.0      53.00
     3       23.52    9.40    4.308  0.20( 0.11) 0.55       6.1      56.00
     4       22.93   12.28    3.698  0.20( 0.11) 0.54       6.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.52    Tc(MIN.) =     9.40
 EFFECTIVE AREA(ACRES) =       6.09   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        6.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.57
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.52
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.84
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       6.09
```

```
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.52

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    8.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.558
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    3.43
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.27
  FLOW VELOCITY(FEET/SEC.) =  4.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.52
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.48
  TOTAL STREAM AREA(ACRES) =       1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.47    5.47    5.878  0.20( 0.11) 0.54       3.3      59.00
      1       23.43    9.65    4.245  0.20( 0.11) 0.55       6.0      53.00
      1       23.52    9.84    4.198  0.20( 0.11) 0.55       6.1      56.00
      1       22.93   12.72    3.624  0.20( 0.11) 0.54       6.9      22.00
      2        5.91    8.52    4.558  0.20( 0.12) 0.60       1.5      61.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.47    5.878  0.20( 0.11) 0.55       4.3      59.00
      2       28.01    8.52    4.558  0.20( 0.11) 0.56       6.8      61.00
      3       28.93    9.65    4.245  0.20( 0.11) 0.56       7.5      53.00
      4       28.96    9.84    4.198  0.20( 0.11) 0.56       7.6      56.00
      5       27.60   12.72    3.624  0.20( 0.11) 0.55       8.4      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.96    Tc(MIN.) =     9.84
  EFFECTIVE AREA(ACRES) =       7.57   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.96
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.57
```

```
  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    91    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.89
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.89

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.597
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    3.06
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
  FLOW VELOCITY(FEET/SEC.) =  4.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.40
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.48    5.869  0.20( 0.11) 0.55       4.3      59.00
      1       28.01    8.54    4.553  0.20( 0.11) 0.56       6.8      61.00
      1       28.93    9.67    4.241  0.20( 0.11) 0.56       7.5      53.00
      1       28.96    9.85    4.195  0.20( 0.11) 0.56       7.6      56.00
      1       27.60   12.73    3.622  0.20( 0.11) 0.55       8.4      22.00
      2        5.80    8.40    4.597  0.20( 0.12) 0.60       1.4      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.25    5.48    5.869  0.20( 0.11) 0.56       5.2      59.00
      2       33.59    8.40    4.597  0.20( 0.11) 0.56       8.1      64.00
      3       33.75    8.54    4.553  0.20( 0.11) 0.56       8.2      61.00
      4       34.27    9.67    4.241  0.20( 0.11) 0.56       8.9      53.00
      5       34.24    9.85    4.195  0.20( 0.11) 0.56       9.0      56.00
      6       32.14   12.73    3.622  0.20( 0.11) 0.56       9.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.27    Tc(MIN.) =     9.67
  EFFECTIVE AREA(ACRES) =       8.92   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        9.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.27
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.95
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.95
  RAINFALL INTENSITY(INCH/HR) =   4.17
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.92
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.27

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.608
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.30
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.30

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    9.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.209
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.32
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.79
 RAINFALL INTENSITY(INCH/HR) =   4.21
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       1.02
 TOTAL STREAM AREA(ACRES) =       1.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
 ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.15      0.20      0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.83
 TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.15
 TOTAL STREAM AREA(ACRES) =       0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.25    5.78    5.692  0.20( 0.11) 0.56       5.2      59.00
     1       33.59    8.68    4.510  0.20( 0.11) 0.56       8.1      64.00
     1       33.75    8.82    4.468  0.20( 0.11) 0.56       8.2      61.00
     1       34.27    9.95    4.171  0.20( 0.11) 0.56       8.9      53.00
     1       34.24   10.14    4.127  0.20( 0.11) 0.56       9.0      56.00
     1       32.14   13.03    3.574  0.20( 0.11) 0.56       9.9      22.00
     2        3.76    9.79    4.209  0.20( 0.11) 0.56       1.0      67.00
     3        0.83    5.00    6.187  0.20( 0.02) 0.10       0.2      63.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	30.27	5.00	6.187	0.20(0.11)	0.55	5.2	63.00
2	32.04	5.78	5.692	0.20(0.11)	0.55	5.9	59.00
3	37.78	8.68	4.510	0.20(0.11)	0.56	9.1	64.00
4	37.96	8.82	4.468	0.20(0.11)	0.56	9.3	61.00
5	38.53	9.79	4.209	0.20(0.11)	0.56	10.0	67.00
6	38.56	9.95	4.171	0.20(0.11)	0.56	10.1	53.00
7	38.48	10.14	4.127	0.20(0.11)	0.56	10.2	56.00
8	35.80	13.03	3.574	0.20(0.11)	0.55	11.0	22.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 38.56 Tc(MIN.) = 9.95
EFFECTIVE AREA(ACRES) = 10.09 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 11.0
LONGEST FLOWPATH FROM NODE 22.00 TO NODE 69.00 = 1725.00 FEET.

****
FLOW PROCESS FROM NODE 69.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 454.50
FLOW LENGTH(FEET) = 30.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.28
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.56
PIPE TRAVEL TIME(MIN.) = 0.04 Tc(MIN.) = 9.99
LONGEST FLOWPATH FROM NODE 22.00 TO NODE 70.00 = 1755.00 FEET.

****
FLOW PROCESS FROM NODE 70.00 TO NODE 70.00 IS CODE = 11

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
==========

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	30.27	5.05	6.154	0.20(0.11)	0.55	5.2	63.00
2	32.04	5.83	5.666	0.20(0.11)	0.55	5.9	59.00
3	37.78	8.73	4.497	0.20(0.11)	0.56	9.1	64.00
4	37.96	8.87	4.455	0.20(0.11)	0.56	9.3	61.00
5	38.53	9.84	4.198	0.20(0.11)	0.56	10.0	67.00
6	38.56	9.99	4.161	0.20(0.11)	0.56	10.1	53.00
7	38.48	10.18	4.117	0.20(0.11)	0.56	10.2	56.00
8	35.80	13.07	3.567	0.20(0.11)	0.55	11.0	22.00

LONGEST FLOWPATH FROM NODE 22.00 TO NODE 70.00 = 1755.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.93	5.23	6.027	0.20(0.10)	0.49	11.9	45.00
2	83.20	7.23	5.009	0.20(0.10)	0.49	16.5	31.00
3	84.76	7.54	4.889	0.20(0.10)	0.49	17.3	38.00
4	85.54	7.72	4.824	0.20(0.10)	0.49	17.7	6.00
5	87.21	8.10	4.692	0.20(0.10)	0.50	18.7	35.00
6	87.51	8.19	4.665	0.20(0.10)	0.50	18.9	25.00
7	87.58	8.21	4.658	0.20(0.10)	0.50	19.0	24.00
8	88.03	8.36	4.609	0.20(0.10)	0.50	19.3	46.00
9	89.15	8.85	4.461	0.20(0.10)	0.50	20.4	32.00
10	90.59	9.61	4.256	0.20(0.10)	0.50	21.9	14.00
11	91.40	10.08	4.141	0.20(0.10)	0.50	22.8	43.00
12	91.47	10.16	4.121	0.20(0.10)	0.50	22.9	33.00
13	91.47	10.28	4.094	0.20(0.10)	0.50	23.1	41.00
14	90.88	10.92	3.955	0.20(0.10)	0.50	23.9	13.00
15	90.42	11.31	3.875	0.20(0.10)	0.50	24.3	19.00
16	90.31	11.40	3.859	0.20(0.10)	0.50	24.4	29.00
17	88.72	12.27	3.699	0.20(0.10)	0.51	25.1	16.00

```
    18       88.13   12.58    3.646  0.20( 0.10) 0.51      25.3      17.00
    19       86.99   13.15    3.555  0.20( 0.10) 0.51      25.7      10.00
    20       86.45   13.36    3.523  0.20( 0.10) 0.51      25.8       7.00
    21       83.53   14.36    3.381  0.20( 0.10) 0.51      26.1       4.00
    22       78.73   15.95    3.183  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      102.10    5.05    6.154  0.20( 0.10) 0.51      16.6      63.00
      2      103.63    5.23    6.027  0.20( 0.10) 0.51      17.3      45.00
      3      108.03    5.83    5.666  0.20( 0.10) 0.51      19.2      59.00
      4      118.01    7.23    5.009  0.20( 0.10) 0.51      24.0      31.00
      5      120.19    7.54    4.889  0.20( 0.10) 0.51      25.2      38.00
      6      121.33    7.72    4.824  0.20( 0.10) 0.51      25.8       6.00
      7      123.75    8.10    4.692  0.20( 0.10) 0.51      27.2      35.00
      8      124.21    8.19    4.665  0.20( 0.10) 0.51      27.5      25.00
      9      124.33    8.21    4.658  0.20( 0.10) 0.51      27.5      24.00
     10      125.08    8.36    4.609  0.20( 0.10) 0.51      28.1      46.00
     11      126.65    8.73    4.497  0.20( 0.10) 0.52      29.2      64.00
     12      127.08    8.85    4.461  0.20( 0.10) 0.52      29.6      32.00
     13      127.14    8.87    4.455  0.20( 0.10) 0.52      29.7      61.00
     14      128.98    9.61    4.256  0.20( 0.10) 0.52      31.7      14.00
     15      129.52    9.84    4.198  0.20( 0.10) 0.52      32.3      67.00
     16      129.82    9.99    4.161  0.20( 0.10) 0.52      32.7      53.00
     17      129.92   10.08    4.141  0.20( 0.10) 0.52      32.9      43.00
     18      129.96   10.16    4.121  0.20( 0.10) 0.52      33.1      33.00
     19      129.95   10.18    4.117  0.20( 0.10) 0.52      33.2      56.00
     20      129.85   10.28    4.094  0.20( 0.10) 0.52      33.3      41.00
     21      128.67   10.92    3.955  0.20( 0.10) 0.52      34.3      13.00
     22      127.85   11.31    3.875  0.20( 0.10) 0.52      34.8      19.00
     23      127.66   11.40    3.859  0.20( 0.10) 0.52      34.9      29.00
     24      125.26   12.27    3.699  0.20( 0.10) 0.52      35.9      16.00
     25      124.38   12.58    3.646  0.20( 0.10) 0.52      36.2      17.00
     26      122.94   13.07    3.567  0.20( 0.10) 0.52      36.7      22.00
     27      122.66   13.15    3.555  0.20( 0.10) 0.52      36.7      10.00
     28      121.79   13.36    3.523  0.20( 0.10) 0.52      36.8       7.00
     29      117.40   14.36    3.381  0.20( 0.10) 0.52      37.2       4.00
     30      110.55   15.95    3.183  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      129.96  Tc(MIN.) =   10.161
  EFFECTIVE AREA(ACRES) =     33.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.63
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.96
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
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  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.24
  RAINFALL INTENSITY(INCH/HR) =   4.10
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =      33.12
  TOTAL STREAM AREA(ACRES) =      37.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     129.96

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    91    5.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.05
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      2.05

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   6.00
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      102.10    5.13    6.098  0.20( 0.10) 0.51      16.6      63.00
      1      103.63    5.32    5.973  0.20( 0.10) 0.51      17.3      45.00
      1      108.03    5.91    5.623  0.20( 0.10) 0.51      19.2      59.00
      1      118.01    7.31    4.979  0.20( 0.10) 0.51      24.0      31.00
      1      120.19    7.62    4.860  0.20( 0.10) 0.51      25.2      38.00
      1      121.33    7.80    4.797  0.20( 0.10) 0.51      25.8       6.00
      1      123.75    8.18    4.667  0.20( 0.10) 0.51      27.2      35.00
      1      124.21    8.26    4.640  0.20( 0.10) 0.51      27.5      25.00
      1      124.33    8.28    4.633  0.20( 0.10) 0.51      27.5      24.00
      1      125.08    8.44    4.585  0.20( 0.10) 0.51      28.1      46.00
      1      126.65    8.80    4.474  0.20( 0.10) 0.52      29.2      64.00
      1      127.08    8.93    4.439  0.20( 0.10) 0.52      29.6      32.00
      1      127.14    8.95    4.433  0.20( 0.10) 0.52      29.7      61.00
      1      128.98    9.68    4.236  0.20( 0.10) 0.52      31.7      14.00
      1      129.52    9.92    4.179  0.20( 0.10) 0.52      32.3      67.00
```

```
     1      129.82   10.07    4.142  0.20( 0.10) 0.52      32.7       53.00
     1      129.92   10.15    4.123  0.20( 0.10) 0.52      32.9       43.00
     1      129.96   10.24    4.104  0.20( 0.10) 0.52      33.1       33.00
     1      129.95   10.26    4.099  0.20( 0.10) 0.52      33.2       56.00
     1      129.85   10.36    4.076  0.20( 0.10) 0.52      33.3       41.00
     1      128.67   10.99    3.939  0.20( 0.10) 0.52      34.3       13.00
     1      127.85   11.39    3.860  0.20( 0.10) 0.52      34.8       19.00
     1      127.66   11.48    3.844  0.20( 0.10) 0.52      34.9       29.00
     1      125.26   12.35    3.685  0.20( 0.10) 0.52      35.9       16.00
     1      124.38   12.66    3.633  0.20( 0.10) 0.52      36.2       17.00
     1      122.94   13.15    3.555  0.20( 0.10) 0.52      36.7       22.00
     1      122.66   13.23    3.543  0.20( 0.10) 0.52      36.7       10.00
     1      121.79   13.44    3.511  0.20( 0.10) 0.52      36.8        7.00
     1      117.40   14.43    3.370  0.20( 0.10) 0.52      37.2        4.00
     1      110.55   16.02    3.174  0.20( 0.10) 0.52      37.4        1.00
     2        2.05    5.27    6.003  0.20( 0.02) 0.10       0.4       47.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      104.12    5.13    6.098  0.20( 0.10) 0.50      17.0       63.00
      2      105.31    5.27    6.003  0.20( 0.10) 0.50      17.5       47.00
      3      105.66    5.32    5.973  0.20( 0.10) 0.50      17.6       45.00
      4      109.95    5.91    5.623  0.20( 0.10) 0.50      19.6       59.00
      5      119.70    7.31    4.979  0.20( 0.10) 0.50      24.4       31.00
      6      121.85    7.62    4.860  0.20( 0.10) 0.51      25.5       38.00
      7      122.96    7.80    4.797  0.20( 0.10) 0.51      26.1        6.00
      8      125.34    8.18    4.667  0.20( 0.10) 0.51      27.6       35.00
      9      125.79    8.26    4.640  0.20( 0.10) 0.51      27.8       25.00
     10      125.90    8.28    4.633  0.20( 0.10) 0.51      27.9       24.00
     11      126.64    8.44    4.585  0.20( 0.10) 0.51      28.4       46.00
     12      128.17    8.80    4.474  0.20( 0.10) 0.51      29.6       64.00
     13      128.59    8.93    4.439  0.20( 0.10) 0.51      30.0       32.00
     14      128.65    8.95    4.433  0.20( 0.10) 0.51      30.0       61.00
     15      130.42    9.68    4.236  0.20( 0.10) 0.51      32.1       14.00
     16      130.94    9.92    4.179  0.20( 0.10) 0.51      32.7       67.00
     17      131.23   10.07    4.142  0.20( 0.10) 0.51      33.1       53.00
     18      131.33   10.15    4.123  0.20( 0.10) 0.51      33.3       43.00
     19      131.35   10.24    4.104  0.20( 0.10) 0.51      33.5       33.00
     20      131.34   10.26    4.099  0.20( 0.10) 0.51      33.5       56.00
     21      131.24   10.36    4.076  0.20( 0.10) 0.51      33.7       41.00
     22      130.01   10.99    3.939  0.20( 0.10) 0.51      34.7       13.00
     23      129.16   11.39    3.860  0.20( 0.10) 0.51      35.2       19.00
     24      128.97   11.48    3.844  0.20( 0.10) 0.51      35.3       29.00
     25      126.51   12.35    3.685  0.20( 0.10) 0.51      36.3       16.00
     26      125.62   12.66    3.633  0.20( 0.10) 0.52      36.6       17.00
     27      124.14   13.15    3.555  0.20( 0.10) 0.52      37.1       22.00
     28      123.87   13.23    3.543  0.20( 0.10) 0.52      37.1       10.00
     29      122.98   13.44    3.511  0.20( 0.10) 0.52      37.2        7.00
     30      118.54   14.43    3.370  0.20( 0.10) 0.52      37.5        4.00
     31      111.63   16.02    3.174  0.20( 0.10) 0.52      37.8        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     131.35    Tc(MIN.) =    10.24
  EFFECTIVE AREA(ACRES) =      33.50   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       37.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   450.00  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.15
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.35
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.469
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.42
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      4.42

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.107
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    4.66
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
```

```
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.64
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.22
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.72

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    91    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.73

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   10.34
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.081
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    4.03
 EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
 FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
 LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   4.08
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.72   10.22    4.107  0.20( 0.12) 0.60       2.4      33.00
     2        6.49   10.34    4.081  0.20( 0.12) 0.60       1.8      73.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.18   10.22    4.107  0.20( 0.12) 0.60       4.2      33.00
     2       15.15   10.34    4.081  0.20( 0.12) 0.60       4.2      73.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.18    Tc(MIN.) =    10.22
 EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.30
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.18
 PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.91
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.96
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.18

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.740
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    91    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    9.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.403
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       5.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.05
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.09

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.956
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    91    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.14
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.14

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    8.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.582
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.09
  EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   4.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.26
  TOTAL STREAM AREA(ACRES) =       1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.18   10.91    3.958  0.20( 0.12) 0.60       4.2      33.00
      1       15.15   11.02    3.935  0.20( 0.12) 0.60       4.2      73.00
      2        5.09    9.05    4.403  0.20( 0.12) 0.60       1.3      76.00
      3        5.07    8.45    4.582  0.20( 0.11) 0.56       1.3      78.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.68    8.45    4.582  0.20( 0.12) 0.59       5.8      78.00
      2       24.02    9.05    4.403  0.20( 0.12) 0.59       6.1      76.00
      3       24.10   10.91    3.958  0.20( 0.12) 0.59       6.8      33.00
      4       24.02   11.02    3.935  0.20( 0.12) 0.59       6.8      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.10    Tc(MIN.) =    10.91
  EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.85
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.10
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.918
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        3.28      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =   11.03
  EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      34.32

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.68    8.64    4.522  0.20( 0.14) 0.70       9.0      78.00
      2       35.51    9.25    4.350  0.20( 0.14) 0.70       9.4      76.00
      3       34.32   11.10    3.918  0.20( 0.14) 0.69      10.1      33.00
      4       34.18   11.21    3.895  0.20( 0.14) 0.69      10.1      73.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      35.68  Tc(MIN.) =    8.64
  AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.05

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.68
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.05
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.68
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.706
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    91    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.59
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      3.59

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    9.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.217
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.57      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    2.15
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  5.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.76
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.36

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.288
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.60
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.60

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.86
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       8.23
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  6.37   DEPTH*VELOCITY(FT*FT/SEC.) =   2.10
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.69
  RAINFALL INTENSITY(INCH/HR) =   4.83
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.68    9.08    4.395  0.20( 0.14) 0.70       9.0      78.00
      1       35.51    9.69    4.236  0.20( 0.14) 0.70       9.4      76.00
      1       34.32   11.54    3.831  0.20( 0.14) 0.69      10.1      33.00
      1       34.18   11.66    3.810  0.20( 0.14) 0.69      10.1      73.00
      2        5.36    9.76    4.217  0.20( 0.08) 0.40       1.4      82.00
      3        8.23    7.69    4.835  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.42    7.69    4.835  0.20( 0.13) 0.65      10.7      80.00
      2       48.35    9.08    4.395  0.20( 0.13) 0.65      12.3      78.00
      3       48.04    9.69    4.236  0.20( 0.13) 0.65      12.7      76.00
      4       47.98    9.76    4.217  0.20( 0.13) 0.65      12.8      82.00
      5       45.66   11.54    3.831  0.20( 0.13) 0.65      13.5      33.00
      6       45.46   11.66    3.810  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.35    Tc(MIN.) =     9.08
  EFFECTIVE AREA(ACRES) =      12.33   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.44
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.35
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
```

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.42	7.77	4.806	0.20(0.13)	0.65	10.7	80.00
2	48.35	9.16	4.373	0.20(0.13)	0.65	12.3	78.00
3	48.04	9.77	4.216	0.20(0.13)	0.65	12.7	76.00
4	47.98	9.84	4.198	0.20(0.13)	0.65	12.8	82.00
5	45.66	11.62	3.816	0.20(0.13)	0.65	13.5	33.00
6	45.46	11.74	3.795	0.20(0.13)	0.65	13.5	73.00

LONGEST FLOWPATH FROM NODE 33.00 TO NODE 86.00 = 1770.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.12	5.17	6.069	0.20(0.10)	0.50	17.0	63.00
2	105.31	5.31	5.976	0.20(0.10)	0.50	17.5	47.00
3	105.66	5.36	5.947	0.20(0.10)	0.50	17.6	45.00
4	109.95	5.95	5.600	0.20(0.10)	0.50	19.6	59.00
5	119.70	7.35	4.963	0.20(0.10)	0.50	24.4	31.00
6	121.85	7.66	4.846	0.20(0.10)	0.51	25.5	38.00
7	122.96	7.84	4.782	0.20(0.10)	0.51	26.1	6.00
8	125.34	8.22	4.653	0.20(0.10)	0.51	27.6	35.00
9	125.79	8.30	4.627	0.20(0.10)	0.51	27.8	25.00
10	125.90	8.33	4.620	0.20(0.10)	0.51	27.9	24.00
11	126.64	8.48	4.573	0.20(0.10)	0.51	28.4	46.00
12	128.17	8.84	4.462	0.20(0.10)	0.51	29.6	64.00
13	128.59	8.97	4.427	0.20(0.10)	0.51	30.0	32.00
14	128.65	8.99	4.422	0.20(0.10)	0.51	30.0	61.00
15	130.42	9.72	4.227	0.20(0.10)	0.51	32.1	14.00
16	130.94	9.96	4.170	0.20(0.10)	0.51	32.7	67.00
17	131.23	10.11	4.133	0.20(0.10)	0.51	33.1	53.00
18	131.33	10.19	4.114	0.20(0.10)	0.51	33.3	43.00
19	131.35	10.28	4.095	0.20(0.10)	0.51	33.5	33.00
20	131.34	10.30	4.090	0.20(0.10)	0.51	33.5	56.00
21	131.24	10.40	4.068	0.20(0.10)	0.51	33.7	41.00
22	130.01	11.03	3.931	0.20(0.10)	0.51	34.7	13.00
23	129.16	11.43	3.853	0.20(0.10)	0.51	35.2	19.00
24	128.97	11.51	3.836	0.20(0.10)	0.51	35.3	29.00
25	126.51	12.39	3.679	0.20(0.10)	0.51	36.3	16.00
26	125.62	12.70	3.627	0.20(0.10)	0.52	36.6	17.00
27	124.14	13.19	3.549	0.20(0.10)	0.52	37.1	22.00
28	123.87	13.27	3.537	0.20(0.10)	0.52	37.1	10.00
29	122.98	13.48	3.505	0.20(0.10)	0.52	37.2	7.00
30	118.54	14.48	3.365	0.20(0.10)	0.52	37.5	4.00
31	111.63	16.07	3.170	0.20(0.10)	0.52	37.8	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 86.00 = 2795.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	143.35	5.17	6.069	0.20(0.11)	0.54	24.2	63.00
2	144.99	5.31	5.976	0.20(0.11)	0.54	24.8	47.00
3	145.48	5.36	5.947	0.20(0.11)	0.54	25.0	45.00
4	151.53	5.95	5.600	0.20(0.11)	0.55	27.8	59.00
5	165.06	7.35	4.963	0.20(0.11)	0.55	34.6	31.00
6	167.99	7.66	4.846	0.20(0.11)	0.55	36.1	38.00
7	168.96	7.77	4.806	0.20(0.11)	0.55	36.6	80.00
8	169.47	7.84	4.782	0.20(0.11)	0.55	37.0	6.00
9	172.38	8.22	4.653	0.20(0.11)	0.55	38.8	35.00
10	172.95	8.30	4.627	0.20(0.11)	0.55	39.2	25.00
11	173.09	8.33	4.620	0.20(0.11)	0.55	39.3	24.00
12	174.04	8.48	4.573	0.20(0.11)	0.55	40.0	46.00
13	176.08	8.84	4.462	0.20(0.11)	0.55	41.6	64.00
14	176.67	8.97	4.427	0.20(0.11)	0.55	42.1	32.00
15	176.75	8.99	4.422	0.20(0.11)	0.55	42.2	61.00
16	177.42	9.16	4.373	0.20(0.11)	0.55	42.9	78.00
17	178.48	9.72	4.227	0.20(0.11)	0.55	44.8	14.00
18	178.56	9.77	4.216	0.20(0.11)	0.55	44.9	76.00

```
     19      178.66    9.84    4.198  0.20( 0.11) 0.55      45.2      82.00
     20      178.77    9.96    4.170  0.20( 0.11) 0.55      45.5      67.00
     21      178.85   10.11    4.133  0.20( 0.11) 0.55      46.0      53.00
     22      178.85   10.19    4.114  0.20( 0.11) 0.55      46.2      43.00
     23      178.76   10.28    4.095  0.20( 0.11) 0.55      46.5      33.00
     24      178.73   10.30    4.090  0.20( 0.11) 0.55      46.5      56.00
     25      178.49   10.40    4.068  0.20( 0.11) 0.55      46.7      41.00
     26      176.44   11.03    3.931  0.20( 0.11) 0.55      47.9      13.00
     27      175.07   11.43    3.853  0.20( 0.11) 0.55      48.6      19.00
     28      174.77   11.51    3.836  0.20( 0.11) 0.55      48.7      29.00
     29      174.33   11.62    3.816  0.20( 0.11) 0.55      48.9      33.00
     30      173.81   11.74    3.795  0.20( 0.11) 0.55      49.0      73.00
     31      170.53   12.39    3.679  0.20( 0.11) 0.55      49.8      16.00
     32      168.99   12.70    3.627  0.20( 0.11) 0.55      50.1      17.00
     33      166.55   13.19    3.549  0.20( 0.11) 0.55      50.5      22.00
     34      166.13   13.27    3.537  0.20( 0.11) 0.55      50.6      10.00
     35      164.85   13.48    3.505  0.20( 0.11) 0.55      50.7       7.00
     36      158.67   14.48    3.365  0.20( 0.11) 0.55      51.0       4.00
     37      149.34   16.07    3.170  0.20( 0.11) 0.55      51.3       1.00
   TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      178.85  Tc(MIN.) =   10.110
  EFFECTIVE AREA(ACRES) =     45.99  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.85
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.61
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.85
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =   10.44
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.44
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      45.99
  TOTAL STREAM AREA(ACRES) =      51.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     178.85

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.43      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    5.43
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.43
  RAINFALL INTENSITY(INCH/HR) =   5.90
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      143.35    5.53    5.840  0.20( 0.11) 0.54      24.2      63.00
      1      144.99    5.67    5.756  0.20( 0.11) 0.54      24.8      47.00
      1      145.48    5.72    5.730  0.20( 0.11) 0.54      25.0      45.00
      1      151.53    6.30    5.421  0.20( 0.11) 0.55      27.8      59.00
      1      165.06    7.69    4.834  0.20( 0.11) 0.55      34.6      31.00
      1      167.99    8.00    4.725  0.20( 0.11) 0.55      36.1      38.00
      1      168.96    8.11    4.688  0.20( 0.11) 0.55      36.6      80.00
```

1	169.47	8.18	4.666	0.20(0.11)	0.55	37.0	6.00
1	172.38	8.56	4.545	0.20(0.11)	0.55	38.8	35.00
1	172.95	8.65	4.520	0.20(0.11)	0.55	39.2	25.00
1	173.09	8.67	4.514	0.20(0.11)	0.55	39.3	24.00
1	174.04	8.82	4.470	0.20(0.11)	0.55	40.0	46.00
1	176.08	9.18	4.369	0.20(0.11)	0.55	41.6	64.00
1	176.67	9.30	4.336	0.20(0.11)	0.55	42.1	32.00
1	176.75	9.32	4.331	0.20(0.11)	0.55	42.2	61.00
1	177.42	9.50	4.284	0.20(0.11)	0.55	42.9	78.00
1	178.48	10.06	4.146	0.20(0.11)	0.55	44.8	14.00
1	178.56	10.10	4.135	0.20(0.11)	0.55	44.9	76.00
1	178.66	10.17	4.118	0.20(0.11)	0.55	45.2	82.00
1	178.77	10.29	4.092	0.20(0.11)	0.55	45.5	67.00
1	178.85	10.44	4.057	0.20(0.11)	0.55	46.0	53.00
1	178.85	10.53	4.038	0.20(0.11)	0.55	46.2	43.00
1	178.76	10.61	4.020	0.20(0.11)	0.55	46.5	33.00
1	178.73	10.63	4.016	0.20(0.11)	0.55	46.5	56.00
1	178.49	10.73	3.995	0.20(0.11)	0.55	46.7	41.00
1	176.44	11.37	3.864	0.20(0.11)	0.55	47.9	13.00
1	175.07	11.76	3.789	0.20(0.11)	0.55	48.6	19.00
1	174.77	11.86	3.772	0.20(0.11)	0.55	48.7	29.00
1	174.33	11.97	3.753	0.20(0.11)	0.55	48.9	33.00
1	173.81	12.08	3.732	0.20(0.11)	0.55	49.0	73.00
1	170.53	12.73	3.621	0.20(0.11)	0.55	49.8	16.00
1	168.99	13.05	3.571	0.20(0.11)	0.55	50.1	17.00
1	166.55	13.54	3.497	0.20(0.11)	0.55	50.5	22.00
1	166.13	13.61	3.486	0.20(0.11)	0.55	50.6	10.00
1	164.85	13.82	3.455	0.20(0.11)	0.55	50.7	7.00
1	158.67	14.82	3.320	0.20(0.11)	0.55	51.0	4.00
1	149.34	16.41	3.131	0.20(0.11)	0.55	51.3	1.00
2	2.32	5.43	5.899	0.20(0.18)	0.90	0.4	88.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	144.64	5.43	5.899	0.20(0.11)	0.55	24.2	88.00
2	145.66	5.53	5.840	0.20(0.11)	0.55	24.6	63.00
3	147.25	5.67	5.756	0.20(0.11)	0.55	25.3	47.00
4	147.74	5.72	5.730	0.20(0.11)	0.55	25.5	45.00
5	153.66	6.30	5.421	0.20(0.11)	0.55	28.3	59.00
6	166.96	7.69	4.834	0.20(0.11)	0.55	35.0	31.00
7	169.84	8.00	4.725	0.20(0.11)	0.55	36.5	38.00
8	170.79	8.11	4.688	0.20(0.11)	0.55	37.1	80.00
9	171.30	8.18	4.666	0.20(0.11)	0.55	37.4	6.00
10	174.16	8.56	4.545	0.20(0.11)	0.55	39.2	35.00
11	174.72	8.65	4.520	0.20(0.11)	0.55	39.6	25.00
12	174.85	8.67	4.514	0.20(0.11)	0.55	39.7	24.00
13	175.78	8.82	4.470	0.20(0.11)	0.55	40.4	46.00
14	177.78	9.18	4.369	0.20(0.11)	0.55	42.0	64.00
15	178.36	9.30	4.336	0.20(0.11)	0.56	42.5	32.00
16	178.44	9.32	4.331	0.20(0.11)	0.56	42.6	61.00
17	179.09	9.50	4.284	0.20(0.11)	0.56	43.3	78.00
18	180.10	10.06	4.146	0.20(0.11)	0.55	45.2	14.00
19	180.17	10.10	4.135	0.20(0.11)	0.55	45.4	76.00
20	180.26	10.17	4.118	0.20(0.11)	0.55	45.6	82.00
21	180.36	10.29	4.092	0.20(0.11)	0.55	46.0	67.00
22	180.43	10.44	4.057	0.20(0.11)	0.55	46.4	53.00
23	180.41	10.53	4.038	0.20(0.11)	0.55	46.7	43.00
24	180.33	10.61	4.020	0.20(0.11)	0.55	46.9	33.00
25	180.29	10.63	4.016	0.20(0.11)	0.55	46.9	56.00
26	180.05	10.73	3.995	0.20(0.11)	0.55	47.1	41.00
27	177.94	11.37	3.864	0.20(0.11)	0.55	48.3	13.00
28	176.54	11.76	3.789	0.20(0.11)	0.55	49.0	19.00
29	176.23	11.86	3.772	0.20(0.11)	0.55	49.2	29.00
30	175.78	11.97	3.753	0.20(0.11)	0.55	49.3	33.00
31	175.25	12.08	3.732	0.20(0.11)	0.55	49.5	73.00
32	171.93	12.73	3.621	0.20(0.11)	0.55	50.2	16.00
33	170.37	13.05	3.571	0.20(0.11)	0.55	50.5	17.00

```
    34      167.90   13.54    3.497  0.20( 0.11) 0.55      51.0      22.00
    35      167.47   13.61    3.486  0.20( 0.11) 0.55      51.0      10.00
    36      166.18   13.82    3.455  0.20( 0.11) 0.55      51.1       7.00
    37      159.95   14.82    3.320  0.20( 0.11) 0.55      51.5       4.00
    38      150.54   16.41    3.131  0.20( 0.11) 0.55      51.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     180.43    Tc(MIN.) =    10.44
  EFFECTIVE AREA(ACRES) =      46.42   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.94
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     180.43
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.406
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20      0.100    91    6.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.41
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.41

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

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  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    7.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    91    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        1.24      0.20     0.900    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.00
 AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   0.62
 Tc(MIN.) =    7.97
 SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    5.09
 EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
 TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       7.46

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   9.92
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
 FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.46
 PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    8.65
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.65
 RAINFALL INTENSITY(INCH/HR) =   4.52
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.46

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        2.42    7.97    4.735  0.20( 0.02) 0.10       0.6      85.00
     2        7.46    8.65    4.520  0.20( 0.18) 0.90       1.8      92.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        9.64    7.97    4.735  0.20( 0.14) 0.70       2.2      85.00
     2        9.77    8.65    4.520  0.20( 0.14) 0.71       2.4      92.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.77    Tc(MIN.) =     8.65
  EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        2.4
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.77
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.67
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.64    8.00    4.728  0.20( 0.14) 0.70       2.2      85.00
      2        9.77    8.67    4.513  0.20( 0.14) 0.71       2.4      92.00
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      144.64    5.56    5.824  0.20( 0.11) 0.55      24.2      88.00
      2      145.66    5.65    5.767  0.20( 0.11) 0.55      24.6      63.00
      3      147.25    5.80    5.685  0.20( 0.11) 0.55      25.3      47.00
      4      147.74    5.84    5.660  0.20( 0.11) 0.55      25.5      45.00
      5      153.66    6.42    5.361  0.20( 0.11) 0.55      28.3      59.00
      6      166.96    7.81    4.792  0.20( 0.11) 0.55      35.0      31.00
      7      169.84    8.12    4.686  0.20( 0.11) 0.55      36.5      38.00
      8      170.79    8.23    4.650  0.20( 0.11) 0.55      37.1      80.00
      9      171.30    8.30    4.628  0.20( 0.11) 0.55      37.4       6.00
     10      174.16    8.68    4.510  0.20( 0.11) 0.55      39.2      35.00
     11      174.72    8.76    4.486  0.20( 0.11) 0.55      39.6      25.00
     12      174.85    8.79    4.479  0.20( 0.11) 0.55      39.7      24.00
     13      175.78    8.94    4.436  0.20( 0.11) 0.55      40.4      46.00
     14      177.78    9.30    4.337  0.20( 0.11) 0.55      42.0      64.00
     15      178.36    9.42    4.305  0.20( 0.11) 0.56      42.5      32.00
     16      178.44    9.44    4.300  0.20( 0.11) 0.56      42.6      61.00
     17      179.09    9.61    4.254  0.20( 0.11) 0.56      43.3      78.00
     18      180.10   10.17    4.118  0.20( 0.11) 0.55      45.2      14.00
     19      180.17   10.22    4.108  0.20( 0.11) 0.55      45.4      76.00
     20      180.26   10.29    4.091  0.20( 0.11) 0.55      45.6      82.00
     21      180.36   10.41    4.066  0.20( 0.11) 0.55      46.0      67.00
     22      180.43   10.56    4.031  0.20( 0.11) 0.55      46.4      53.00
     23      180.41   10.64    4.013  0.20( 0.11) 0.55      46.7      43.00
     24      180.33   10.73    3.995  0.20( 0.11) 0.55      46.9      33.00
     25      180.29   10.75    3.991  0.20( 0.11) 0.55      46.9      56.00
     26      180.05   10.85    3.970  0.20( 0.11) 0.55      47.1      41.00
     27      177.94   11.49    3.842  0.20( 0.11) 0.55      48.3      13.00
     28      176.54   11.88    3.768  0.20( 0.11) 0.55      49.0      19.00
     29      176.23   11.98    3.751  0.20( 0.11) 0.55      49.2      29.00
     30      175.78   12.08    3.732  0.20( 0.11) 0.55      49.3      33.00
     31      175.25   12.20    3.712  0.20( 0.11) 0.55      49.5      73.00
```

32	171.93	12.85	3.602	0.20(0.11)	0.55	50.2	16.00
33	170.37	13.16	3.553	0.20(0.11)	0.55	50.5	17.00
34	167.90	13.65	3.479	0.20(0.11)	0.55	51.0	22.00
35	167.47	13.73	3.468	0.20(0.11)	0.55	51.0	10.00
36	166.18	13.94	3.438	0.20(0.11)	0.55	51.1	7.00
37	159.95	14.94	3.304	0.20(0.11)	0.55	51.5	4.00
38	150.54	16.54	3.118	0.20(0.11)	0.55	51.7	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 96.00 = 3310.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	152.94	5.56	5.824	0.20(0.11)	0.56	25.7	88.00
2	154.02	5.65	5.767	0.20(0.11)	0.56	26.2	63.00
3	155.70	5.80	5.685	0.20(0.11)	0.56	26.9	47.00
4	156.21	5.84	5.660	0.20(0.11)	0.56	27.1	45.00
5	162.47	6.42	5.361	0.20(0.11)	0.56	30.1	59.00
6	176.51	7.81	4.792	0.20(0.11)	0.56	37.2	31.00
7	178.32	8.00	4.728	0.20(0.11)	0.56	38.2	85.00
8	179.51	8.12	4.686	0.20(0.11)	0.56	38.8	38.00
9	180.48	8.23	4.650	0.20(0.11)	0.56	39.4	80.00
10	181.00	8.30	4.628	0.20(0.11)	0.56	39.7	6.00
11	183.84	8.67	4.513	0.20(0.11)	0.56	41.6	92.00
12	183.92	8.68	4.510	0.20(0.11)	0.56	41.6	35.00
13	184.43	8.76	4.486	0.20(0.11)	0.56	42.0	25.00
14	184.55	8.79	4.479	0.20(0.11)	0.56	42.1	24.00
15	185.38	8.94	4.436	0.20(0.11)	0.56	42.8	46.00
16	187.16	9.30	4.337	0.20(0.11)	0.56	44.4	64.00
17	187.67	9.42	4.305	0.20(0.11)	0.56	44.9	32.00
18	187.73	9.44	4.300	0.20(0.11)	0.56	45.0	61.00
19	188.28	9.61	4.254	0.20(0.11)	0.56	45.7	78.00
20	188.98	10.17	4.118	0.20(0.11)	0.56	47.6	14.00
21	189.03	10.22	4.108	0.20(0.11)	0.56	47.8	76.00
22	189.09	10.29	4.091	0.20(0.11)	0.56	48.0	82.00
23	189.13	10.41	4.066	0.20(0.11)	0.56	48.3	67.00
24	189.12	10.56	4.031	0.20(0.11)	0.56	48.8	53.00
25	189.07	10.64	4.013	0.20(0.11)	0.56	49.1	43.00
26	188.94	10.73	3.995	0.20(0.11)	0.56	49.3	33.00
27	188.89	10.75	3.991	0.20(0.11)	0.56	49.3	56.00
28	188.60	10.85	3.970	0.20(0.11)	0.56	49.5	41.00
29	186.21	11.49	3.842	0.20(0.11)	0.56	50.7	13.00
30	184.64	11.88	3.768	0.20(0.11)	0.56	51.4	19.00
31	184.30	11.98	3.751	0.20(0.11)	0.56	51.6	29.00
32	183.80	12.08	3.732	0.20(0.11)	0.56	51.7	33.00
33	183.23	12.20	3.712	0.20(0.11)	0.56	51.9	73.00
34	179.66	12.85	3.602	0.20(0.11)	0.56	52.6	16.00
35	177.99	13.16	3.553	0.20(0.11)	0.56	52.9	17.00
36	175.36	13.65	3.479	0.20(0.11)	0.56	53.4	22.00
37	174.91	13.73	3.468	0.20(0.11)	0.56	53.4	10.00
38	173.55	13.94	3.438	0.20(0.11)	0.56	53.5	7.00
39	167.02	14.94	3.304	0.20(0.11)	0.56	53.8	4.00
40	157.19	16.54	3.118	0.20(0.11)	0.56	54.1	1.00

TOTAL AREA(ACRES) = 54.1

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 189.13 Tc(MIN.) = 10.406
EFFECTIVE AREA(ACRES) = 48.35 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.56
TOTAL AREA(ACRES) = 54.1
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 96.00 = 3310.00 FEET.

****
FLOW PROCESS FROM NODE 96.00 TO NODE 96.00 IS CODE = 12

>>>>>CLEAR MEMORY BANK # 1 <<<<<
==

****
FLOW PROCESS FROM NODE 96.00 TO NODE 102.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.29
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     189.13
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =      48.35
  TOTAL STREAM AREA(ACRES) =      54.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     189.13

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.782
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.14      0.20     0.900    91    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.72
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      4.72

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.681
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        5.08      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.78
  AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =    8.14
```

```
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   20.58
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      25.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =  11.15
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.20
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.20
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   4.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.20

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.95      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
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  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   16.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   11.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.924
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.69      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    5.82
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       9.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  17.95
  FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.07
  RAINFALL INTENSITY(INCH/HR) =   3.92
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      152.94    5.63    5.780  0.20( 0.11) 0.56      25.7      88.00
      1      154.02    5.73    5.725  0.20( 0.11) 0.56      26.2      63.00
      1      155.70    5.87    5.645  0.20( 0.11) 0.56      26.9      47.00
      1      156.21    5.91    5.620  0.20( 0.11) 0.56      27.1      45.00
      1      162.47    6.49    5.327  0.20( 0.11) 0.56      30.1      59.00
      1      176.51    7.88    4.768  0.20( 0.11) 0.56      37.2      31.00
      1      178.32    8.07    4.704  0.20( 0.11) 0.56      38.2      85.00
      1      179.51    8.19    4.663  0.20( 0.11) 0.56      38.8      38.00
      1      180.48    8.30    4.627  0.20( 0.11) 0.56      39.4      80.00
      1      181.00    8.37    4.606  0.20( 0.11) 0.56      39.7       6.00
      1      183.84    8.74    4.493  0.20( 0.11) 0.56      41.6      92.00
      1      183.92    8.75    4.489  0.20( 0.11) 0.56      41.6      35.00
      1      184.43    8.83    4.465  0.20( 0.11) 0.56      42.0      25.00
      1      184.55    8.86    4.459  0.20( 0.11) 0.56      42.1      24.00
      1      185.38    9.01    4.416  0.20( 0.11) 0.56      42.8      46.00
      1      187.16    9.37    4.318  0.20( 0.11) 0.56      44.4      64.00
```

1	187.67	9.49	4.286	0.20(0.11)	0.56	44.9	32.00
1	187.73	9.51	4.282	0.20(0.11)	0.56	45.0	61.00
1	188.28	9.68	4.237	0.20(0.11)	0.56	45.7	78.00
1	188.98	10.24	4.102	0.20(0.11)	0.56	47.6	14.00
1	189.03	10.29	4.092	0.20(0.11)	0.56	47.8	76.00
1	189.09	10.36	4.075	0.20(0.11)	0.56	48.0	82.00
1	189.13	10.48	4.050	0.20(0.11)	0.56	48.3	67.00
1	189.12	10.63	4.016	0.20(0.11)	0.56	48.8	53.00
1	189.07	10.71	3.998	0.20(0.11)	0.56	49.1	43.00
1	188.94	10.80	3.980	0.20(0.11)	0.56	49.3	33.00
1	188.89	10.82	3.976	0.20(0.11)	0.56	49.3	56.00
1	188.60	10.92	3.955	0.20(0.11)	0.56	49.5	41.00
1	186.21	11.56	3.828	0.20(0.11)	0.56	50.7	13.00
1	184.64	11.95	3.755	0.20(0.11)	0.56	51.4	19.00
1	184.30	12.05	3.739	0.20(0.11)	0.56	51.6	29.00
1	183.80	12.15	3.719	0.20(0.11)	0.56	51.7	33.00
1	183.23	12.27	3.700	0.20(0.11)	0.56	51.9	73.00
1	179.66	12.92	3.591	0.20(0.11)	0.56	52.6	16.00
1	177.99	13.23	3.542	0.20(0.11)	0.56	52.9	17.00
1	175.36	13.72	3.469	0.20(0.11)	0.56	53.4	22.00
1	174.91	13.80	3.458	0.20(0.11)	0.56	53.4	10.00
1	173.55	14.01	3.428	0.20(0.11)	0.56	53.5	7.00
1	167.02	15.01	3.295	0.20(0.11)	0.56	53.8	4.00
1	157.19	16.61	3.110	0.20(0.11)	0.56	54.1	1.00
2	25.20	8.20	4.659	0.20(0.18)	0.90	6.2	97.00
3	9.07	11.07	3.924	0.20(0.11)	0.54	2.6	100.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	181.42	5.63	5.780	0.20(0.12)	0.61	31.3	88.00
2	182.69	5.73	5.725	0.20(0.12)	0.61	31.9	63.00
3	184.67	5.87	5.645	0.20(0.12)	0.60	32.7	47.00
4	185.27	5.91	5.620	0.20(0.12)	0.60	33.0	45.00
5	192.67	6.49	5.327	0.20(0.12)	0.60	36.5	59.00
6	209.18	7.88	4.768	0.20(0.12)	0.60	45.0	31.00
7	211.30	8.07	4.704	0.20(0.12)	0.60	46.2	85.00
8	212.70	8.19	4.663	0.20(0.12)	0.61	47.0	38.00
9	212.82	8.20	4.659	0.20(0.12)	0.61	47.1	97.00
10	213.55	8.30	4.627	0.20(0.12)	0.60	47.6	80.00
11	213.98	8.37	4.606	0.20(0.12)	0.60	47.9	6.00
12	216.33	8.74	4.493	0.20(0.12)	0.60	49.9	92.00
13	216.40	8.75	4.489	0.20(0.12)	0.60	49.9	35.00
14	216.80	8.83	4.465	0.20(0.12)	0.60	50.3	25.00
15	216.89	8.86	4.459	0.20(0.12)	0.60	50.4	24.00
16	217.54	9.01	4.416	0.20(0.12)	0.60	51.2	46.00
17	218.91	9.37	4.318	0.20(0.12)	0.60	52.9	64.00
18	219.28	9.49	4.286	0.20(0.12)	0.60	53.4	32.00
19	219.33	9.51	4.282	0.20(0.12)	0.60	53.5	61.00
20	219.69	9.68	4.237	0.20(0.12)	0.60	54.2	78.00
21	219.83	10.24	4.102	0.20(0.12)	0.60	56.3	14.00
22	219.84	10.29	4.092	0.20(0.12)	0.60	56.4	76.00
23	219.83	10.36	4.075	0.20(0.12)	0.60	56.7	82.00
24	219.76	10.48	4.050	0.20(0.12)	0.60	57.1	67.00
25	219.62	10.63	4.016	0.20(0.12)	0.60	57.6	53.00
26	219.49	10.71	3.998	0.20(0.12)	0.60	57.8	43.00
27	219.29	10.80	3.980	0.20(0.12)	0.60	58.1	33.00
28	219.23	10.82	3.976	0.20(0.12)	0.60	58.1	56.00
29	218.86	10.92	3.955	0.20(0.12)	0.60	58.4	41.00
30	218.16	11.07	3.924	0.20(0.12)	0.60	58.7	100.00
31	215.57	11.56	3.828	0.20(0.12)	0.60	59.6	13.00
32	213.43	11.95	3.755	0.20(0.12)	0.60	60.3	19.00
33	212.95	12.05	3.739	0.20(0.12)	0.60	60.4	29.00
34	212.30	12.15	3.719	0.20(0.12)	0.59	60.6	33.00
35	211.57	12.27	3.700	0.20(0.12)	0.59	60.7	73.00
36	207.13	12.92	3.591	0.20(0.12)	0.59	61.5	16.00
37	205.07	13.23	3.542	0.20(0.12)	0.59	61.8	17.00
38	201.85	13.72	3.469	0.20(0.12)	0.59	62.2	22.00

```
     39      201.31   13.80    3.458  0.20( 0.12) 0.59      62.3       10.00
     40      199.71   14.01    3.428  0.20( 0.12) 0.59      62.4        7.00
     41      192.12   15.01    3.295  0.20( 0.12) 0.59      62.7        4.00
     42      180.81   16.61    3.110  0.20( 0.12) 0.59      62.9        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     219.84    Tc(MIN.) =    10.29
  EFFECTIVE AREA(ACRES) =      56.42   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       62.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.59
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     219.84
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.36
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.42
  TOTAL STREAM AREA(ACRES) =      62.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     219.84

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.44      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.38
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.38
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   6.02
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      181.42    5.71    5.736  0.20( 0.12) 0.61      31.3      88.00
      1      182.69    5.80    5.681  0.20( 0.12) 0.61      31.9      63.00
      1      184.67    5.94    5.603  0.20( 0.12) 0.60      32.7      47.00
      1      185.27    5.99    5.579  0.20( 0.12) 0.60      33.0      45.00
      1      192.67    6.57    5.292  0.20( 0.12) 0.60      36.5      59.00
      1      209.18    7.95    4.742  0.20( 0.12) 0.60      45.0      31.00
      1      211.30    8.14    4.680  0.20( 0.12) 0.60      46.2      85.00
      1      212.70    8.27    4.639  0.20( 0.12) 0.61      47.0      38.00
      1      212.82    8.28    4.635  0.20( 0.12) 0.61      47.1      97.00
      1      213.55    8.37    4.604  0.20( 0.12) 0.60      47.6      80.00
      1      213.98    8.44    4.583  0.20( 0.12) 0.60      47.9       6.00
      1      216.33    8.81    4.471  0.20( 0.12) 0.60      49.9      92.00
      1      216.40    8.82    4.468  0.20( 0.12) 0.60      49.9      35.00
      1      216.80    8.91    4.444  0.20( 0.12) 0.60      50.3      25.00
      1      216.89    8.93    4.438  0.20( 0.12) 0.60      50.4      24.00
      1      217.54    9.08    4.396  0.20( 0.12) 0.60      51.2      46.00
      1      218.91    9.44    4.299  0.20( 0.12) 0.60      52.9      64.00
      1      219.28    9.56    4.268  0.20( 0.12) 0.60      53.4      32.00
      1      219.33    9.58    4.263  0.20( 0.12) 0.60      53.5      61.00
      1      219.69    9.76    4.219  0.20( 0.12) 0.60      54.2      78.00
      1      219.83   10.32    4.086  0.20( 0.12) 0.60      56.3      14.00
      1      219.84   10.36    4.076  0.20( 0.12) 0.60      56.4      76.00
      1      219.83   10.43    4.059  0.20( 0.12) 0.60      56.7      82.00
      1      219.76   10.55    4.034  0.20( 0.12) 0.60      57.1      67.00
      1      219.62   10.70    4.000  0.20( 0.12) 0.60      57.6      53.00
      1      219.49   10.79    3.982  0.20( 0.12) 0.60      57.8      43.00
      1      219.29   10.87    3.965  0.20( 0.12) 0.60      58.1      33.00
      1      219.23   10.89    3.961  0.20( 0.12) 0.60      58.1      56.00
      1      218.86   10.99    3.940  0.20( 0.12) 0.60      58.4      41.00
      1      218.16   11.14    3.909  0.20( 0.12) 0.60      58.7     100.00
      1      215.57   11.63    3.815  0.20( 0.12) 0.60      59.6      13.00
      1      213.43   12.02    3.742  0.20( 0.12) 0.60      60.3      19.00
      1      212.95   12.12    3.726  0.20( 0.12) 0.60      60.4      29.00
      1      212.30   12.23    3.707  0.20( 0.12) 0.59      60.6      33.00
      1      211.57   12.34    3.687  0.20( 0.12) 0.59      60.7      73.00
      1      207.13   13.00    3.579  0.20( 0.12) 0.59      61.5      16.00
      1      205.07   13.31    3.531  0.20( 0.12) 0.59      61.8      17.00
      1      201.85   13.80    3.459  0.20( 0.12) 0.59      62.2      22.00
      1      201.31   13.87    3.448  0.20( 0.12) 0.59      62.3      10.00
      1      199.71   14.09    3.418  0.20( 0.12) 0.59      62.4       7.00
      1      192.12   15.09    3.286  0.20( 0.12) 0.59      62.7       4.00
      1      180.81   16.69    3.102  0.20( 0.12) 0.59      62.9       1.00
      2        2.38    5.24    6.021  0.20( 0.18) 0.90       0.4     104.00
```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	177.54	5.24	6.021	0.20(0.12)	0.61	29.2	104.00
2	183.69	5.71	5.736	0.20(0.12)	0.61	31.8	88.00
3	184.93	5.80	5.681	0.20(0.12)	0.61	32.3	63.00
4	186.87	5.94	5.603	0.20(0.12)	0.61	33.2	47.00
5	187.47	5.99	5.579	0.20(0.12)	0.61	33.5	45.00
6	194.75	6.57	5.292	0.20(0.12)	0.61	37.0	59.00
7	211.04	7.95	4.742	0.20(0.12)	0.61	45.5	31.00
8	213.13	8.14	4.680	0.20(0.12)	0.61	46.6	85.00
9	214.52	8.27	4.639	0.20(0.12)	0.61	47.4	38.00
10	214.64	8.28	4.635	0.20(0.12)	0.61	47.5	97.00
11	215.35	8.37	4.604	0.20(0.12)	0.61	48.0	80.00
12	215.77	8.44	4.583	0.20(0.12)	0.61	48.4	6.00
13	218.08	8.81	4.471	0.20(0.12)	0.61	50.3	92.00
14	218.14	8.82	4.468	0.20(0.12)	0.61	50.4	35.00
15	218.53	8.91	4.444	0.20(0.12)	0.61	50.8	25.00
16	218.63	8.93	4.438	0.20(0.12)	0.61	50.9	24.00
17	219.26	9.08	4.396	0.20(0.12)	0.61	51.6	46.00
18	220.58	9.44	4.299	0.20(0.12)	0.60	53.3	64.00
19	220.94	9.56	4.268	0.20(0.12)	0.60	53.8	32.00
20	220.99	9.58	4.263	0.20(0.12)	0.60	53.9	61.00
21	221.33	9.76	4.219	0.20(0.12)	0.60	54.6	78.00
22	221.42	10.32	4.086	0.20(0.12)	0.60	56.7	14.00
23	221.43	10.36	4.076	0.20(0.12)	0.60	56.9	76.00
24	221.41	10.43	4.059	0.20(0.12)	0.60	57.1	82.00
25	221.33	10.55	4.034	0.20(0.12)	0.60	57.5	67.00
26	221.18	10.70	4.000	0.20(0.12)	0.60	58.0	53.00
27	221.04	10.79	3.982	0.20(0.12)	0.60	58.3	43.00
28	220.84	10.87	3.965	0.20(0.12)	0.60	58.5	33.00
29	220.77	10.89	3.961	0.20(0.12)	0.60	58.6	56.00
30	220.39	10.99	3.940	0.20(0.12)	0.60	58.8	41.00
31	219.68	11.14	3.909	0.20(0.12)	0.60	59.1	100.00
32	217.05	11.63	3.815	0.20(0.12)	0.60	60.0	13.00
33	214.88	12.02	3.742	0.20(0.12)	0.60	60.7	19.00
34	214.39	12.12	3.726	0.20(0.12)	0.60	60.9	29.00
35	213.73	12.23	3.707	0.20(0.12)	0.60	61.0	33.00
36	213.00	12.34	3.687	0.20(0.12)	0.60	61.2	73.00
37	208.51	13.00	3.579	0.20(0.12)	0.60	61.9	16.00
38	206.44	13.31	3.531	0.20(0.12)	0.60	62.2	17.00
39	203.19	13.80	3.459	0.20(0.12)	0.60	62.7	22.00
40	202.65	13.87	3.448	0.20(0.12)	0.60	62.7	10.00
41	201.03	14.09	3.418	0.20(0.12)	0.60	62.8	7.00
42	193.38	15.09	3.286	0.20(0.12)	0.60	63.1	4.00
43	182.00	16.69	3.102	0.20(0.12)	0.60	63.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 221.43 Tc(MIN.) = 10.36
EFFECTIVE AREA(ACRES) = 56.86 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 63.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 106.00 = 3485.00 FEET.

****
FLOW PROCESS FROM NODE 106.00 TO NODE 108.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 420.30
FLOW LENGTH(FEET) = 345.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.72
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 221.43
PIPE TRAVEL TIME(MIN.) = 0.28 Tc(MIN.) = 10.64
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 108.00 = 3830.00 FEET.

```
****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      56.86
  TOTAL STREAM AREA(ACRES) =      63.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     221.43

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.748
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.32      0.20     0.100    91    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =    6.98
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.112
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.35      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.60
  EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.67
  TOTAL STREAM AREA(ACRES) =       0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      177.54    5.53    5.838  0.20( 0.12) 0.61      29.2     104.00
      1      183.69    6.00    5.575  0.20( 0.12) 0.61      31.8      88.00
      1      184.93    6.09    5.525  0.20( 0.12) 0.61      32.3      63.00
      1      186.87    6.23    5.452  0.20( 0.12) 0.61      33.2      47.00
      1      187.47    6.28    5.430  0.20( 0.12) 0.61      33.5      45.00
      1      194.75    6.85    5.167  0.20( 0.12) 0.61      37.0      59.00
      1      211.04    8.23    4.650  0.20( 0.12) 0.61      45.5      31.00
      1      213.13    8.42    4.591  0.20( 0.12) 0.61      46.6      85.00
      1      214.52    8.54    4.552  0.20( 0.12) 0.61      47.4      38.00
      1      214.64    8.56    4.548  0.20( 0.12) 0.61      47.5      97.00
      1      215.35    8.65    4.519  0.20( 0.12) 0.61      48.0      80.00
      1      215.77    8.72    4.499  0.20( 0.12) 0.61      48.4       6.00
      1      218.08    9.09    4.393  0.20( 0.12) 0.61      50.3      92.00
      1      218.14    9.10    4.389  0.20( 0.12) 0.61      50.4      35.00
      1      218.53    9.19    4.367  0.20( 0.12) 0.61      50.8      25.00
      1      218.63    9.21    4.361  0.20( 0.12) 0.61      50.9      24.00
      1      219.26    9.36    4.321  0.20( 0.12) 0.61      51.6      46.00
      1      220.58    9.72    4.228  0.20( 0.12) 0.60      53.3      64.00
      1      220.94    9.84    4.198  0.20( 0.12) 0.60      53.8      32.00
      1      220.99    9.86    4.194  0.20( 0.12) 0.60      53.9      61.00
      1      221.33   10.03    4.151  0.20( 0.12) 0.60      54.6      78.00
      1      221.42   10.59    4.024  0.20( 0.12) 0.60      56.7      14.00
      1      221.43   10.64    4.014  0.20( 0.12) 0.60      56.9      76.00
      1      221.41   10.71    3.998  0.20( 0.12) 0.60      57.1      82.00
      1      221.33   10.83    3.974  0.20( 0.12) 0.60      57.5      67.00
      1      221.18   10.98    3.942  0.20( 0.12) 0.60      58.0      53.00
      1      221.04   11.06    3.925  0.20( 0.12) 0.60      58.3      43.00
      1      220.84   11.15    3.908  0.20( 0.12) 0.60      58.5      33.00
      1      220.77   11.17    3.904  0.20( 0.12) 0.60      58.6      56.00
      1      220.39   11.27    3.884  0.20( 0.12) 0.60      58.8      41.00
      1      219.68   11.42    3.854  0.20( 0.12) 0.60      59.1     100.00
      1      217.05   11.91    3.763  0.20( 0.12) 0.60      60.0      13.00
      1      214.88   12.30    3.693  0.20( 0.12) 0.60      60.7      19.00
      1      214.39   12.40    3.677  0.20( 0.12) 0.60      60.9      29.00
      1      213.73   12.51    3.659  0.20( 0.12) 0.60      61.0      33.00
      1      213.00   12.62    3.640  0.20( 0.12) 0.60      61.2      73.00
      1      208.51   13.27    3.536  0.20( 0.12) 0.60      61.9      16.00
      1      206.44   13.59    3.489  0.20( 0.12) 0.60      62.2      17.00
      1      203.19   14.08    3.419  0.20( 0.12) 0.60      62.7      22.00
      1      202.65   14.15    3.409  0.20( 0.12) 0.60      62.7      10.00
      1      201.03   14.37    3.379  0.20( 0.12) 0.60      62.8       7.00
```

```
     1      193.38   15.37    3.251  0.20( 0.12) 0.60      63.1       4.00
     1      182.00   16.98    3.071  0.20( 0.12) 0.60      63.4       1.00
     2        3.07    6.98    5.112  0.20( 0.02) 0.10       0.7      95.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      180.32    5.53    5.838  0.20( 0.12) 0.60      29.8     104.00
      2      186.57    6.00    5.575  0.20( 0.12) 0.60      32.4      88.00
      3      187.83    6.09    5.525  0.20( 0.12) 0.60      32.9      63.00
      4      189.80    6.23    5.452  0.20( 0.12) 0.60      33.8      47.00
      5      190.40    6.28    5.430  0.20( 0.12) 0.60      34.1      45.00
      6      197.79    6.85    5.167  0.20( 0.12) 0.60      37.6      59.00
      7      199.32    6.98    5.112  0.20( 0.12) 0.60      38.4      95.00
      8      213.83    8.23    4.650  0.20( 0.12) 0.60      46.1      31.00
      9      215.89    8.42    4.591  0.20( 0.12) 0.60      47.3      85.00
     10      217.25    8.54    4.552  0.20( 0.12) 0.60      48.1      38.00
     11      217.37    8.56    4.548  0.20( 0.12) 0.60      48.2      97.00
     12      218.06    8.65    4.519  0.20( 0.12) 0.60      48.7      80.00
     13      218.47    8.72    4.499  0.20( 0.12) 0.60      49.0       6.00
     14      220.72    9.09    4.393  0.20( 0.12) 0.60      51.0      92.00
     15      220.78    9.10    4.389  0.20( 0.12) 0.60      51.0      35.00
     16      221.16    9.19    4.367  0.20( 0.12) 0.60      51.5      25.00
     17      221.24    9.21    4.361  0.20( 0.12) 0.60      51.6      24.00
     18      221.85    9.36    4.321  0.20( 0.12) 0.60      52.3      46.00
     19      223.12    9.72    4.228  0.20( 0.12) 0.60      54.0      64.00
     20      223.46    9.84    4.198  0.20( 0.12) 0.60      54.5      32.00
     21      223.51    9.86    4.194  0.20( 0.12) 0.60      54.6      61.00
     22      223.82   10.03    4.151  0.20( 0.12) 0.60      55.3      78.00
     23      223.84   10.59    4.024  0.20( 0.12) 0.60      57.4      14.00
     24      223.84   10.64    4.014  0.20( 0.12) 0.60      57.5      76.00
     25      223.81   10.71    3.998  0.20( 0.12) 0.59      57.8      82.00
     26      223.72   10.83    3.974  0.20( 0.12) 0.59      58.2      67.00
     27      223.54   10.98    3.942  0.20( 0.12) 0.59      58.7      53.00
     28      223.40   11.06    3.925  0.20( 0.12) 0.59      58.9      43.00
     29      223.18   11.15    3.908  0.20( 0.12) 0.59      59.2      33.00
     30      223.11   11.17    3.904  0.20( 0.12) 0.59      59.2      56.00
     31      222.72   11.27    3.884  0.20( 0.12) 0.59      59.5      41.00
     32      221.99   11.42    3.854  0.20( 0.12) 0.59      59.8     100.00
     33      219.31   11.91    3.763  0.20( 0.12) 0.59      60.7      13.00
     34      217.09   12.30    3.693  0.20( 0.12) 0.59      61.4      19.00
     35      216.60   12.40    3.677  0.20( 0.12) 0.59      61.5      29.00
     36      215.93   12.51    3.659  0.20( 0.12) 0.59      61.7      33.00
     37      215.18   12.62    3.640  0.20( 0.12) 0.59      61.8      73.00
     38      210.63   13.27    3.536  0.20( 0.12) 0.59      62.6      16.00
     39      208.53   13.59    3.489  0.20( 0.12) 0.59      62.9      17.00
     40      205.24   14.08    3.419  0.20( 0.12) 0.59      63.3      22.00
     41      204.69   14.15    3.409  0.20( 0.12) 0.59      63.4      10.00
     42      203.06   14.37    3.379  0.20( 0.12) 0.59      63.5       7.00
     43      195.33   15.37    3.251  0.20( 0.12) 0.59      63.8       4.00
     44      183.84   16.98    3.071  0.20( 0.12) 0.59      64.1       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     223.84    Tc(MIN.) =    10.59
  EFFECTIVE AREA(ACRES) =      57.37   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       64.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
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  PIPE-FLOW VELOCITY(FEET/SEC.) =  47.82
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     223.84
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.775
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.93      0.20     0.900    91    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.554
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.84      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.05
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.68
  Tc(MIN.) =    8.54
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    3.31
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       6.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =  11.75
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.342
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    91    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
```

```
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
 STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.68
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.005
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.55
 EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.69

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
 FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
 LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.68
 RAINFALL INTENSITY(INCH/HR) =   4.01
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.05
 TOTAL STREAM AREA(ACRES) =       1.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        6.97   10.19    4.116  0.20( 0.18) 0.90       1.8      97.00
     2        3.69   10.68    4.005  0.20( 0.10) 0.50       1.0     111.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       10.59   10.19    4.116  0.20( 0.15) 0.76       2.8      97.00
     2       10.46   10.68    4.005  0.20( 0.15) 0.75       2.8     111.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      10.59    Tc(MIN.) =    10.19
 EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.15
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
 TOTAL AREA(ACRES) =        2.8
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.59
```

```
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.518
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20      0.600    91    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.09
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.09

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    9.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.304
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20      0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       4.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.42
  RAINFALL INTENSITY(INCH/HR) =   4.30
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.997
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.22
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.22

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.81
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.701
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       6.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  4.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.08
  RAINFALL INTENSITY(INCH/HR) =   4.70
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.79    9.42    4.304  0.20( 0.11) 0.56       1.3     114.00
      2        6.21    8.08    4.701  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.71    8.08    4.701  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.42    4.304  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.71    Tc(MIN.) =     8.08
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.71
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
```

```
------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.71    8.18    4.665  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.53    4.276  0.20( 0.11) 0.53       2.8     114.00
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.59   10.30    4.088  0.20( 0.15) 0.76       2.8      97.00
      2       10.46   10.80    3.980  0.20( 0.15) 0.75       2.8     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.35    8.18    4.665  0.20( 0.13) 0.63       4.8     116.00
      2       20.72    9.53    4.276  0.20( 0.13) 0.64       5.3     114.00
      3       20.58   10.30    4.088  0.20( 0.13) 0.64       5.5      97.00
      4       20.19   10.80    3.980  0.20( 0.13) 0.64       5.6     111.00
    TOTAL AREA(ACRES) =          5.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       20.72  Tc(MIN.) =    9.527
  EFFECTIVE AREA(ACRES) =      5.33  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.72
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.78
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.33
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.72
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    91    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =   10.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.952
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  2.60   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.93
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.55
  TOTAL STREAM AREA(ACRES) =       1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.44    4.584  0.20( 0.13) 0.63       4.8     116.00
      1       20.72    9.78    4.212  0.20( 0.13) 0.64       5.3     114.00
      1       20.58   10.56    4.032  0.20( 0.13) 0.64       5.5      97.00
      1       20.19   11.05    3.927  0.20( 0.13) 0.64       5.6     111.00
      2        5.37   10.93    3.952  0.20( 0.10) 0.50       1.5     120.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.18    8.44    4.584  0.20( 0.12) 0.61       6.0     116.00
      2       25.86    9.78    4.212  0.20( 0.12) 0.61       6.7     114.00
      3       25.88   10.56    4.032  0.20( 0.12) 0.61       7.0      97.00
      4       25.66   10.93    3.952  0.20( 0.12) 0.61       7.1     120.00
      5       25.53   11.05    3.927  0.20( 0.12) 0.61       7.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.88    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =       7.04   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.88
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.73
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.04
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.88
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.749
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20     0.100    91    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.96
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.96

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   5.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.96

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.560
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    8.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
```

```
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.98
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       7.61

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       2.16
  TOTAL STREAM AREA(ACRES) =       2.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1       25.18    8.61    4.531  0.20( 0.12) 0.61       6.0     116.00
     1       25.86    9.95    4.171  0.20( 0.12) 0.61       6.7     114.00
     1       25.88   10.73    3.995  0.20( 0.12) 0.61       7.0      97.00
     1       25.66   11.11    3.917  0.20( 0.12) 0.61       7.1     120.00
     1       25.53   11.23    3.893  0.20( 0.12) 0.61       7.1     111.00
     2        1.96    5.68    5.749  0.20( 0.02) 0.10       0.4     118.00
     3        7.61   10.64    4.013  0.20( 0.10) 0.50       2.2     123.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       29.03    5.68    5.749  0.20( 0.11) 0.55       5.5     118.00
     2       33.69    8.61    4.531  0.20( 0.11) 0.56       8.1     116.00
     3       34.67    9.95    4.171  0.20( 0.11) 0.56       9.1     114.00
     4       34.85   10.64    4.013  0.20( 0.11) 0.57       9.5     123.00
     5       34.81   10.73    3.995  0.20( 0.11) 0.57       9.6      97.00
     6       34.41   11.11    3.917  0.20( 0.11) 0.57       9.7     120.00
     7       34.22   11.23    3.893  0.20( 0.11) 0.57       9.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.85    Tc(MIN.) =    10.64
  EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.396
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.59      0.20     0.900    91    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      2.24

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.979
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.49      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    5.20
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.80
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.22

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.029
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.11
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    8.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.637
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.89      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    3.63
  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.27
 RAINFALL INTENSITY(INCH/HR) =   4.64
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.50
 EFFECTIVE STREAM AREA(ACRES) =       1.59
 TOTAL STREAM AREA(ACRES) =       1.59
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        7.22   10.80    3.979  0.20( 0.12) 0.61       2.1     127.00
     2        6.49    8.27    4.637  0.20( 0.10) 0.50       1.6     129.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.96    8.27    4.637  0.20( 0.11) 0.56       3.2     129.00
     2       12.77   10.80    3.979  0.20( 0.11) 0.56       3.7     127.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.96    Tc(MIN.) =     8.27
 EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =        3.7
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.12
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.96
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.32
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.96    8.32    4.621  0.20( 0.11) 0.56       3.2     129.00
     2       12.77   10.85    3.968  0.20( 0.11) 0.56       3.7     127.00
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
     1       29.03    6.01    5.567  0.20( 0.11) 0.55       5.5      118.00
     2       33.69    8.92    4.440  0.20( 0.11) 0.56       8.1      116.00
     3       34.67   10.26    4.098  0.20( 0.11) 0.56       9.1      114.00
     4       34.85   10.95    3.948  0.20( 0.11) 0.57       9.5      123.00
     5       34.81   11.04    3.930  0.20( 0.11) 0.57       9.6       97.00
     6       34.41   11.41    3.855  0.20( 0.11) 0.57       9.7      120.00
     7       34.22   11.53    3.832  0.20( 0.11) 0.57       9.7      111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       40.36    6.01    5.567  0.20( 0.11) 0.55       7.8      118.00
     2       45.69    8.32    4.621  0.20( 0.11) 0.56      10.8      129.00
     3       46.61    8.92    4.440  0.20( 0.11) 0.56      11.4      116.00
     4       47.49   10.26    4.098  0.20( 0.11) 0.56      12.7      114.00
     5       47.59   10.85    3.968  0.20( 0.11) 0.57      13.2      127.00
     6       47.55   10.95    3.948  0.20( 0.11) 0.57      13.2      123.00
     7       47.45   11.04    3.930  0.20( 0.11) 0.57      13.2       97.00
     8       46.80   11.41    3.855  0.20( 0.11) 0.57      13.3      120.00
     9       46.54   11.53    3.832  0.20( 0.11) 0.57      13.4      111.00
    TOTAL AREA(ACRES) =        13.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       47.59  Tc(MIN.) =   10.855
  EFFECTIVE AREA(ACRES) =     13.15  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.51
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.59
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.99
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.99
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      13.15
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.59

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.370
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.49

********************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   5.37
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.36    6.15    5.494  0.20( 0.11) 0.55       7.8     118.00
      1       45.69    8.46    4.579  0.20( 0.11) 0.56      10.8     129.00
      1       46.61    9.05    4.403  0.20( 0.11) 0.56      11.4     116.00
      1       47.49   10.39    4.068  0.20( 0.11) 0.56      12.7     114.00
      1       47.59   10.99    3.941  0.20( 0.11) 0.57      13.2     127.00
      1       47.55   11.09    3.921  0.20( 0.11) 0.57      13.2     123.00
      1       47.45   11.17    3.903  0.20( 0.11) 0.57      13.2      97.00
      1       46.80   11.55    3.830  0.20( 0.11) 0.57      13.3     120.00
      1       46.54   11.67    3.807  0.20( 0.11) 0.57      13.4     111.00
      2        1.49    6.40    5.370  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.83    6.15    5.494  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    6.40    5.370  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    8.46    4.579  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.05    4.403  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   10.39    4.068  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   10.99    3.941  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.09    3.921  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.17    3.903  0.20( 0.11) 0.56      13.6      97.00
      9       47.87   11.55    3.830  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   11.67    3.807  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.69    Tc(MIN.) =    10.99
  EFFECTIVE AREA(ACRES) =      13.46   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.69
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   11.64
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.46      0.20     0.500    91    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.88

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.28   Tc(MIN.) =    9.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.268
```

```
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.17      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    4.37
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.62
  FLOW VELOCITY(FEET/SEC.) =  4.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   4.27
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.09

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.980
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.73      0.20      0.500    91    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.21
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.21

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =    8.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.666
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.88
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.09    9.56    4.268  0.20( 0.11) 0.57       1.6     134.00
      2        5.88    8.18    4.666  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.59    8.18    4.666  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.56    4.268  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.59    Tc(MIN.) =     8.18
  EFFECTIVE AREA(ACRES) =       2.83   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.59
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.59    8.25    4.643  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.63    4.251  0.20( 0.11) 0.54       3.1     134.00
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       41.83    6.83    5.175  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    7.08    5.069  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    9.11    4.388  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.70    4.231  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   11.04    3.929  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   11.64    3.813  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.73    3.795  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.82    3.779  0.20( 0.11) 0.56      13.6      97.00
      9       47.87   12.20    3.712  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   12.32    3.691  0.20( 0.11) 0.55      13.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       52.55    6.83    5.175  0.20( 0.11) 0.53      10.4     118.00
      2       53.32    7.08    5.069  0.20( 0.11) 0.53      10.8     138.00
      3       56.65    8.25    4.643  0.20( 0.11) 0.54      12.8     136.00
      4       58.47    9.11    4.388  0.20( 0.11) 0.54      14.0     129.00
      5       59.18    9.63    4.251  0.20( 0.11) 0.54      14.7     134.00
      6       59.23    9.70    4.231  0.20( 0.11) 0.54      14.8     116.00
      7       59.19   11.04    3.929  0.20( 0.11) 0.55      16.0     114.00
      8       58.94   11.64    3.813  0.20( 0.11) 0.55      16.5     127.00
      9       58.84   11.73    3.795  0.20( 0.11) 0.55      16.6     123.00
     10       58.69   11.82    3.779  0.20( 0.11) 0.55      16.6      97.00
     11       57.83   12.20    3.712  0.20( 0.11) 0.55      16.7     120.00
     12       57.51   12.32    3.691  0.20( 0.11) 0.55      16.7     111.00
    TOTAL AREA(ACRES) =        16.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       59.23  Tc(MIN.) =    9.704
  EFFECTIVE AREA(ACRES) =     14.78  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
 FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.31
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      59.23
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       52.55    7.16    5.035  0.20( 0.11) 0.53      10.4     118.00
     2       53.32    7.41    4.937  0.20( 0.11) 0.53      10.8     138.00
     3       56.65    8.58    4.540  0.20( 0.11) 0.54      12.8     136.00
     4       58.47    9.44    4.300  0.20( 0.11) 0.54      14.0     129.00
     5       59.18    9.95    4.171  0.20( 0.11) 0.54      14.7     134.00
     6       59.23   10.02    4.153  0.20( 0.11) 0.54      14.8     116.00
     7       59.19   11.36    3.865  0.20( 0.11) 0.55      16.0     114.00
     8       58.94   11.96    3.754  0.20( 0.11) 0.55      16.5     127.00
     9       58.84   12.05    3.737  0.20( 0.11) 0.55      16.6     123.00
    10       58.69   12.15    3.720  0.20( 0.11) 0.55      16.6      97.00
    11       57.83   12.53    3.655  0.20( 0.11) 0.55      16.7     120.00
    12       57.51   12.65    3.635  0.20( 0.11) 0.55      16.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      180.32    5.55    5.825  0.20( 0.12) 0.60      29.8     104.00
     2      186.57    6.02    5.564  0.20( 0.12) 0.60      32.4      88.00
     3      187.83    6.11    5.514  0.20( 0.12) 0.60      32.9      63.00
     4      189.80    6.25    5.442  0.20( 0.12) 0.60      33.8      47.00
     5      190.40    6.30    5.420  0.20( 0.12) 0.60      34.1      45.00
     6      197.79    6.87    5.158  0.20( 0.12) 0.60      37.6      59.00
     7      199.32    7.00    5.104  0.20( 0.12) 0.60      38.4      95.00
     8      213.83    8.25    4.644  0.20( 0.12) 0.60      46.1      31.00
     9      215.89    8.44    4.585  0.20( 0.12) 0.60      47.3      85.00
    10      217.25    8.56    4.546  0.20( 0.12) 0.60      48.1      38.00
    11      217.37    8.57    4.542  0.20( 0.12) 0.60      48.2      97.00
    12      218.06    8.67    4.513  0.20( 0.12) 0.60      48.7      80.00
    13      218.47    8.74    4.493  0.20( 0.12) 0.60      49.0       6.00
    14      220.72    9.11    4.387  0.20( 0.12) 0.60      51.0      92.00
    15      220.78    9.12    4.384  0.20( 0.12) 0.60      51.0      35.00
    16      221.16    9.20    4.362  0.20( 0.12) 0.60      51.5      25.00
    17      221.24    9.23    4.356  0.20( 0.12) 0.60      51.6      24.00
    18      221.85    9.38    4.316  0.20( 0.12) 0.60      52.3      46.00
    19      223.12    9.74    4.224  0.20( 0.12) 0.60      54.0      64.00
    20      223.46    9.86    4.194  0.20( 0.12) 0.60      54.5      32.00
    21      223.51    9.88    4.189  0.20( 0.12) 0.60      54.6      61.00
    22      223.82   10.05    4.147  0.20( 0.12) 0.60      55.3      78.00
    23      223.84   10.61    4.020  0.20( 0.12) 0.60      57.4      14.00
    24      223.84   10.66    4.010  0.20( 0.12) 0.60      57.5      76.00
    25      223.81   10.73    3.994  0.20( 0.12) 0.59      57.8      82.00
    26      223.72   10.85    3.970  0.20( 0.12) 0.59      58.2      67.00
    27      223.54   11.00    3.938  0.20( 0.12) 0.59      58.7      53.00
    28      223.40   11.08    3.921  0.20( 0.12) 0.59      58.9      43.00
    29      223.18   11.17    3.904  0.20( 0.12) 0.59      59.2      33.00
    30      223.11   11.19    3.900  0.20( 0.12) 0.59      59.2      56.00
    31      222.72   11.29    3.881  0.20( 0.12) 0.59      59.5      41.00
```

32	221.99	11.44	3.851	0.20(0.12)	0.59	59.8	100.00
33	219.31	11.93	3.760	0.20(0.12)	0.59	60.7	13.00
34	217.09	12.32	3.690	0.20(0.12)	0.59	61.4	19.00
35	216.60	12.42	3.674	0.20(0.12)	0.59	61.5	29.00
36	215.93	12.52	3.656	0.20(0.12)	0.59	61.7	33.00
37	215.18	12.64	3.637	0.20(0.12)	0.59	61.8	73.00
38	210.63	13.29	3.533	0.20(0.12)	0.59	62.6	16.00
39	208.53	13.61	3.486	0.20(0.12)	0.59	62.9	17.00
40	205.24	14.10	3.416	0.20(0.12)	0.59	63.3	22.00
41	204.69	14.17	3.406	0.20(0.12)	0.59	63.4	10.00
42	203.06	14.39	3.377	0.20(0.12)	0.59	63.5	7.00
43	195.33	15.39	3.249	0.20(0.12)	0.59	63.8	4.00
44	183.84	17.00	3.069	0.20(0.12)	0.59	64.1	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 140.00 = 3885.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	227.60	5.55	5.825	0.20(0.12)	0.59	37.9	104.00
2	235.44	6.02	5.564	0.20(0.12)	0.59	41.1	88.00
3	237.03	6.11	5.514	0.20(0.12)	0.59	41.8	63.00
4	239.47	6.25	5.442	0.20(0.12)	0.59	42.9	47.00
5	240.22	6.30	5.420	0.20(0.12)	0.59	43.2	45.00
6	249.43	6.87	5.158	0.20(0.12)	0.59	47.6	59.00
7	251.35	7.00	5.104	0.20(0.12)	0.59	48.6	95.00
8	253.81	7.16	5.035	0.20(0.12)	0.59	49.9	118.00
9	257.46	7.41	4.937	0.20(0.12)	0.59	51.8	138.00
10	269.53	8.25	4.644	0.20(0.12)	0.59	58.4	31.00
11	272.12	8.44	4.585	0.20(0.12)	0.59	59.8	85.00
12	273.84	8.56	4.546	0.20(0.12)	0.59	60.8	38.00
13	273.99	8.57	4.542	0.20(0.12)	0.59	60.9	97.00
14	274.07	8.58	4.540	0.20(0.12)	0.59	61.0	136.00
15	274.90	8.67	4.513	0.20(0.12)	0.59	61.6	80.00
16	275.45	8.74	4.493	0.20(0.12)	0.59	62.0	6.00
17	278.49	9.11	4.387	0.20(0.12)	0.59	64.5	92.00
18	278.57	9.12	4.384	0.20(0.12)	0.59	64.6	35.00
19	279.13	9.20	4.362	0.20(0.12)	0.59	65.1	25.00
20	279.27	9.23	4.356	0.20(0.12)	0.59	65.3	24.00
21	280.19	9.38	4.316	0.20(0.12)	0.59	66.2	46.00
22	280.54	9.44	4.300	0.20(0.12)	0.59	66.6	129.00
23	282.00	9.74	4.224	0.20(0.12)	0.59	68.4	64.00
24	282.51	9.86	4.194	0.20(0.12)	0.59	69.1	32.00
25	282.58	9.88	4.189	0.20(0.12)	0.59	69.2	61.00
26	282.81	9.95	4.171	0.20(0.12)	0.59	69.6	134.00
27	283.01	10.02	4.153	0.20(0.12)	0.59	70.0	116.00
28	283.05	10.05	4.147	0.20(0.12)	0.59	70.1	78.00
29	283.05	10.61	4.020	0.20(0.12)	0.59	72.7	14.00
30	283.05	10.66	4.010	0.20(0.12)	0.58	72.9	76.00
31	283.02	10.73	3.994	0.20(0.12)	0.58	73.2	82.00
32	282.92	10.85	3.970	0.20(0.12)	0.58	73.7	67.00
33	282.74	11.00	3.938	0.20(0.12)	0.58	74.4	53.00
34	282.59	11.08	3.921	0.20(0.12)	0.58	74.7	43.00
35	282.37	11.17	3.904	0.20(0.12)	0.58	75.0	33.00
36	282.30	11.19	3.900	0.20(0.12)	0.58	75.1	56.00
37	281.91	11.29	3.881	0.20(0.12)	0.58	75.4	41.00
38	281.54	11.36	3.865	0.20(0.12)	0.58	75.7	114.00
39	281.15	11.44	3.851	0.20(0.12)	0.58	75.9	100.00
40	278.26	11.93	3.760	0.20(0.12)	0.58	77.2	13.00
41	278.08	11.96	3.754	0.20(0.12)	0.58	77.3	127.00
42	277.43	12.05	3.737	0.20(0.12)	0.58	77.5	123.00
43	276.74	12.15	3.720	0.20(0.12)	0.58	77.7	97.00
44	275.39	12.32	3.690	0.20(0.12)	0.58	78.0	19.00
45	274.69	12.42	3.674	0.20(0.12)	0.58	78.2	29.00
46	273.77	12.52	3.656	0.20(0.12)	0.58	78.4	33.00
47	273.74	12.53	3.655	0.20(0.12)	0.58	78.4	120.00
48	272.72	12.64	3.637	0.20(0.12)	0.58	78.6	73.00
49	272.61	12.65	3.635	0.20(0.12)	0.58	78.6	111.00
50	266.48	13.29	3.533	0.20(0.12)	0.58	79.3	16.00
51	263.61	13.61	3.486	0.20(0.12)	0.58	79.6	17.00
52	259.18	14.10	3.416	0.20(0.12)	0.58	80.1	22.00
53	258.46	14.17	3.406	0.20(0.12)	0.58	80.1	10.00

```
     54      256.35   14.39    3.377  0.20( 0.12) 0.58      80.2       7.00
     55      246.54   15.39    3.249  0.20( 0.12) 0.58      80.5       4.00
     56      232.11   17.00    3.069  0.20( 0.12) 0.58      80.8       1.00
    TOTAL AREA(ACRES) =        80.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      283.05  Tc(MIN.) =   10.052
  EFFECTIVE AREA(ACRES) =     70.12  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       80.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  75.0 INCH PIPE IS  56.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.43
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     283.05
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.21
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =      70.12
  TOTAL STREAM AREA(ACRES) =      80.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     283.05

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.12      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.67

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.67

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.455
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    91    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    8.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.19
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.98
  FLOW VELOCITY(FEET/SEC.) =  3.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       5.89

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.03
  RAINFALL INTENSITY(INCH/HR) =   4.72
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      227.60    5.72    5.730  0.20( 0.12) 0.59      37.9     104.00
      1      235.44    6.18    5.481  0.20( 0.12) 0.59      41.1      88.00
      1      237.03    6.27    5.433  0.20( 0.12) 0.59      41.8      63.00
      1      239.47    6.42    5.364  0.20( 0.12) 0.59      42.9      47.00
      1      240.22    6.46    5.342  0.20( 0.12) 0.59      43.2      45.00
      1      249.43    7.03    5.091  0.20( 0.12) 0.59      47.6      59.00
      1      251.35    7.15    5.039  0.20( 0.12) 0.59      48.6      95.00
      1      253.81    7.32    4.973  0.20( 0.12) 0.59      49.9     118.00
      1      257.46    7.57    4.878  0.20( 0.12) 0.59      51.8     138.00
      1      269.53    8.41    4.594  0.20( 0.12) 0.59      58.4      31.00
      1      272.12    8.59    4.537  0.20( 0.12) 0.59      59.8      85.00
      1      273.84    8.72    4.499  0.20( 0.12) 0.59      60.8      38.00
      1      273.99    8.73    4.496  0.20( 0.12) 0.59      60.9      97.00
      1      274.07    8.74    4.493  0.20( 0.12) 0.59      61.0     136.00
      1      274.90    8.83    4.467  0.20( 0.12) 0.59      61.6      80.00
      1      275.45    8.90    4.447  0.20( 0.12) 0.59      62.0       6.00
      1      278.49    9.26    4.345  0.20( 0.12) 0.59      64.5      92.00
      1      278.57    9.28    4.342  0.20( 0.12) 0.59      64.6      35.00
      1      279.13    9.36    4.320  0.20( 0.12) 0.59      65.1      25.00
      1      279.27    9.38    4.315  0.20( 0.12) 0.59      65.3      24.00
      1      280.19    9.53    4.276  0.20( 0.12) 0.59      66.2      46.00
      1      280.54    9.59    4.260  0.20( 0.12) 0.59      66.6     129.00
```

1	282.00	9.89	4.186	0.20(0.12)	0.59	68.4	64.00
1	282.51	10.01	4.157	0.20(0.12)	0.59	69.1	32.00
1	282.58	10.03	4.152	0.20(0.12)	0.59	69.2	61.00
1	282.81	10.10	4.135	0.20(0.12)	0.59	69.6	134.00
1	283.01	10.18	4.117	0.20(0.12)	0.59	70.0	116.00
1	283.05	10.21	4.111	0.20(0.12)	0.59	70.1	78.00
1	283.05	10.77	3.987	0.20(0.12)	0.59	72.7	14.00
1	283.05	10.81	3.977	0.20(0.12)	0.58	72.9	76.00
1	283.02	10.88	3.962	0.20(0.12)	0.58	73.2	82.00
1	282.92	11.00	3.939	0.20(0.12)	0.58	73.7	67.00
1	282.74	11.15	3.907	0.20(0.12)	0.58	74.4	53.00
1	282.59	11.24	3.890	0.20(0.12)	0.58	74.7	43.00
1	282.37	11.32	3.874	0.20(0.12)	0.58	75.0	33.00
1	282.30	11.34	3.870	0.20(0.12)	0.58	75.1	56.00
1	281.91	11.44	3.851	0.20(0.12)	0.58	75.4	41.00
1	281.54	11.52	3.836	0.20(0.12)	0.58	75.7	114.00
1	281.15	11.59	3.821	0.20(0.12)	0.58	75.9	100.00
1	278.26	12.08	3.733	0.20(0.12)	0.58	77.2	13.00
1	278.08	12.11	3.727	0.20(0.12)	0.58	77.3	127.00
1	277.43	12.21	3.710	0.20(0.12)	0.58	77.5	123.00
1	276.74	12.31	3.693	0.20(0.12)	0.58	77.7	97.00
1	275.39	12.48	3.664	0.20(0.12)	0.58	78.0	19.00
1	274.69	12.57	3.648	0.20(0.12)	0.58	78.2	29.00
1	273.77	12.68	3.630	0.20(0.12)	0.58	78.4	33.00
1	273.74	12.69	3.629	0.20(0.12)	0.58	78.4	120.00
1	272.72	12.79	3.612	0.20(0.12)	0.58	78.6	73.00
1	272.61	12.81	3.610	0.20(0.12)	0.58	78.6	111.00
1	266.48	13.45	3.510	0.20(0.12)	0.58	79.3	16.00
1	263.61	13.76	3.464	0.20(0.12)	0.58	79.6	17.00
1	259.18	14.25	3.395	0.20(0.12)	0.58	80.1	22.00
1	258.46	14.33	3.384	0.20(0.12)	0.58	80.1	10.00
1	256.35	14.54	3.356	0.20(0.12)	0.58	80.2	7.00
1	246.54	15.55	3.230	0.20(0.12)	0.58	80.5	4.00
1	232.11	17.16	3.053	0.20(0.12)	0.58	80.8	1.00
2	0.67	5.00	6.187	0.20(0.02)	0.10	0.1	140.00
3	5.89	8.03	4.716	0.20(0.04)	0.20	1.4	141.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.77	5.00	6.187	0.20(0.11)	0.57	34.1	140.00
2	233.32	5.72	5.730	0.20(0.12)	0.58	39.0	104.00
3	241.31	6.18	5.481	0.20(0.12)	0.58	42.3	88.00
4	242.93	6.27	5.433	0.20(0.11)	0.57	43.0	63.00
5	245.41	6.42	5.364	0.20(0.11)	0.57	44.1	47.00
6	246.17	6.46	5.342	0.20(0.11)	0.57	44.5	45.00
7	255.55	7.03	5.091	0.20(0.11)	0.57	49.0	59.00
8	257.51	7.15	5.039	0.20(0.12)	0.58	50.0	95.00
9	260.01	7.32	4.973	0.20(0.12)	0.58	51.3	118.00
10	263.73	7.57	4.878	0.20(0.12)	0.58	53.3	138.00
11	270.49	8.03	4.716	0.20(0.12)	0.58	57.0	141.00
12	275.76	8.41	4.594	0.20(0.12)	0.58	59.9	31.00
13	278.27	8.59	4.537	0.20(0.12)	0.58	61.4	85.00
14	279.94	8.72	4.499	0.20(0.12)	0.58	62.4	38.00
15	280.09	8.73	4.496	0.20(0.12)	0.58	62.4	97.00
16	280.17	8.74	4.493	0.20(0.12)	0.58	62.5	136.00
17	280.96	8.83	4.467	0.20(0.12)	0.58	63.1	80.00
18	281.48	8.90	4.447	0.20(0.12)	0.58	63.6	6.00
19	284.38	9.26	4.345	0.20(0.12)	0.58	66.1	92.00
20	284.46	9.28	4.342	0.20(0.12)	0.58	66.1	35.00
21	284.99	9.36	4.320	0.20(0.12)	0.58	66.7	25.00
22	285.12	9.38	4.315	0.20(0.12)	0.58	66.8	24.00
23	285.99	9.53	4.276	0.20(0.12)	0.58	67.7	46.00
24	286.31	9.59	4.260	0.20(0.12)	0.58	68.1	129.00
25	287.68	9.89	4.186	0.20(0.12)	0.58	69.9	64.00
26	288.15	10.01	4.157	0.20(0.12)	0.58	70.6	32.00
27	288.21	10.03	4.152	0.20(0.12)	0.58	70.7	61.00
28	288.42	10.10	4.135	0.20(0.12)	0.58	71.1	134.00

```
    29      288.59   10.18    4.117  0.20( 0.12) 0.58      71.5     116.00
    30      288.63   10.21    4.111  0.20( 0.12) 0.58      71.6      78.00
    31      288.45   10.77    3.987  0.20( 0.12) 0.58      74.2      14.00
    32      288.44   10.81    3.977  0.20( 0.12) 0.58      74.4      76.00
    33      288.39   10.88    3.962  0.20( 0.12) 0.58      74.8      82.00
    34      288.26   11.00    3.939  0.20( 0.12) 0.58      75.2      67.00
    35      288.04   11.15    3.907  0.20( 0.12) 0.58      75.9      53.00
    36      287.86   11.24    3.890  0.20( 0.12) 0.58      76.2      43.00
    37      287.62   11.32    3.874  0.20( 0.12) 0.58      76.6      33.00
    38      287.54   11.34    3.870  0.20( 0.12) 0.58      76.6      56.00
    39      287.13   11.44    3.851  0.20( 0.12) 0.58      77.0      41.00
    40      286.74   11.52    3.836  0.20( 0.12) 0.58      77.2     114.00
    41      286.32   11.59    3.821  0.20( 0.12) 0.58      77.4     100.00
    42      283.32   12.08    3.733  0.20( 0.12) 0.58      78.7      13.00
    43      283.12   12.11    3.727  0.20( 0.12) 0.58      78.8     127.00
    44      282.45   12.21    3.710  0.20( 0.12) 0.58      79.0     123.00
    45      281.74   12.31    3.693  0.20( 0.12) 0.58      79.2      97.00
    46      280.35   12.48    3.664  0.20( 0.12) 0.58      79.6      19.00
    47      279.63   12.57    3.648  0.20( 0.12) 0.58      79.7      29.00
    48      278.69   12.68    3.630  0.20( 0.12) 0.58      79.9      33.00
    49      278.65   12.69    3.629  0.20( 0.12) 0.58      79.9     120.00
    50      277.61   12.79    3.612  0.20( 0.12) 0.58      80.1      73.00
    51      277.49   12.81    3.610  0.20( 0.12) 0.58      80.1     111.00
    52      271.23   13.45    3.510  0.20( 0.12) 0.58      80.8      16.00
    53      268.30   13.76    3.464  0.20( 0.12) 0.58      81.1      17.00
    54      263.77   14.25    3.395  0.20( 0.12) 0.58      81.6      22.00
    55      263.03   14.33    3.384  0.20( 0.12) 0.58      81.6      10.00
    56      260.89   14.54    3.356  0.20( 0.12) 0.58      81.7       7.00
    57      250.90   15.55    3.230  0.20( 0.12) 0.58      82.1       4.00
    58      236.23   17.16    3.053  0.20( 0.12) 0.58      82.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     288.63    Tc(MIN.) =    10.21
  EFFECTIVE AREA(ACRES) =      71.64   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       82.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  55.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.86
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     288.63
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.96      0.20      0.600    91   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      3.16

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   13.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.546
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        1.82      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    5.61
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       8.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  17.60
  FLOW VELOCITY(FEET/SEC.) =  3.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.57
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.26
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.751
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    91   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.87
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.87

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.574
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.27      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =   13.03
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.82
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =   4.27
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
```

```
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   14.73
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.73
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.54
  TOTAL STREAM AREA(ACRES) =       0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.443
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    8.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65   14.73    3.331  0.20( 0.18) 0.90       0.5     147.00
      2        2.41    8.91    4.443  0.20( 0.12) 0.60       0.6      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.76    8.91    4.443  0.20( 0.14) 0.70       0.9      10.00
```

```
     2        3.44   14.73    3.331  0.20( 0.15) 0.74       1.2     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.76    Tc(MIN.) =     8.91
  EFFECTIVE AREA(ACRES) =       0.95   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.13
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.76    9.13    4.382  0.20( 0.14) 0.70       0.9      10.00
      2        3.44   14.95    3.303  0.20( 0.15) 0.74       1.2     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.57   13.26    3.539  0.20( 0.12) 0.60       2.8     144.00
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
    TOTAL AREA(ACRES) =         3.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       12.11  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      3.88  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.08      0.20     0.500    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   2.10    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.74
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.34

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.266
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    91    9.57
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.59

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =   10.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.095
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.34    9.74    4.222  0.20( 0.10) 0.50       0.1     147.00
      2        2.88   10.28    4.095  0.20( 0.09) 0.44       0.8     152.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.16    9.74    4.222  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.28    4.095  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.22    Tc(MIN.) =    10.28
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.22
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.16    9.79    4.210  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.33    4.083  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.19    9.13    4.382  0.20( 0.12) 0.59       3.6      10.00
      2       14.44    9.79    4.210  0.20( 0.12) 0.59       3.9     147.00
      3       14.62   10.33    4.083  0.20( 0.12) 0.59       4.0     152.00
      4       14.88   13.26    3.539  0.20( 0.12) 0.60       4.8     144.00
      5       14.01   14.95    3.303  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       14.88  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      4.76  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.88
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   13.66
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.66
  RAINFALL INTENSITY(INCH/HR) =   3.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.76
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.88

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.175
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    91    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.02
  RAINFALL INTENSITY(INCH/HR) =   6.17
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.23
  TOTAL STREAM AREA(ACRES) =       0.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.19    9.53    4.275  0.20( 0.12) 0.59       3.6      10.00
      1       14.44   10.19    4.114  0.20( 0.12) 0.59       3.9     147.00
      1       14.62   10.73    3.996  0.20( 0.12) 0.59       4.0     152.00
      1       14.88   13.66    3.479  0.20( 0.12) 0.60       4.8     144.00
      1       14.01   15.36    3.253  0.20( 0.12) 0.61       4.8     147.00
      2        1.27    5.02    6.175  0.20( 0.04) 0.20       0.2     150.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.16    5.02    6.175  0.20( 0.11) 0.55       2.1     150.00
      2       15.07    9.53    4.275  0.20( 0.11) 0.57       3.9      10.00
      3       15.29   10.19    4.114  0.20( 0.11) 0.57       4.1     147.00
      4       15.44   10.73    3.996  0.20( 0.11) 0.57       4.3     152.00
      5       15.60   13.66    3.479  0.20( 0.12) 0.58       5.0     144.00
      6       14.67   15.36    3.253  0.20( 0.12) 0.59       5.1     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.60    Tc(MIN.) =    13.66
  EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.60
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.69
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.69
  RAINFALL INTENSITY(INCH/HR) =   3.47
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.99
  TOTAL STREAM AREA(ACRES) =       5.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.60

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.813
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.30      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.16    5.05    6.150  0.20( 0.11) 0.55       2.1     150.00
      1       15.07    9.57    4.266  0.20( 0.11) 0.57       3.9      10.00
      1       15.29   10.23    4.106  0.20( 0.11) 0.57       4.1     147.00
      1       15.44   10.76    3.988  0.20( 0.11) 0.57       4.3     152.00
      1       15.60   13.69    3.474  0.20( 0.12) 0.58       5.0     144.00
      1       14.67   15.39    3.249  0.20( 0.12) 0.59       5.1     147.00
      2        1.56    5.58    5.813  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.65    5.05    6.150  0.20( 0.10) 0.51       2.4     150.00
      2       14.05    5.58    5.813  0.20( 0.10) 0.51       2.6      14.00
      3       16.21    9.57    4.266  0.20( 0.11) 0.54       4.2      10.00
      4       16.38   10.23    4.106  0.20( 0.11) 0.55       4.4     147.00
      5       16.51   10.76    3.988  0.20( 0.11) 0.55       4.6     152.00
      6       16.52   13.69    3.474  0.20( 0.11) 0.56       5.3     144.00
      7       15.54   15.39    3.249  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    13.69
  EFFECTIVE AREA(ACRES) =       5.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   13.97
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.97
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       5.29
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.826
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    91    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    6.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.314
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.26      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    1.24
  EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.52
  RAINFALL INTENSITY(INCH/HR) =   5.31
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       0.52
  TOTAL STREAM AREA(ACRES) =       0.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.47

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.65    5.34    5.959  0.20( 0.10) 0.51       2.4     150.00
      1       14.05    5.86    5.649  0.20( 0.10) 0.51       2.6      14.00
      1       16.21    9.84    4.197  0.20( 0.11) 0.54       4.2      10.00
      1       16.38   10.50    4.044  0.20( 0.11) 0.55       4.4     147.00
      1       16.51   11.04    3.931  0.20( 0.11) 0.55       4.6     152.00
      1       16.52   13.97    3.434  0.20( 0.11) 0.56       5.3     144.00
      1       15.54   15.67    3.215  0.20( 0.11) 0.57       5.4     147.00
      2        2.47    6.52    5.314  0.20( 0.03) 0.15       0.5     154.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.92    5.34    5.959  0.20( 0.09) 0.46       2.8     150.00
      2       16.42    5.86    5.649  0.20( 0.09) 0.46       3.1      14.00
      3       16.88    6.52    5.314  0.20( 0.09) 0.46       3.4     154.00
      4       18.16    9.84    4.197  0.20( 0.10) 0.50       4.7      10.00
      5       18.26   10.50    4.044  0.20( 0.10) 0.50       4.9     147.00
      6       18.33   11.04    3.931  0.20( 0.10) 0.51       5.1     152.00
      7       18.12   13.97    3.434  0.20( 0.10) 0.52       5.8     144.00
      8       17.03   15.67    3.215  0.20( 0.11) 0.53       5.9     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.33    Tc(MIN.) =    11.04
  EFFECTIVE AREA(ACRES) =       5.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.33
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.415
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.24      0.20     0.600    91    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.79
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      4.79

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.425
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.68      0.20      0.600    91    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.63
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.63

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.63

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.79    9.01    4.415  0.20( 0.12) 0.60       1.2     159.00
      2        2.63    8.98    4.425  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.42    8.98    4.425  0.20( 0.12) 0.60       1.9     160.00
      2        7.42    9.01    4.415  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.42    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.42
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.19
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        7.42    9.16    4.374  0.20( 0.12) 0.60       1.9     160.00
    2        7.42    9.19    4.365  0.20( 0.12) 0.60       1.9     159.00
 LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       15.92    5.41    5.912  0.20( 0.09) 0.46       2.8     150.00
    2       16.42    5.93    5.609  0.20( 0.09) 0.46       3.1      14.00
    3       16.88    6.59    5.280  0.20( 0.09) 0.46       3.4     154.00
    4       18.16    9.92    4.179  0.20( 0.10) 0.50       4.7      10.00
    5       18.26   10.58    4.028  0.20( 0.10) 0.50       4.9     147.00
    6       18.33   11.11    3.916  0.20( 0.10) 0.51       5.1     152.00
    7       18.12   14.04    3.424  0.20( 0.10) 0.52       5.8     144.00
    8       17.03   15.74    3.207  0.20( 0.11) 0.53       5.9     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.90    5.41    5.912  0.20( 0.10) 0.50       4.0     150.00
    2       22.62    5.93    5.609  0.20( 0.10) 0.50       4.4      14.00
    3       23.37    6.59    5.280  0.20( 0.10) 0.50       4.8     154.00
    4       25.29    9.16    4.374  0.20( 0.10) 0.52       6.3     160.00
    5       25.30    9.19    4.365  0.20( 0.11) 0.53       6.3     159.00
    6       25.26    9.92    4.179  0.20( 0.11) 0.53       6.6      10.00
    7       25.09   10.58    4.028  0.20( 0.11) 0.53       6.8     147.00
    8       24.97   11.11    3.916  0.20( 0.11) 0.53       7.0     152.00
    9       23.89   14.04    3.424  0.20( 0.11) 0.54       7.7     144.00
   10       22.43   15.74    3.207  0.20( 0.11) 0.55       7.8     147.00
  TOTAL AREA(ACRES) =         7.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       25.30  Tc(MIN.) =    9.190
 EFFECTIVE AREA(ACRES) =      6.33  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        7.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.25
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.30
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    9.40
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.452
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.28      0.20     0.600    91    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      4.99

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.99

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.738
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      5.05
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      5.05
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.99    9.36    4.321  0.20( 0.12) 0.60       1.3      17.00
      2        5.05    7.97    4.738  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.72    7.97    4.738  0.20( 0.11) 0.55       2.3      16.00
      2        9.59    9.36    4.321  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.72    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.01
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.72    8.01    4.723  0.20( 0.11) 0.55       2.3      16.00
      2        9.59    9.40    4.309  0.20( 0.11) 0.55       2.5      17.00
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.90    5.63    5.781  0.20( 0.10) 0.50       4.0     150.00
    2       22.62    6.15    5.496  0.20( 0.10) 0.50       4.4      14.00
    3       23.37    6.81    5.185  0.20( 0.10) 0.50       4.8     154.00
    4       25.29    9.37    4.318  0.20( 0.10) 0.52       6.3     160.00
    5       25.30    9.40    4.309  0.20( 0.11) 0.53       6.3     159.00
    6       25.26   10.13    4.129  0.20( 0.11) 0.53       6.6      10.00
    7       25.09   10.79    3.983  0.20( 0.11) 0.53       6.8     147.00
    8       24.97   11.32    3.874  0.20( 0.11) 0.53       7.0     152.00
    9       23.89   14.25    3.395  0.20( 0.11) 0.54       7.7     144.00
   10       22.43   15.96    3.182  0.20( 0.11) 0.55       7.8     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       30.30    5.63    5.781  0.20( 0.10) 0.51       5.6     150.00
    2       31.33    6.15    5.496  0.20( 0.10) 0.51       6.1      14.00
    3       32.45    6.81    5.185  0.20( 0.10) 0.52       6.8     154.00
    4       33.99    8.01    4.723  0.20( 0.10) 0.52       7.8      16.00
    5       34.88    9.37    4.318  0.20( 0.11) 0.53       8.8     160.00
    6       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8     159.00
    7       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8      17.00
    8       34.43   10.13    4.129  0.20( 0.11) 0.54       9.1      10.00
    9       33.94   10.79    3.983  0.20( 0.11) 0.54       9.3     147.00
   10       33.56   11.32    3.874  0.20( 0.11) 0.54       9.5     152.00
   11       31.39   14.25    3.395  0.20( 0.11) 0.55      10.2     144.00
   12       29.44   15.96    3.182  0.20( 0.11) 0.55      10.3     147.00
  TOTAL AREA(ACRES) =        10.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       34.89  Tc(MIN.) =    9.400
 EFFECTIVE AREA(ACRES) =      8.82  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =       10.3
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.66
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.89
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.45
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.45
 RAINFALL INTENSITY(INCH/HR) =   4.30
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.53
 EFFECTIVE STREAM AREA(ACRES) =       8.82
```

```
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.89

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.521
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    91    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.44

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    7.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.863
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.44      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  3.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.61
  RAINFALL INTENSITY(INCH/HR) =   4.86
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.17

********************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.157
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.71

********************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   6.16
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.30    5.68    5.750  0.20( 0.10) 0.51       5.6     150.00
      1       31.33    6.20    5.469  0.20( 0.10) 0.51       6.1      14.00
      1       32.45    6.86    5.162  0.20( 0.10) 0.52       6.8     154.00
      1       33.99    8.06    4.706  0.20( 0.10) 0.52       7.8      16.00
      1       34.88    9.42    4.305  0.20( 0.11) 0.53       8.8     160.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53       8.8     159.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53       8.8      17.00
      1       34.43   10.18    4.117  0.20( 0.11) 0.54       9.1      10.00
      1       33.94   10.84    3.972  0.20( 0.11) 0.54       9.3     147.00
      1       33.56   11.37    3.864  0.20( 0.11) 0.54       9.5     152.00
      1       31.39   14.31    3.388  0.20( 0.11) 0.55      10.2     144.00
      1       29.44   16.01    3.176  0.20( 0.11) 0.55      10.3     147.00
      2        3.17    7.61    4.863  0.20( 0.03) 0.16       0.7      19.00
      3        1.71    5.04    6.157  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```

```
 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.20    5.04    6.157  0.20( 0.09) 0.46       5.8     161.00
     2       34.70    5.68    5.750  0.20( 0.09) 0.46       6.4     150.00
     3       35.76    6.20    5.469  0.20( 0.09) 0.47       7.0      14.00
     4       36.93    6.86    5.162  0.20( 0.09) 0.47       7.7     154.00
     5       37.94    7.61    4.863  0.20( 0.09) 0.47       8.5      19.00
     6       38.37    8.06    4.706  0.20( 0.10) 0.48       8.9      16.00
     7       38.88    9.42    4.305  0.20( 0.10) 0.49       9.8     160.00
     8       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9     159.00
     9       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9      17.00
    10       38.26   10.18    4.117  0.20( 0.10) 0.50      10.1      10.00
    11       37.63   10.84    3.972  0.20( 0.10) 0.50      10.4     147.00
    12       37.15   11.37    3.864  0.20( 0.10) 0.50      10.5     152.00
    13       34.54   14.31    3.388  0.20( 0.10) 0.51      11.3     144.00
    14       32.39   16.01    3.176  0.20( 0.10) 0.51      11.3     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      38.89    Tc(MIN.) =     9.45
 EFFECTIVE AREA(ACRES) =       9.86   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       11.3
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.01
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      38.89
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.51
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
 ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.709
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.85      0.20     0.600    91    8.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.51
 TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      3.51

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.673
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.51    8.05    4.709  0.20( 0.12) 0.60       0.9     168.00
      2        4.06    8.16    4.673  0.20( 0.12) 0.60       1.0     169.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.54    8.05    4.709  0.20( 0.12) 0.60       1.8     168.00
      2        7.54    8.16    4.673  0.20( 0.12) 0.60       1.8     169.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.54    Tc(MIN.) =     8.05
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.54    8.19    4.663  0.20( 0.12) 0.60       1.8     168.00
      2        7.54    8.30    4.628  0.20( 0.12) 0.60       1.8     169.00
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.20    5.11    6.113  0.20( 0.09) 0.46       5.8     161.00
      2       34.70    5.74    5.715  0.20( 0.09) 0.46       6.4     150.00
      3       35.76    6.26    5.439  0.20( 0.09) 0.47       7.0      14.00
      4       36.93    6.92    5.136  0.20( 0.09) 0.47       7.7     154.00
      5       37.94    7.67    4.842  0.20( 0.09) 0.47       8.5      19.00
      6       38.37    8.12    4.686  0.20( 0.10) 0.48       8.9      16.00
      7       38.88    9.48    4.289  0.20( 0.10) 0.49       9.8     160.00
      8       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9     159.00
      9       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9      17.00
     10       38.26   10.24    4.104  0.20( 0.10) 0.50      10.1      10.00
     11       37.63   10.90    3.960  0.20( 0.10) 0.50      10.4     147.00
     12       37.15   11.43    3.852  0.20( 0.10) 0.50      10.5     152.00
     13       34.54   14.37    3.380  0.20( 0.10) 0.51      11.3     144.00
     14       32.39   16.08    3.169  0.20( 0.10) 0.51      11.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.41    5.11    6.113  0.20( 0.10) 0.48       6.9     161.00
      2       41.21    5.74    5.715  0.20( 0.10) 0.49       7.7     150.00
      3       42.52    6.26    5.439  0.20( 0.10) 0.49       8.4      14.00
      4       43.96    6.92    5.136  0.20( 0.10) 0.49       9.3     154.00
      5       45.28    7.67    4.842  0.20( 0.10) 0.50      10.2      19.00
      6       45.89    8.12    4.686  0.20( 0.10) 0.50      10.7      16.00
      7       45.94    8.19    4.663  0.20( 0.10) 0.50      10.7     168.00
      8       45.98    8.30    4.628  0.20( 0.10) 0.50      10.8     169.00
      9       45.86    9.48    4.289  0.20( 0.10) 0.51      11.7     160.00
     10       45.85    9.51    4.281  0.20( 0.10) 0.51      11.7     159.00
     11       45.84    9.51    4.281  0.20( 0.10) 0.51      11.7      17.00
     12       44.92   10.24    4.104  0.20( 0.10) 0.51      12.0      10.00
     13       44.05   10.90    3.960  0.20( 0.10) 0.51      12.2     147.00
     14       43.39   11.43    3.852  0.20( 0.10) 0.51      12.4     152.00
     15       39.99   14.37    3.380  0.20( 0.10) 0.52      13.1     144.00
     16       37.49   16.08    3.169  0.20( 0.10) 0.52      13.2     147.00
```

```
    TOTAL AREA(ACRES) =        13.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       45.98  Tc(MIN.) =    8.299
  EFFECTIVE AREA(ACRES) =     10.82  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   472.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.98
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.98
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.50
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      10.82
  TOTAL STREAM AREA(ACRES) =      13.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.98

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.55
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.55

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.41    5.32    5.973  0.20( 0.10) 0.48       6.9     161.00
      1       41.21    5.95    5.599  0.20( 0.10) 0.49       7.7     150.00
      1       42.52    6.47    5.337  0.20( 0.10) 0.49       8.4      14.00
      1       43.96    7.13    5.049  0.20( 0.10) 0.49       9.3     154.00
      1       45.28    7.87    4.770  0.20( 0.10) 0.50      10.2      19.00
      1       45.89    8.32    4.621  0.20( 0.10) 0.50      10.7      16.00
      1       45.94    8.39    4.599  0.20( 0.10) 0.50      10.7     168.00
      1       45.98    8.50    4.565  0.20( 0.10) 0.50      10.8     169.00
      1       45.86    9.68    4.238  0.20( 0.10) 0.51      11.7     160.00
      1       45.85    9.71    4.230  0.20( 0.10) 0.51      11.7     159.00
      1       45.84    9.71    4.230  0.20( 0.10) 0.51      11.7      17.00
      1       44.92   10.45    4.056  0.20( 0.10) 0.51      12.0      10.00
      1       44.05   11.11    3.917  0.20( 0.10) 0.51      12.2     147.00
      1       43.39   11.64    3.812  0.20( 0.10) 0.51      12.4     152.00
      1       39.99   14.58    3.351  0.20( 0.10) 0.52      13.1     144.00
      1       37.49   16.29    3.145  0.20( 0.10) 0.52      13.2     147.00
      2        1.55    5.00    6.187  0.20( 0.02) 0.10       0.3     170.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.96    5.00    6.187  0.20( 0.09) 0.47       6.8     170.00
      2       40.91    5.32    5.973  0.20( 0.09) 0.47       7.2     161.00
      3       42.62    5.95    5.599  0.20( 0.09) 0.47       8.0     150.00
      4       43.86    6.47    5.337  0.20( 0.10) 0.48       8.7      14.00
      5       45.23    7.13    5.049  0.20( 0.10) 0.48       9.5     154.00
      6       46.48    7.87    4.770  0.20( 0.10) 0.48      10.4      19.00
      7       47.05    8.32    4.621  0.20( 0.10) 0.49      10.9      16.00
      8       47.10    8.39    4.599  0.20( 0.10) 0.49      11.0     168.00
      9       47.12    8.50    4.565  0.20( 0.10) 0.49      11.1     169.00
     10       46.92    9.68    4.238  0.20( 0.10) 0.50      12.0     160.00
     11       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0     159.00
     12       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0      17.00
     13       45.94   10.45    4.056  0.20( 0.10) 0.50      12.3      10.00
     14       45.03   11.11    3.917  0.20( 0.10) 0.50      12.5     147.00
     15       44.35   11.64    3.812  0.20( 0.10) 0.50      12.7     152.00
     16       40.83   14.58    3.351  0.20( 0.10) 0.51      13.4     144.00
     17       38.27   16.29    3.145  0.20( 0.10) 0.51      13.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.12    Tc(MIN.) =     8.50
  EFFECTIVE AREA(ACRES) =      11.10   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.12
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.56
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.81      0.20     0.200    91    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   5.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.812
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.51      0.20     0.100    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
  SUBAREA RUNOFF(CFS) =      2.66
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.66

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.66

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.06    5.94    5.604  0.20( 0.04) 0.20       0.8     173.00
      2        2.66    5.58    5.812  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.61    5.58    5.812  0.20( 0.03) 0.16       1.3     174.00
      2        6.62    5.94    5.604  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.62    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.62
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.61    5.72    5.728  0.20( 0.03) 0.16       1.3     174.00
      2        6.62    6.09    5.528  0.20( 0.03) 0.16       1.3     173.00
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.
```

```
 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.96    5.06    6.142  0.20( 0.09) 0.47       6.8     170.00
     2       40.91    5.38    5.932  0.20( 0.09) 0.47       7.2     161.00
     3       42.62    6.02    5.564  0.20( 0.09) 0.47       8.0     150.00
     4       43.86    6.54    5.307  0.20( 0.10) 0.48       8.7      14.00
     5       45.23    7.19    5.024  0.20( 0.10) 0.48       9.5     154.00
     6       46.48    7.94    4.748  0.20( 0.10) 0.48      10.4      19.00
     7       47.05    8.38    4.601  0.20( 0.10) 0.49      10.9      16.00
     8       47.10    8.46    4.579  0.20( 0.10) 0.49      11.0     168.00
     9       47.12    8.56    4.546  0.20( 0.10) 0.49      11.1     169.00
    10       46.92    9.74    4.222  0.20( 0.10) 0.50      12.0     160.00
    11       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0     159.00
    12       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0      17.00
    13       45.94   10.51    4.042  0.20( 0.10) 0.50      12.3      10.00
    14       45.03   11.17    3.904  0.20( 0.10) 0.50      12.5     147.00
    15       44.35   11.71    3.800  0.20( 0.10) 0.50      12.7     152.00
    16       40.83   14.64    3.343  0.20( 0.10) 0.51      13.4     144.00
    17       38.27   16.35    3.138  0.20( 0.10) 0.51      13.4     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.24    5.06    6.142  0.20( 0.08) 0.42       7.9     170.00
     2       47.35    5.38    5.932  0.20( 0.08) 0.42       8.4     161.00
     3       48.42    5.72    5.728  0.20( 0.09) 0.43       8.9     174.00
     4       49.24    6.02    5.564  0.20( 0.09) 0.43       9.3     150.00
     5       49.40    6.09    5.528  0.20( 0.09) 0.43       9.4     173.00
     6       50.21    6.54    5.307  0.20( 0.09) 0.43      10.0      14.00
     7       51.24    7.19    5.024  0.20( 0.09) 0.44      10.9     154.00
     8       52.16    7.94    4.748  0.20( 0.09) 0.45      11.8      19.00
     9       52.55    8.38    4.601  0.20( 0.09) 0.45      12.3      16.00
    10       52.57    8.46    4.579  0.20( 0.09) 0.45      12.3     168.00
    11       52.56    8.56    4.546  0.20( 0.09) 0.46      12.4     169.00
    12       51.97    9.74    4.222  0.20( 0.09) 0.47      13.3     160.00
    13       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3     159.00
    14       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3      17.00
    15       50.77   10.51    4.042  0.20( 0.09) 0.47      13.6      10.00
    16       49.69   11.17    3.904  0.20( 0.09) 0.47      13.8     147.00
    17       48.89   11.71    3.800  0.20( 0.09) 0.47      14.0     152.00
    18       44.82   14.64    3.343  0.20( 0.10) 0.48      14.7     144.00
    19       42.01   16.35    3.138  0.20( 0.10) 0.48      14.8     147.00
   TOTAL AREA(ACRES) =        14.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       52.57  Tc(MIN.) =    8.455
 EFFECTIVE AREA(ACRES) =     12.33  AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       14.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
 FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.28
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      52.57
```

```
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.45
  EFFECTIVE STREAM AREA(ACRES) =      12.33
  TOTAL STREAM AREA(ACRES) =      14.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      52.57

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20     0.100    91    5.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.21
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.21

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.70
  RAINFALL INTENSITY(INCH/HR) =   5.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.810
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =    7.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.966
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  3.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   4.97
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1       46.24    5.42    5.905  0.20( 0.08) 0.42       7.9     170.00
     1       47.35    5.74    5.716  0.20( 0.08) 0.42       8.4     161.00
     1       48.42    6.08    5.533  0.20( 0.09) 0.43       8.9     174.00
     1       49.24    6.37    5.383  0.20( 0.09) 0.43       9.3     150.00
     1       49.40    6.44    5.350  0.20( 0.09) 0.43       9.4     173.00
     1       50.21    6.89    5.148  0.20( 0.09) 0.43      10.0      14.00
     1       51.24    7.55    4.886  0.20( 0.09) 0.44      10.9     154.00
     1       52.16    8.28    4.634  0.20( 0.09) 0.45      11.8      19.00
     1       52.55    8.73    4.496  0.20( 0.09) 0.45      12.3      16.00
     1       52.57    8.80    4.476  0.20( 0.09) 0.45      12.3     168.00
     1       52.56    8.91    4.444  0.20( 0.09) 0.46      12.4     169.00
     1       51.97   10.09    4.139  0.20( 0.09) 0.47      13.3     160.00
     1       51.94   10.12    4.131  0.20( 0.09) 0.47      13.3     159.00
     1       51.94   10.12    4.131  0.20( 0.09) 0.47      13.3      17.00
     1       50.77   10.87    3.966  0.20( 0.09) 0.47      13.6      10.00
     1       49.69   11.53    3.834  0.20( 0.09) 0.47      13.8     147.00
     1       48.89   12.06    3.735  0.20( 0.09) 0.47      14.0     152.00
     1       44.82   15.00    3.297  0.20( 0.10) 0.48      14.7     144.00
     1       42.01   16.72    3.098  0.20( 0.10) 0.48      14.8     147.00
     2        2.21    5.70    5.737  0.20( 0.02) 0.10       0.4     175.00
     3        3.55    7.34    4.966  0.20( 0.04) 0.20       0.8     167.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.52    5.42    5.905  0.20( 0.08) 0.39       8.9     170.00
      2       52.62    5.70    5.737  0.20( 0.08) 0.39       9.4     175.00
      3       52.75    5.74    5.716  0.20( 0.08) 0.40       9.4     161.00
      4       53.83    6.08    5.533  0.20( 0.08) 0.40      10.0     174.00
      5       54.65    6.37    5.383  0.20( 0.08) 0.40      10.4     150.00
      6       54.82    6.44    5.350  0.20( 0.08) 0.40      10.6     173.00
      7       55.65    6.89    5.148  0.20( 0.08) 0.41      11.2      14.00
      8       56.37    7.34    4.966  0.20( 0.08) 0.41      11.8     167.00
      9       56.61    7.55    4.886  0.20( 0.08) 0.41      12.1     154.00
     10       57.26    8.28    4.634  0.20( 0.08) 0.42      13.0      19.00
     11       57.49    8.73    4.496  0.20( 0.09) 0.43      13.5      16.00
     12       57.49    8.80    4.476  0.20( 0.09) 0.43      13.6     168.00
     13       57.44    8.91    4.444  0.20( 0.09) 0.43      13.7     169.00
     14       56.51   10.09    4.139  0.20( 0.09) 0.44      14.5     160.00
     15       56.48   10.12    4.131  0.20( 0.09) 0.44      14.5     159.00
     16       56.48   10.12    4.131  0.20( 0.09) 0.44      14.5      17.00
     17       55.13   10.87    3.966  0.20( 0.09) 0.44      14.8      10.00
     18       53.90   11.53    3.834  0.20( 0.09) 0.45      15.0     147.00
     19       52.99   12.06    3.735  0.20( 0.09) 0.45      15.2     152.00
     20       48.43   15.00    3.297  0.20( 0.09) 0.46      15.9     144.00
     21       45.41   16.72    3.098  0.20( 0.09) 0.46      16.0     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      57.49    Tc(MIN.) =     8.73
  EFFECTIVE AREA(ACRES) =      13.49   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =       16.0
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   458.40  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.84
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.661
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    91    8.20
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.75
 TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
 FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =   10.57
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
 STREET FLOW TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    9.38
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.315
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.89
 EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.43

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.50
 FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
```

```
 LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.38
 RAINFALL INTENSITY(INCH/HR) =   4.31
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.54
 EFFECTIVE STREAM AREA(ACRES) =       1.17
 TOTAL STREAM AREA(ACRES) =       1.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.43

****************************************************************************
 FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
 ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.618
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91    8.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      4.53
 TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.53

****************************************************************************
 FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
 STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.40
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   14.20
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.88
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.188
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.83

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.88
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.14
  TOTAL STREAM AREA(ACRES) =       2.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.43    9.38    4.315  0.20( 0.11) 0.54       1.2     179.00
      2        7.83    9.88    4.188  0.20( 0.12) 0.60       2.1     181.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.10    9.38    4.315  0.20( 0.12) 0.58       3.2     179.00
      2       12.13    9.88    4.188  0.20( 0.12) 0.58       3.3     181.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.13    Tc(MIN.) =     9.88
  EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.13
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.02
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.10    9.52    4.279  0.20( 0.12) 0.58       3.2     179.00
      2       12.13   10.02    4.155  0.20( 0.12) 0.58       3.3     181.00
  LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.52    5.48    5.868  0.20( 0.08) 0.39       8.9     170.00
      2       52.62    5.76    5.703  0.20( 0.08) 0.39       9.4     175.00
      3       52.75    5.80    5.683  0.20( 0.08) 0.40       9.4     161.00
      4       53.83    6.14    5.502  0.20( 0.08) 0.40      10.0     174.00
      5       54.65    6.43    5.355  0.20( 0.08) 0.40      10.4     150.00
      6       54.82    6.50    5.322  0.20( 0.08) 0.40      10.6     173.00
      7       55.65    6.95    5.123  0.20( 0.08) 0.41      11.2      14.00
      8       56.37    7.40    4.943  0.20( 0.08) 0.41      11.8     167.00
      9       56.61    7.61    4.864  0.20( 0.08) 0.41      12.1     154.00
     10       57.26    8.34    4.615  0.20( 0.08) 0.42      13.0      19.00
     11       57.49    8.79    4.479  0.20( 0.09) 0.43      13.5      16.00
     12       57.49    8.86    4.458  0.20( 0.09) 0.43      13.6     168.00
     13       57.44    8.97    4.428  0.20( 0.09) 0.43      13.7     169.00
     14       56.51   10.14    4.125  0.20( 0.09) 0.44      14.5     160.00
     15       56.48   10.18    4.117  0.20( 0.09) 0.44      14.5     159.00
     16       56.48   10.18    4.117  0.20( 0.09) 0.44      14.5      17.00
     17       55.13   10.93    3.953  0.20( 0.09) 0.44      14.8      10.00
     18       53.90   11.59    3.823  0.20( 0.09) 0.45      15.0     147.00
     19       52.99   12.12    3.725  0.20( 0.09) 0.45      15.2     152.00
     20       48.43   15.06    3.289  0.20( 0.09) 0.46      15.9     144.00
     21       45.41   16.78    3.092  0.20( 0.09) 0.46      16.0     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.16    5.48    5.868  0.20( 0.09) 0.43      10.7     170.00
      2       62.46    5.76    5.703  0.20( 0.09) 0.43      11.3     175.00
      3       62.61    5.80    5.683  0.20( 0.09) 0.43      11.4     161.00
      4       63.93    6.14    5.502  0.20( 0.09) 0.43      12.0     174.00
      5       64.95    6.43    5.355  0.20( 0.09) 0.43      12.6     150.00
      6       65.16    6.50    5.322  0.20( 0.09) 0.43      12.7     173.00
      7       66.28    6.95    5.123  0.20( 0.09) 0.44      13.5      14.00
      8       67.28    7.40    4.943  0.20( 0.09) 0.44      14.3     167.00
      9       67.65    7.61    4.864  0.20( 0.09) 0.44      14.7     154.00
     10       68.71    8.34    4.615  0.20( 0.09) 0.45      15.8      19.00
     11       69.20    8.79    4.479  0.20( 0.09) 0.45      16.5      16.00
     12       69.24    8.86    4.458  0.20( 0.09) 0.46      16.5     168.00
     13       69.25    8.97    4.428  0.20( 0.09) 0.46      16.7     169.00
     14       69.11    9.52    4.279  0.20( 0.09) 0.46      17.3     179.00
     15       68.74   10.02    4.155  0.20( 0.09) 0.46      17.7     181.00
     16       68.55   10.14    4.125  0.20( 0.09) 0.47      17.8     160.00
     17       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8     159.00
     18       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8      17.00
     19       66.65   10.93    3.953  0.20( 0.09) 0.47      18.1      10.00
     20       65.03   11.59    3.823  0.20( 0.09) 0.47      18.3     147.00
     21       63.82   12.12    3.725  0.20( 0.09) 0.47      18.5     152.00
     22       57.96   15.06    3.289  0.20( 0.10) 0.48      19.2     144.00
     23       54.34   16.78    3.092  0.20( 0.10) 0.48      19.3     147.00
    TOTAL AREA(ACRES) =        19.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       69.25  Tc(MIN.) =    8.966
  EFFECTIVE AREA(ACRES) =     16.67  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
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  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.210
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    91    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.82
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      4.82

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.937
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.42
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  16.07
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.42
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.42

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.336
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.35
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.35

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   10.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.129
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.13
  RAINFALL INTENSITY(INCH/HR) =   4.13
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.42   11.14    3.910  0.20( 0.12) 0.60       2.4     184.00
      2        4.88   10.13    4.129  0.20( 0.11) 0.55       1.4     187.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.98   10.13    4.129  0.20( 0.12) 0.58       3.6     187.00
      2       13.04   11.14    3.910  0.20( 0.12) 0.58       3.8     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.04    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.04
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   3.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.04

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.086
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20      0.600    91    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.752
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.91
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.46

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.152
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.58
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.58

****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
```

```
 UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
 STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.29
   HALFSTREET FLOOD WIDTH(FEET) =    9.39
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.01
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    7.61
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.864
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.84
 EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       4.27

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
 FLOW VELOCITY(FEET/SEC.) =  4.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
 LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.61
 RAINFALL INTENSITY(INCH/HR) =   4.86
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.00
 TOTAL STREAM AREA(ACRES) =       1.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.27

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.98   10.57    4.029  0.20( 0.12) 0.58       3.6     187.00
     1       13.04   11.58    3.824  0.20( 0.12) 0.58       3.8     184.00
     2        5.46    7.93    4.752  0.20( 0.12) 0.60       1.3     190.00
     3        4.27    7.61    4.864  0.20( 0.12) 0.60       1.0     191.10

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       20.98    7.61    4.864  0.20( 0.12) 0.59       4.8     191.10
     2       21.16    7.93    4.752  0.20( 0.12) 0.59       5.0     190.00
```

```
     3       21.11   10.57    4.029  0.20( 0.12) 0.59       5.9     187.00
     4       20.74   11.58    3.824  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.16    Tc(MIN.) =     7.93
  EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.98    7.66    4.846  0.20( 0.12) 0.59       4.8     191.10
      2       21.16    7.98    4.735  0.20( 0.12) 0.59       5.0     190.00
      3       21.11   10.62    4.018  0.20( 0.12) 0.59       5.9     187.00
      4       20.74   11.63    3.815  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.16    5.48    5.868  0.20( 0.09) 0.43      10.7     170.00
      2       62.46    5.76    5.703  0.20( 0.09) 0.43      11.3     175.00
      3       62.61    5.80    5.683  0.20( 0.09) 0.43      11.4     161.00
      4       63.93    6.14    5.502  0.20( 0.09) 0.43      12.0     174.00
      5       64.95    6.43    5.355  0.20( 0.09) 0.43      12.6     150.00
      6       65.16    6.50    5.322  0.20( 0.09) 0.43      12.7     173.00
      7       66.28    6.95    5.123  0.20( 0.09) 0.44      13.5      14.00
      8       67.28    7.40    4.943  0.20( 0.09) 0.44      14.3     167.00
      9       67.65    7.61    4.864  0.20( 0.09) 0.44      14.7     154.00
     10       68.71    8.34    4.615  0.20( 0.09) 0.45      15.8      19.00
     11       69.20    8.79    4.479  0.20( 0.09) 0.45      16.5      16.00
     12       69.24    8.86    4.458  0.20( 0.09) 0.46      16.5     168.00
     13       69.25    8.97    4.428  0.20( 0.09) 0.46      16.7     169.00
     14       69.11    9.52    4.279  0.20( 0.09) 0.46      17.3     179.00
     15       68.74   10.02    4.155  0.20( 0.09) 0.46      17.7     181.00
     16       68.55   10.14    4.125  0.20( 0.09) 0.47      17.8     160.00
     17       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8     159.00
     18       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8      17.00
     19       66.65   10.93    3.953  0.20( 0.09) 0.47      18.1      10.00
     20       65.03   11.59    3.823  0.20( 0.09) 0.47      18.3     147.00
     21       63.82   12.12    3.725  0.20( 0.09) 0.47      18.5     152.00
     22       57.96   15.06    3.289  0.20( 0.10) 0.48      19.2     144.00
     23       54.34   16.78    3.092  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
      1       79.42    5.48    5.868  0.20( 0.09) 0.47      14.2     170.00
      2       81.11    5.76    5.703  0.20( 0.09) 0.47      14.9     175.00
      3       81.31    5.80    5.683  0.20( 0.09) 0.47      15.0     161.00
      4       83.07    6.14    5.502  0.20( 0.09) 0.47      15.9     174.00
      5       84.47    6.43    5.355  0.20( 0.09) 0.47      16.7     150.00
      6       84.77    6.50    5.322  0.20( 0.09) 0.47      16.8     173.00
      7       86.43    6.95    5.123  0.20( 0.09) 0.47      17.9      14.00
      8       87.96    7.40    4.943  0.20( 0.10) 0.48      19.0     167.00
      9       88.57    7.61    4.864  0.20( 0.10) 0.48      19.5     154.00
     10       88.70    7.66    4.846  0.20( 0.10) 0.48      19.6     191.10
     11       89.34    7.98    4.735  0.20( 0.10) 0.48      20.2     190.00
     12       89.87    8.34    4.615  0.20( 0.10) 0.48      20.9      19.00
     13       90.34    8.79    4.479  0.20( 0.10) 0.49      21.7      16.00
     14       90.38    8.86    4.458  0.20( 0.10) 0.49      21.8     168.00
     15       90.39    8.97    4.428  0.20( 0.10) 0.49      22.0     169.00
     16       90.23    9.52    4.279  0.20( 0.10) 0.49      22.8     179.00
     17       89.86   10.02    4.155  0.20( 0.10) 0.49      23.4     181.00
     18       89.67   10.14    4.125  0.20( 0.10) 0.50      23.5     160.00
     19       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6     159.00
     20       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6      17.00
     21       88.51   10.62    4.018  0.20( 0.10) 0.50      23.9     187.00
     22       87.64   10.93    3.953  0.20( 0.10) 0.50      24.1      10.00
     23       85.78   11.59    3.823  0.20( 0.10) 0.50      24.4     147.00
     24       85.67   11.63    3.815  0.20( 0.10) 0.50      24.5     184.00
     25       84.06   12.12    3.725  0.20( 0.10) 0.50      24.6     152.00
     26       75.75   15.06    3.289  0.20( 0.10) 0.50      25.3     144.00
     27       71.02   16.78    3.092  0.20( 0.10) 0.51      25.4     147.00
   TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       90.39  Tc(MIN.) =    8.966
  EFFECTIVE AREA(ACRES) =     22.00  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.87
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.39
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  41.26
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.39
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.05
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.05
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =      22.00
  TOTAL STREAM AREA(ACRES) =      25.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      90.39

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.54
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      6.54

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.28
  RAINFALL INTENSITY(INCH/HR) =   6.00
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.54

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

1	79.42	5.57	5.814	0.20(0.09)	0.47	14.2	170.00
1	81.11	5.85	5.652	0.20(0.09)	0.47	14.9	175.00
1	81.31	5.89	5.633	0.20(0.09)	0.47	15.0	161.00
1	83.07	6.22	5.458	0.20(0.09)	0.47	15.9	174.00
1	84.47	6.52	5.314	0.20(0.09)	0.47	16.7	150.00
1	84.77	6.59	5.282	0.20(0.09)	0.47	16.8	173.00
1	86.43	7.04	5.087	0.20(0.09)	0.47	17.9	14.00
1	87.96	7.48	4.911	0.20(0.10)	0.48	19.0	167.00
1	88.57	7.69	4.833	0.20(0.10)	0.48	19.5	154.00
1	88.70	7.75	4.815	0.20(0.10)	0.48	19.6	191.10
1	89.34	8.06	4.706	0.20(0.10)	0.48	20.2	190.00
1	89.87	8.42	4.589	0.20(0.10)	0.48	20.9	19.00
1	90.34	8.87	4.454	0.20(0.10)	0.49	21.7	16.00
1	90.38	8.94	4.434	0.20(0.10)	0.49	21.8	168.00
1	90.39	9.05	4.404	0.20(0.10)	0.49	22.0	169.00
1	90.23	9.60	4.257	0.20(0.10)	0.49	22.8	179.00
1	89.86	10.10	4.135	0.20(0.10)	0.49	23.4	181.00
1	89.67	10.23	4.105	0.20(0.10)	0.50	23.5	160.00
1	89.61	10.26	4.098	0.20(0.10)	0.50	23.6	159.00
1	89.61	10.26	4.098	0.20(0.10)	0.50	23.6	17.00
1	88.51	10.71	4.000	0.20(0.10)	0.50	23.9	187.00
1	87.64	11.01	3.936	0.20(0.10)	0.50	24.1	10.00
1	85.78	11.67	3.807	0.20(0.10)	0.50	24.4	147.00
1	85.67	11.71	3.799	0.20(0.10)	0.50	24.5	184.00
1	84.06	12.21	3.710	0.20(0.10)	0.50	24.6	152.00
1	75.75	15.15	3.278	0.20(0.10)	0.50	25.3	144.00
1	71.02	16.87	3.082	0.20(0.10)	0.51	25.4	147.00
2	6.54	5.28	5.999	0.20(0.18)	0.90	1.2	195.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	84.17	5.28	5.999	0.20(0.10)	0.50	14.6	195.00
2	85.76	5.57	5.814	0.20(0.10)	0.50	15.4	170.00
3	87.26	5.85	5.652	0.20(0.10)	0.50	16.2	175.00
4	87.44	5.89	5.633	0.20(0.10)	0.50	16.3	161.00
5	89.00	6.22	5.458	0.20(0.10)	0.50	17.1	174.00
6	90.24	6.52	5.314	0.20(0.10)	0.50	17.9	150.00
7	90.50	6.59	5.282	0.20(0.10)	0.50	18.1	173.00
8	91.95	7.04	5.087	0.20(0.10)	0.50	19.1	14.00
9	93.27	7.48	4.911	0.20(0.10)	0.50	20.2	167.00
10	93.80	7.69	4.833	0.20(0.10)	0.50	20.7	154.00
11	93.91	7.75	4.815	0.20(0.10)	0.50	20.8	191.10
12	94.43	8.06	4.706	0.20(0.10)	0.50	21.4	190.00
13	94.82	8.42	4.589	0.20(0.10)	0.51	22.1	19.00
14	95.15	8.87	4.454	0.20(0.10)	0.51	22.9	16.00
15	95.16	8.94	4.434	0.20(0.10)	0.51	23.0	168.00
16	95.14	9.05	4.404	0.20(0.10)	0.51	23.2	169.00
17	94.82	9.60	4.257	0.20(0.10)	0.51	24.0	179.00
18	94.31	10.10	4.135	0.20(0.10)	0.51	24.6	181.00
19	94.08	10.23	4.105	0.20(0.10)	0.52	24.8	160.00
20	94.02	10.26	4.098	0.20(0.10)	0.52	24.8	159.00
21	94.02	10.26	4.098	0.20(0.10)	0.52	24.8	17.00
22	92.80	10.71	4.000	0.20(0.10)	0.52	25.1	187.00
23	91.87	11.01	3.936	0.20(0.10)	0.52	25.3	10.00
24	89.86	11.67	3.807	0.20(0.10)	0.52	25.7	147.00
25	89.74	11.71	3.799	0.20(0.10)	0.52	25.7	184.00
26	88.02	12.21	3.710	0.20(0.10)	0.52	25.8	152.00
27	79.23	15.15	3.278	0.20(0.10)	0.52	26.6	144.00
28	74.29	16.87	3.082	0.20(0.10)	0.52	26.6	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 95.16 Tc(MIN.) = 8.94
EFFECTIVE AREA(ACRES) = 23.04 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 26.6
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 197.00 = 2485.00 FEET.

```
****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  38.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.16
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      23.04
  TOTAL STREAM AREA(ACRES) =      26.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      95.16

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    91    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.33
  RAINFALL INTENSITY(INCH/HR) =   5.96
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.33
  TOTAL STREAM AREA(ACRES) =       0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	84.17	5.59	5.807	0.20(0.10)	0.50	14.6	195.00
1	85.76	5.88	5.637	0.20(0.10)	0.50	15.4	170.00
1	87.26	6.16	5.489	0.20(0.10)	0.50	16.2	175.00
1	87.44	6.20	5.471	0.20(0.10)	0.50	16.3	161.00
1	89.00	6.53	5.310	0.20(0.10)	0.50	17.1	174.00
1	90.24	6.83	5.176	0.20(0.10)	0.50	17.9	150.00
1	90.50	6.90	5.147	0.20(0.10)	0.50	18.1	173.00
1	91.95	7.34	4.964	0.20(0.10)	0.50	19.1	14.00
1	93.27	7.79	4.800	0.20(0.10)	0.50	20.2	167.00
1	93.80	8.00	4.727	0.20(0.10)	0.50	20.7	154.00
1	93.91	8.05	4.709	0.20(0.10)	0.50	20.8	191.10
1	94.43	8.37	4.607	0.20(0.10)	0.50	21.4	190.00
1	94.82	8.73	4.496	0.20(0.10)	0.51	22.1	19.00
1	95.15	9.18	4.369	0.20(0.10)	0.51	22.9	16.00
1	95.16	9.25	4.350	0.20(0.10)	0.51	23.0	168.00
1	95.14	9.36	4.321	0.20(0.10)	0.51	23.2	169.00
1	94.82	9.91	4.182	0.20(0.10)	0.51	24.0	179.00
1	94.31	10.41	4.065	0.20(0.10)	0.51	24.6	181.00
1	94.08	10.53	4.037	0.20(0.10)	0.52	24.8	160.00
1	94.02	10.57	4.030	0.20(0.10)	0.52	24.8	159.00
1	94.02	10.57	4.030	0.20(0.10)	0.52	24.8	17.00
1	92.80	11.01	3.936	0.20(0.10)	0.52	25.1	187.00
1	91.87	11.32	3.875	0.20(0.10)	0.52	25.3	10.00
1	89.86	11.98	3.751	0.20(0.10)	0.52	25.7	147.00
1	89.74	12.02	3.743	0.20(0.10)	0.52	25.7	184.00
1	88.02	12.52	3.657	0.20(0.10)	0.52	25.8	152.00
1	79.23	15.47	3.239	0.20(0.10)	0.52	26.6	144.00
1	74.29	17.19	3.049	0.20(0.10)	0.52	26.6	147.00
2	1.76	5.33	5.962	0.20(0.02)	0.10	0.3	183.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)		Ap	Ae (ACRES)	HEADWATER NODE
1	84.33	5.33	5.962	0.20(0.10)		0.49	14.3	183.00
2	85.89	5.59	5.807	0.20(0.10)		0.49	15.0	195.00
3	87.42	5.88	5.637	0.20(0.10)		0.49	15.7	170.00
4	88.88	6.16	5.489	0.20(0.10)		0.49	16.5	175.00
5	89.06	6.20	5.471	0.20(0.10)		0.49	16.6	161.00
6	90.57	6.53	5.310	0.20(0.10)		0.49	17.5	174.00
7	91.77	6.83	5.176	0.20(0.10)		0.49	18.2	150.00
8	92.03	6.90	5.147	0.20(0.10)		0.49	18.4	173.00
9	93.42	7.34	4.964	0.20(0.10)		0.49	19.5	14.00
10	94.69	7.79	4.800	0.20(0.10)		0.50	20.5	167.00
11	95.19	8.00	4.727	0.20(0.10)		0.50	21.0	154.00
12	95.30	8.05	4.709	0.20(0.10)		0.50	21.1	191.10
13	95.79	8.37	4.607	0.20(0.10)		0.50	21.8	190.00
14	96.15	8.73	4.496	0.20(0.10)		0.50	22.5	19.00
15	96.44	9.18	4.369	0.20(0.10)		0.50	23.3	16.00
16	96.45	9.25	4.350	0.20(0.10)		0.50	23.4	168.00
17	96.41	9.36	4.321	0.20(0.10)		0.50	23.5	169.00
18	96.05	9.91	4.182	0.20(0.10)		0.51	24.3	179.00
19	95.51	10.41	4.065	0.20(0.10)		0.51	25.0	181.00
20	95.27	10.53	4.037	0.20(0.10)		0.51	25.1	160.00
21	95.21	10.57	4.030	0.20(0.10)		0.51	25.1	159.00
22	95.21	10.57	4.030	0.20(0.10)		0.51	25.1	17.00
23	93.97	11.01	3.936	0.20(0.10)		0.51	25.4	187.00
24	93.01	11.32	3.875	0.20(0.10)		0.51	25.6	10.00
25	90.97	11.98	3.751	0.20(0.10)		0.51	26.0	147.00
26	90.85	12.02	3.743	0.20(0.10)		0.51	26.0	184.00
27	89.11	12.52	3.657	0.20(0.10)		0.51	26.2	152.00
28	80.18	15.47	3.239	0.20(0.10)		0.52	26.9	144.00
29	75.19	17.19	3.049	0.20(0.10)		0.52	26.9	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 96.45 Tc(MIN.) = 9.25
EFFECTIVE AREA(ACRES) = 23.37 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50

```
  TOTAL AREA(ACRES) =       26.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.52
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.45
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    9.34
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.760
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.12      0.20     0.500    91    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      4.70
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.70

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   4.76
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.70

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.556
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20      0.600    91    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.19
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.19

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.70    7.90    4.760  0.20( 0.10) 0.50       1.1     199.00
      2        3.19    8.53    4.556  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.79    7.90    4.760  0.20( 0.11) 0.54       1.9     199.00
      2        7.69    8.53    4.556  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.79    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
```

>>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	7.79	7.98	4.732	0.20(0.11)	0.54	1.9	199.00
2	7.69	8.61	4.532	0.20(0.11)	0.54	1.9	200.00

LONGEST FLOWPATH FROM NODE 199.00 TO NODE 202.00 = 365.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	84.33	5.43	5.904	0.20(0.10)	0.49	14.3	183.00
2	85.89	5.68	5.753	0.20(0.10)	0.49	15.0	195.00
3	87.42	5.97	5.588	0.20(0.10)	0.49	15.7	170.00
4	88.88	6.25	5.443	0.20(0.10)	0.49	16.5	175.00
5	89.06	6.29	5.426	0.20(0.10)	0.49	16.6	161.00
6	90.57	6.62	5.268	0.20(0.10)	0.49	17.5	174.00
7	91.77	6.91	5.138	0.20(0.10)	0.49	18.2	150.00
8	92.03	6.98	5.109	0.20(0.10)	0.49	18.4	173.00
9	93.42	7.43	4.930	0.20(0.10)	0.49	19.5	14.00
10	94.69	7.88	4.769	0.20(0.10)	0.50	20.5	167.00
11	95.19	8.09	4.697	0.20(0.10)	0.50	21.0	154.00
12	95.30	8.14	4.680	0.20(0.10)	0.50	21.1	191.10
13	95.79	8.45	4.579	0.20(0.10)	0.50	21.8	190.00
14	96.15	8.82	4.470	0.20(0.10)	0.50	22.5	19.00
15	96.44	9.27	4.345	0.20(0.10)	0.50	23.3	16.00
16	96.45	9.34	4.326	0.20(0.10)	0.50	23.4	168.00
17	96.41	9.44	4.298	0.20(0.10)	0.50	23.5	169.00
18	96.05	9.99	4.161	0.20(0.10)	0.51	24.3	179.00
19	95.51	10.50	4.045	0.20(0.10)	0.51	25.0	181.00
20	95.27	10.62	4.018	0.20(0.10)	0.51	25.1	160.00
21	95.21	10.66	4.010	0.20(0.10)	0.51	25.1	159.00
22	95.21	10.66	4.010	0.20(0.10)	0.51	25.1	17.00
23	93.97	11.10	3.918	0.20(0.10)	0.51	25.4	187.00
24	93.01	11.41	3.857	0.20(0.10)	0.51	25.6	10.00
25	90.97	12.07	3.735	0.20(0.10)	0.51	26.0	147.00
26	90.85	12.11	3.727	0.20(0.10)	0.51	26.0	184.00
27	89.11	12.61	3.642	0.20(0.10)	0.51	26.2	152.00
28	80.18	15.56	3.228	0.20(0.10)	0.52	26.9	144.00
29	75.19	17.29	3.040	0.20(0.10)	0.52	26.9	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 202.00 = 2690.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	90.97	5.43	5.904	0.20(0.10)	0.50	15.6	183.00
2	92.65	5.68	5.753	0.20(0.10)	0.50	16.3	195.00
3	94.33	5.97	5.588	0.20(0.10)	0.50	17.1	170.00
4	95.92	6.25	5.443	0.20(0.10)	0.49	17.9	175.00
5	96.11	6.29	5.426	0.20(0.10)	0.49	18.0	161.00
6	97.78	6.62	5.268	0.20(0.10)	0.49	19.0	174.00
7	99.11	6.91	5.138	0.20(0.10)	0.50	19.8	150.00
8	99.40	6.98	5.109	0.20(0.10)	0.50	20.0	173.00
9	100.98	7.43	4.930	0.20(0.10)	0.50	21.2	14.00
10	102.44	7.88	4.769	0.20(0.10)	0.50	22.4	167.00
11	102.74	7.98	4.732	0.20(0.10)	0.50	22.6	199.00
12	102.97	8.09	4.697	0.20(0.10)	0.50	22.9	154.00
13	103.07	8.14	4.680	0.20(0.10)	0.50	23.0	191.10
14	103.50	8.45	4.579	0.20(0.10)	0.50	23.7	190.00
15	103.63	8.61	4.532	0.20(0.10)	0.50	24.0	200.00
16	103.73	8.82	4.470	0.20(0.10)	0.50	24.4	19.00
17	103.80	9.27	4.345	0.20(0.10)	0.51	25.2	16.00
18	103.77	9.34	4.326	0.20(0.10)	0.51	25.3	168.00
19	103.69	9.44	4.298	0.20(0.10)	0.51	25.5	169.00
20	103.10	9.99	4.161	0.20(0.10)	0.51	26.2	179.00
21	102.35	10.50	4.045	0.20(0.10)	0.51	26.9	181.00
22	102.07	10.62	4.018	0.20(0.10)	0.51	27.0	160.00
23	101.99	10.66	4.010	0.20(0.10)	0.51	27.0	159.00
24	101.99	10.66	4.010	0.20(0.10)	0.51	27.0	17.00

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     25      100.59   11.10    3.918  0.20( 0.10) 0.51      27.4     187.00
     26       99.52   11.41    3.857  0.20( 0.10) 0.51      27.5      10.00
     27       97.27   12.07    3.735  0.20( 0.10) 0.51      27.9     147.00
     28       97.14   12.11    3.727  0.20( 0.10) 0.52      27.9     184.00
     29       95.25   12.61    3.642  0.20( 0.10) 0.52      28.1     152.00
     30       85.60   15.56    3.228  0.20( 0.10) 0.52      28.8     144.00
     31       80.28   17.29    3.040  0.20( 0.10) 0.52      28.9     147.00
    TOTAL AREA(ACRES) =        28.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      103.80  Tc(MIN.) =    9.266
  EFFECTIVE AREA(ACRES) =     25.18  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       28.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.41
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     103.80
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.58
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.58
  RAINFALL INTENSITY(INCH/HR) =   4.26
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      25.18
  TOTAL STREAM AREA(ACRES) =      28.87
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     103.80

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.652
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"         D        0.39      0.20     0.200    91    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.97

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    7.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.991
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.42      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.87
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.28
  RAINFALL INTENSITY(INCH/HR) =   4.99
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       90.97    5.76    5.708  0.20( 0.10) 0.50      15.6     183.00
      1       92.65    6.00    5.576  0.20( 0.10) 0.50      16.3     195.00
      1       94.33    6.29    5.424  0.20( 0.10) 0.50      17.1     170.00
```

1	95.92	6.57	5.291	0.20(0.10)	0.49	17.9	175.00
1	96.11	6.61	5.275	0.20(0.10)	0.49	18.0	161.00
1	97.78	6.94	5.129	0.20(0.10)	0.49	19.0	174.00
1	99.11	7.23	5.009	0.20(0.10)	0.50	19.8	150.00
1	99.40	7.30	4.981	0.20(0.10)	0.50	20.0	173.00
1	100.98	7.75	4.815	0.20(0.10)	0.50	21.2	14.00
1	102.44	8.19	4.663	0.20(0.10)	0.50	22.4	167.00
1	102.74	8.30	4.629	0.20(0.10)	0.50	22.6	199.00
1	102.97	8.40	4.596	0.20(0.10)	0.50	22.9	154.00
1	103.07	8.45	4.580	0.20(0.10)	0.50	23.0	191.10
1	103.50	8.77	4.485	0.20(0.10)	0.50	23.7	190.00
1	103.63	8.92	4.440	0.20(0.10)	0.50	24.0	200.00
1	103.73	9.13	4.382	0.20(0.10)	0.50	24.4	19.00
1	103.80	9.58	4.263	0.20(0.10)	0.51	25.2	16.00
1	103.77	9.65	4.245	0.20(0.10)	0.51	25.3	168.00
1	103.69	9.76	4.218	0.20(0.10)	0.51	25.5	169.00
1	103.10	10.31	4.088	0.20(0.10)	0.51	26.2	179.00
1	102.35	10.81	3.978	0.20(0.10)	0.51	26.9	181.00
1	102.07	10.94	3.951	0.20(0.10)	0.51	27.0	160.00
1	101.99	10.97	3.944	0.20(0.10)	0.51	27.0	159.00
1	101.99	10.97	3.944	0.20(0.10)	0.51	27.0	17.00
1	100.59	11.41	3.856	0.20(0.10)	0.51	27.4	187.00
1	99.52	11.72	3.797	0.20(0.10)	0.51	27.5	10.00
1	97.27	12.38	3.680	0.20(0.10)	0.51	27.9	147.00
1	97.14	12.43	3.673	0.20(0.10)	0.52	27.9	184.00
1	95.25	12.92	3.591	0.20(0.10)	0.52	28.1	152.00
1	85.60	15.89	3.189	0.20(0.10)	0.52	28.8	144.00
1	80.28	17.62	3.007	0.20(0.10)	0.52	28.9	147.00
2	3.61	7.28	4.991	0.20(0.04)	0.20	0.8	192.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	94.24	5.76	5.708	0.20(0.10)	0.48	16.2	183.00
2	95.98	6.00	5.576	0.20(0.10)	0.48	17.0	195.00
3	97.73	6.29	5.424	0.20(0.10)	0.48	17.8	170.00
4	99.38	6.57	5.291	0.20(0.10)	0.48	18.7	175.00
5	99.58	6.61	5.275	0.20(0.10)	0.48	18.8	161.00
6	101.32	6.94	5.129	0.20(0.10)	0.48	19.8	174.00
7	102.71	7.23	5.009	0.20(0.10)	0.48	20.6	150.00
8	102.91	7.28	4.991	0.20(0.10)	0.48	20.8	192.00
9	103.00	7.30	4.981	0.20(0.10)	0.48	20.8	173.00
10	104.46	7.75	4.815	0.20(0.10)	0.49	22.0	14.00
11	105.81	8.19	4.663	0.20(0.10)	0.49	23.2	167.00
12	106.09	8.30	4.629	0.20(0.10)	0.49	23.4	199.00
13	106.29	8.40	4.596	0.20(0.10)	0.49	23.7	154.00
14	106.38	8.45	4.580	0.20(0.10)	0.49	23.8	191.10
15	106.75	8.77	4.485	0.20(0.10)	0.49	24.5	190.00
16	106.84	8.92	4.440	0.20(0.10)	0.49	24.8	200.00
17	106.90	9.13	4.382	0.20(0.10)	0.49	25.2	19.00
18	106.88	9.58	4.263	0.20(0.10)	0.50	26.0	16.00
19	106.84	9.65	4.245	0.20(0.10)	0.50	26.1	168.00
20	106.74	9.76	4.218	0.20(0.10)	0.50	26.3	169.00
21	106.05	10.31	4.088	0.20(0.10)	0.50	27.0	179.00
22	105.22	10.81	3.978	0.20(0.10)	0.50	27.7	181.00
23	104.92	10.94	3.951	0.20(0.10)	0.50	27.8	160.00
24	104.83	10.97	3.944	0.20(0.10)	0.50	27.9	159.00
25	104.83	10.97	3.944	0.20(0.10)	0.50	27.9	17.00
26	103.37	11.41	3.856	0.20(0.10)	0.50	28.2	187.00
27	102.26	11.72	3.797	0.20(0.10)	0.50	28.3	10.00
28	99.92	12.38	3.680	0.20(0.10)	0.51	28.7	147.00
29	99.78	12.43	3.673	0.20(0.10)	0.51	28.7	184.00
30	97.83	12.92	3.591	0.20(0.10)	0.51	28.9	152.00
31	87.90	15.89	3.189	0.20(0.10)	0.51	29.6	144.00
32	82.44	17.62	3.007	0.20(0.10)	0.51	29.7	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 106.90 Tc(MIN.) = 9.13

```
  EFFECTIVE AREA(ACRES) =      25.19   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       29.7
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.09
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.90
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.343
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    91    9.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.04
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.04

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   10.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.049
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    7.43
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      10.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.54
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.73
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.25

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.842
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    91    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   5.84
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.25   10.48    4.049  0.20( 0.12) 0.60       2.9     184.00
      2        0.89    5.53    5.842  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.77    5.53    5.842  0.20( 0.11) 0.55       1.7      59.00
      2       10.87   10.48    4.049  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.87    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.87
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   10.82
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.87

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
```

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.81      0.20      0.600    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.77    5.89    5.634  0.20( 0.11) 0.55       1.7      59.00
      1       10.87   10.82    3.975  0.20( 0.11) 0.57       3.1     184.00
      2        3.43    7.72    4.825  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.83    5.89    5.634  0.20( 0.11) 0.56       2.3      59.00
      2       12.98    7.72    4.825  0.20( 0.11) 0.57       3.0      64.00
      3       13.68   10.82    3.975  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.68    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.68
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.86
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.86
  RAINFALL INTENSITY(INCH/HR) =   3.97
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.68

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.243
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.48      0.20     0.600    91    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    6.46
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.11
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  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  13.14
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.81
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.83    5.92    5.615  0.20( 0.11) 0.56       2.3      59.00
      1       12.98    7.75    4.812  0.20( 0.11) 0.57       3.0      64.00
      1       13.68   10.86    3.968  0.20( 0.12) 0.58       3.9     184.00
      2        8.11   11.00    3.938  0.20( 0.12) 0.60       2.4     208.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    5.92    5.615  0.20( 0.12) 0.58       3.6      59.00
      2       20.00    7.75    4.812  0.20( 0.12) 0.58       4.7      64.00
      3       21.75   10.86    3.968  0.20( 0.12) 0.59       6.2     184.00
      4       21.68   11.00    3.938  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.75    Tc(MIN.) =    10.86
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.75
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   11.65
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   11.65
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.75

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.75
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =   10.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.04      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.04      SUBAREA RUNOFF(CFS) =    7.08
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       9.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  5.96   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.63

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.627
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    9.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.354
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  5.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.23
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.51

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    6.77    5.200  0.20( 0.12) 0.58       3.6      59.00
      1       20.00    8.60    4.536  0.20( 0.12) 0.58       4.7      64.00
      1       21.75   11.65    3.810  0.20( 0.12) 0.59       6.2     184.00
      1       21.68   11.80    3.783  0.20( 0.12) 0.59       6.2     208.00
      2        9.63   10.82    3.976  0.20( 0.11) 0.57       2.8     211.00
      3        5.51    9.23    4.354  0.20( 0.10) 0.50       1.4     213.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.90    6.77    5.200  0.20( 0.11) 0.56       6.4      59.00
      2       34.11    8.60    4.536  0.20( 0.11) 0.57       8.2      64.00
      3       34.88    9.23    4.354  0.20( 0.11) 0.57       8.8     213.00
      4       35.92   10.82    3.976  0.20( 0.11) 0.57      10.0     211.00
      5       35.77   11.65    3.810  0.20( 0.11) 0.57      10.4     184.00
      6       35.60   11.80    3.783  0.20( 0.11) 0.57      10.5     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.92    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =      10.00   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.5
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.32
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.92
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.05
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      10.00
  TOTAL STREAM AREA(ACRES) =      10.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.92

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.18      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.90    7.02    5.096  0.20( 0.11) 0.56       6.4      59.00
      1       34.11    8.83    4.467  0.20( 0.11) 0.57       8.2      64.00
      1       34.88    9.46    4.293  0.20( 0.11) 0.57       8.8     213.00
      1       35.92   11.05    3.929  0.20( 0.11) 0.57      10.0     211.00
      1       35.77   11.88    3.767  0.20( 0.11) 0.57      10.4     184.00
      1       35.60   12.03    3.741  0.20( 0.11) 0.57      10.5     208.00
      2        1.00    5.00    6.187  0.20( 0.02) 0.10       0.2     215.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       27.85    5.00    6.187  0.20( 0.11) 0.55       4.7     215.00
      2       31.72    7.02    5.096  0.20( 0.11) 0.55       6.6      59.00
      3       34.83    8.83    4.467  0.20( 0.11) 0.56       8.4      64.00
      4       35.58    9.46    4.293  0.20( 0.11) 0.56       9.0     213.00
      5       36.55   11.05    3.929  0.20( 0.11) 0.56      10.2     211.00
      6       36.37   11.88    3.767  0.20( 0.11) 0.56      10.6     184.00
      7       36.20   12.03    3.741  0.20( 0.11) 0.56      10.6     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.55    Tc(MIN.) =    11.05
  EFFECTIVE AREA(ACRES) =      10.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       10.6
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.55
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       27.85    5.06    6.147  0.20( 0.11) 0.55       4.7     215.00
      2       31.72    7.07    5.074  0.20( 0.11) 0.55       6.6      59.00
      3       34.83    8.88    4.452  0.20( 0.11) 0.56       8.4      64.00
      4       35.58    9.51    4.279  0.20( 0.11) 0.56       9.0     213.00
      5       36.55   11.10    3.918  0.20( 0.11) 0.56      10.2     211.00
      6       36.37   11.94    3.758  0.20( 0.11) 0.56      10.6     184.00
      7       36.20   12.08    3.732  0.20( 0.11) 0.56      10.6     208.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       94.24    5.80    5.685  0.20( 0.10) 0.48      16.2     183.00
      2       95.98    6.04    5.555  0.20( 0.10) 0.48      17.0     195.00
      3       97.73    6.33    5.405  0.20( 0.10) 0.48      17.8     170.00
      4       99.38    6.61    5.273  0.20( 0.10) 0.48      18.7     175.00
      5       99.58    6.64    5.257  0.20( 0.10) 0.48      18.8     161.00
      6      101.32    6.98    5.112  0.20( 0.10) 0.48      19.8     174.00
      7      102.71    7.27    4.993  0.20( 0.10) 0.48      20.6     150.00
      8      102.91    7.31    4.975  0.20( 0.10) 0.48      20.8     192.00
      9      103.00    7.34    4.966  0.20( 0.10) 0.48      20.8     173.00
     10      104.46    7.79    4.801  0.20( 0.10) 0.49      22.0      14.00
     11      105.81    8.23    4.650  0.20( 0.10) 0.49      23.2     167.00
     12      106.09    8.34    4.616  0.20( 0.10) 0.49      23.4     199.00
     13      106.29    8.44    4.584  0.20( 0.10) 0.49      23.7     154.00
     14      106.38    8.49    4.568  0.20( 0.10) 0.49      23.8     191.10
```

15	106.75	8.81	4.473	0.20(0.10)	0.49	24.5	190.00
16	106.84	8.96	4.428	0.20(0.10)	0.49	24.8	200.00
17	106.90	9.17	4.371	0.20(0.10)	0.49	25.2	19.00
18	106.88	9.62	4.253	0.20(0.10)	0.50	26.0	16.00
19	106.84	9.69	4.235	0.20(0.10)	0.50	26.1	168.00
20	106.74	9.80	4.208	0.20(0.10)	0.50	26.3	169.00
21	106.05	10.35	4.079	0.20(0.10)	0.50	27.0	179.00
22	105.22	10.85	3.969	0.20(0.10)	0.50	27.7	181.00
23	104.92	10.98	3.943	0.20(0.10)	0.50	27.8	160.00
24	104.83	11.01	3.936	0.20(0.10)	0.50	27.9	159.00
25	104.83	11.01	3.936	0.20(0.10)	0.50	27.9	17.00
26	103.37	11.45	3.848	0.20(0.10)	0.50	28.2	187.00
27	102.26	11.76	3.790	0.20(0.10)	0.50	28.3	10.00
28	99.92	12.42	3.673	0.20(0.10)	0.51	28.7	147.00
29	99.78	12.47	3.666	0.20(0.10)	0.51	28.7	184.00
30	97.83	12.96	3.584	0.20(0.10)	0.51	28.9	152.00
31	87.90	15.93	3.185	0.20(0.10)	0.51	29.6	144.00
32	82.44	17.66	3.002	0.20(0.10)	0.51	29.7	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 217.00 = 3025.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	116.87	5.06	6.147	0.20(0.10)	0.50	18.9	215.00
2	123.51	5.80	5.685	0.20(0.10)	0.50	21.6	183.00
3	125.71	6.04	5.555	0.20(0.10)	0.50	22.6	195.00
4	128.03	6.33	5.405	0.20(0.10)	0.50	23.7	170.00
5	130.22	6.61	5.273	0.20(0.10)	0.50	24.8	175.00
6	130.48	6.64	5.257	0.20(0.10)	0.50	25.0	161.00
7	132.87	6.98	5.112	0.20(0.10)	0.50	26.2	174.00
8	133.48	7.07	5.074	0.20(0.10)	0.50	26.6	59.00
9	134.78	7.27	4.993	0.20(0.10)	0.50	27.4	150.00
10	135.05	7.31	4.975	0.20(0.10)	0.50	27.6	192.00
11	135.19	7.34	4.966	0.20(0.10)	0.50	27.7	173.00
12	137.41	7.79	4.801	0.20(0.10)	0.50	29.3	14.00
13	139.53	8.23	4.650	0.20(0.10)	0.50	30.9	167.00
14	139.99	8.34	4.616	0.20(0.10)	0.51	31.3	199.00
15	140.37	8.44	4.584	0.20(0.10)	0.51	31.6	154.00
16	140.54	8.49	4.568	0.20(0.10)	0.51	31.8	191.10
17	141.45	8.81	4.473	0.20(0.10)	0.51	32.8	190.00
18	141.62	8.88	4.452	0.20(0.10)	0.51	33.0	64.00
19	141.77	8.96	4.428	0.20(0.10)	0.51	33.3	200.00
20	142.07	9.17	4.371	0.20(0.10)	0.51	33.9	19.00
21	142.46	9.51	4.279	0.20(0.10)	0.51	34.8	213.00
22	142.52	9.62	4.253	0.20(0.10)	0.51	35.0	16.00
23	142.52	9.69	4.235	0.20(0.10)	0.51	35.2	168.00
24	142.49	9.80	4.208	0.20(0.10)	0.51	35.5	169.00
25	142.13	10.35	4.079	0.20(0.10)	0.52	36.7	179.00
26	141.62	10.85	3.969	0.20(0.10)	0.52	37.7	181.00
27	141.39	10.98	3.943	0.20(0.10)	0.52	37.9	160.00
28	141.33	11.01	3.936	0.20(0.10)	0.52	38.0	159.00
29	141.33	11.01	3.936	0.20(0.10)	0.52	38.0	17.00
30	141.09	11.10	3.918	0.20(0.10)	0.52	38.1	211.00
31	139.84	11.45	3.848	0.20(0.10)	0.52	38.5	187.00
32	138.68	11.76	3.790	0.20(0.10)	0.52	38.9	10.00
33	138.01	11.94	3.758	0.20(0.10)	0.52	39.0	184.00
34	137.33	12.08	3.732	0.20(0.10)	0.52	39.2	208.00
35	135.54	12.42	3.673	0.20(0.10)	0.52	39.3	147.00
36	135.33	12.47	3.666	0.20(0.10)	0.52	39.4	184.00
37	132.56	12.96	3.584	0.20(0.10)	0.52	39.5	152.00
38	118.63	15.93	3.185	0.20(0.10)	0.52	40.2	144.00
39	111.35	17.66	3.002	0.20(0.10)	0.52	40.3	147.00

TOTAL AREA(ACRES) = 40.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 142.52 Tc(MIN.) = 9.690
EFFECTIVE AREA(ACRES) = 35.22 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 40.3
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 217.00 = 3025.00 FEET.

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****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.02
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     142.52
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.01
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.01
 RAINFALL INTENSITY(INCH/HR) =   4.16
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.51
 EFFECTIVE STREAM AREA(ACRES) =      35.22
 TOTAL STREAM AREA(ACRES) =      40.31
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     142.52

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.839
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    91    7.68
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.86
 TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      3.86

****************************************************************************
 FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
 STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
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 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.53
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   12.79
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
 STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    9.13
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.383
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    5.33
 EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
 FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.13
 RAINFALL INTENSITY(INCH/HR) =   4.38
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.30
 TOTAL STREAM AREA(ACRES) =       2.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      116.87    5.39    5.927  0.20( 0.10) 0.50      18.9     215.00
     1      123.51    6.13    5.508  0.20( 0.10) 0.50      21.6     183.00
     1      125.71    6.36    5.389  0.20( 0.10) 0.50      22.6     195.00
     1      128.03    6.66    5.251  0.20( 0.10) 0.50      23.7     170.00
     1      130.22    6.94    5.129  0.20( 0.10) 0.50      24.8     175.00
     1      130.48    6.97    5.114  0.20( 0.10) 0.50      25.0     161.00
     1      132.87    7.30    4.980  0.20( 0.10) 0.50      26.2     174.00
     1      133.48    7.40    4.944  0.20( 0.10) 0.50      26.6      59.00
     1      134.78    7.60    4.869  0.20( 0.10) 0.50      27.4     150.00
     1      135.05    7.64    4.853  0.20( 0.10) 0.50      27.6     192.00
     1      135.19    7.66    4.844  0.20( 0.10) 0.50      27.7     173.00
     1      137.41    8.11    4.689  0.20( 0.10) 0.50      29.3      14.00
     1      139.53    8.56    4.548  0.20( 0.10) 0.50      30.9     167.00
     1      139.99    8.66    4.516  0.20( 0.10) 0.51      31.3     199.00
     1      140.37    8.77    4.485  0.20( 0.10) 0.51      31.6     154.00
     1      140.54    8.82    4.470  0.20( 0.10) 0.51      31.8     191.10
     1      141.45    9.13    4.381  0.20( 0.10) 0.51      32.8     190.00
     1      141.62    9.20    4.363  0.20( 0.10) 0.51      33.0      64.00
     1      141.77    9.28    4.341  0.20( 0.10) 0.51      33.3     200.00
```

1	142.07	9.49	4.287	0.20(0.10)	0.51	33.9	19.00
1	142.46	9.83	4.200	0.20(0.10)	0.51	34.8	213.00
1	142.52	9.93	4.175	0.20(0.10)	0.51	35.0	16.00
1	142.52	10.01	4.158	0.20(0.10)	0.51	35.2	168.00
1	142.49	10.11	4.132	0.20(0.10)	0.51	35.5	169.00
1	142.13	10.66	4.009	0.20(0.10)	0.52	36.7	179.00
1	141.62	11.17	3.904	0.20(0.10)	0.52	37.7	181.00
1	141.39	11.30	3.877	0.20(0.10)	0.52	37.9	160.00
1	141.33	11.34	3.871	0.20(0.10)	0.52	38.0	159.00
1	141.33	11.34	3.871	0.20(0.10)	0.52	38.0	17.00
1	141.09	11.43	3.853	0.20(0.10)	0.52	38.1	211.00
1	139.84	11.78	3.787	0.20(0.10)	0.52	38.5	187.00
1	138.68	12.09	3.731	0.20(0.10)	0.52	38.9	10.00
1	138.01	12.26	3.700	0.20(0.10)	0.52	39.0	184.00
1	137.33	12.41	3.675	0.20(0.10)	0.52	39.2	208.00
1	135.54	12.75	3.619	0.20(0.10)	0.52	39.3	147.00
1	135.33	12.79	3.612	0.20(0.10)	0.52	39.4	184.00
1	132.56	13.29	3.534	0.20(0.10)	0.52	39.5	152.00
1	118.63	16.27	3.147	0.20(0.10)	0.52	40.2	144.00
1	111.35	18.00	2.969	0.20(0.10)	0.52	40.3	147.00
2	8.82	9.13	4.383	0.20(0.12)	0.60	2.3	201.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.97	5.39	5.927	0.20(0.10)	0.51	20.2	215.00
2	131.00	6.13	5.508	0.20(0.10)	0.51	23.2	183.00
3	133.31	6.36	5.389	0.20(0.10)	0.51	24.2	195.00
4	135.78	6.66	5.251	0.20(0.10)	0.51	25.4	170.00
5	138.10	6.94	5.129	0.20(0.10)	0.51	26.6	175.00
6	138.38	6.97	5.114	0.20(0.10)	0.51	26.7	161.00
7	140.92	7.30	4.980	0.20(0.10)	0.51	28.1	174.00
8	141.58	7.40	4.944	0.20(0.10)	0.51	28.5	59.00
9	142.96	7.60	4.869	0.20(0.10)	0.51	29.3	150.00
10	143.25	7.64	4.853	0.20(0.10)	0.51	29.5	192.00
11	143.40	7.66	4.844	0.20(0.10)	0.51	29.6	173.00
12	145.82	8.11	4.689	0.20(0.10)	0.51	31.3	14.00
13	148.12	8.56	4.548	0.20(0.10)	0.51	33.1	167.00
14	148.62	8.66	4.516	0.20(0.10)	0.51	33.5	199.00
15	149.05	8.77	4.485	0.20(0.10)	0.51	33.8	154.00
16	149.24	8.82	4.470	0.20(0.10)	0.51	34.0	191.10
17	150.26	9.13	4.383	0.20(0.10)	0.51	35.1	201.00
18	150.27	9.13	4.381	0.20(0.10)	0.51	35.1	190.00
19	150.41	9.20	4.363	0.20(0.10)	0.51	35.3	64.00
20	150.51	9.28	4.341	0.20(0.10)	0.51	35.6	200.00
21	150.69	9.49	4.287	0.20(0.10)	0.52	36.2	19.00
22	150.90	9.83	4.200	0.20(0.10)	0.52	37.1	213.00
23	150.91	9.93	4.175	0.20(0.10)	0.52	37.3	16.00
24	150.88	10.01	4.158	0.20(0.10)	0.52	37.5	168.00
25	150.79	10.11	4.132	0.20(0.10)	0.52	37.8	169.00
26	150.18	10.66	4.009	0.20(0.10)	0.52	39.0	179.00
27	149.45	11.17	3.904	0.20(0.10)	0.52	40.0	181.00
28	149.17	11.30	3.877	0.20(0.10)	0.52	40.2	160.00
29	149.09	11.34	3.871	0.20(0.10)	0.52	40.3	159.00
30	149.09	11.34	3.871	0.20(0.10)	0.52	40.3	17.00
31	148.82	11.43	3.853	0.20(0.10)	0.52	40.4	211.00
32	147.43	11.78	3.787	0.20(0.10)	0.52	40.8	187.00
33	146.15	12.09	3.731	0.20(0.10)	0.52	41.2	10.00
34	145.42	12.26	3.700	0.20(0.11)	0.53	41.3	184.00
35	144.68	12.41	3.675	0.20(0.11)	0.53	41.5	208.00
36	142.78	12.75	3.619	0.20(0.11)	0.53	41.6	147.00
37	142.56	12.79	3.612	0.20(0.11)	0.53	41.7	184.00
38	139.63	13.29	3.534	0.20(0.11)	0.53	41.8	152.00
39	124.90	16.27	3.147	0.20(0.11)	0.53	42.5	144.00
40	117.25	18.00	2.969	0.20(0.11)	0.53	42.6	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 150.91 Tc(MIN.) = 9.93

```
  EFFECTIVE AREA(ACRES) =      37.35   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       42.6
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  30.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.39
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     150.91
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.96
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.63
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.56
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
  STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    9.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.418
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    5.03
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.55
  FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.01
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.01

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.884
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    91    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.26
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.640
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    5.80
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  14.08
  FLOW VELOCITY(FEET/SEC.) =  4.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.26
  RAINFALL INTENSITY(INCH/HR) =   4.64
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.01    9.08    4.396  0.20( 0.12) 0.60       2.1     220.00
      2        7.72    8.26    4.640  0.20( 0.10) 0.50       1.9     223.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.43    8.26    4.640  0.20( 0.11) 0.55       3.8     223.00
      2       15.31    9.08    4.396  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.43    Tc(MIN.) =     8.26
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.43
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    8.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.43    8.58    4.542  0.20( 0.11) 0.55       3.8     223.00
      2       15.31    9.39    4.311  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      123.97    5.42    5.911  0.20( 0.10) 0.51      20.2     215.00
      2      131.00    6.15    5.494  0.20( 0.10) 0.51      23.2     183.00
      3      133.31    6.39    5.376  0.20( 0.10) 0.51      24.2     195.00
      4      135.78    6.68    5.239  0.20( 0.10) 0.51      25.4     170.00
      5      138.10    6.96    5.118  0.20( 0.10) 0.51      26.6     175.00
      6      138.38    7.00    5.103  0.20( 0.10) 0.51      26.7     161.00
      7      140.92    7.33    4.970  0.20( 0.10) 0.51      28.1     174.00
      8      141.58    7.42    4.934  0.20( 0.10) 0.51      28.5      59.00
      9      142.96    7.62    4.860  0.20( 0.10) 0.51      29.3     150.00
     10      143.25    7.67    4.844  0.20( 0.10) 0.51      29.5     192.00
     11      143.40    7.69    4.835  0.20( 0.10) 0.51      29.6     173.00
     12      145.82    8.14    4.681  0.20( 0.10) 0.51      31.3      14.00
     13      148.12    8.58    4.541  0.20( 0.10) 0.51      33.1     167.00
     14      148.62    8.69    4.508  0.20( 0.10) 0.51      33.5     199.00
     15      149.05    8.79    4.478  0.20( 0.10) 0.51      33.8     154.00
     16      149.24    8.84    4.463  0.20( 0.10) 0.51      34.0     191.10
     17      150.26    9.15    4.376  0.20( 0.10) 0.51      35.1     201.00
     18      150.27    9.16    4.374  0.20( 0.10) 0.51      35.1     190.00
     19      150.41    9.22    4.357  0.20( 0.10) 0.51      35.3      64.00
     20      150.51    9.30    4.335  0.20( 0.10) 0.51      35.6     200.00
     21      150.69    9.51    4.280  0.20( 0.10) 0.52      36.2      19.00
     22      150.90    9.86    4.194  0.20( 0.10) 0.52      37.1     213.00
     23      150.91    9.96    4.169  0.20( 0.10) 0.52      37.3      16.00
     24      150.88   10.03    4.152  0.20( 0.10) 0.52      37.5     168.00
```

25	150.79	10.14	4.127	0.20(0.10)	0.52	37.8	169.00
26	150.18	10.69	4.004	0.20(0.10)	0.52	39.0	179.00
27	149.45	11.19	3.900	0.20(0.10)	0.52	40.0	181.00
28	149.17	11.33	3.873	0.20(0.10)	0.52	40.2	160.00
29	149.09	11.36	3.866	0.20(0.10)	0.52	40.3	159.00
30	149.09	11.36	3.866	0.20(0.10)	0.52	40.3	17.00
31	148.82	11.45	3.849	0.20(0.10)	0.52	40.4	211.00
32	147.43	11.80	3.782	0.20(0.10)	0.52	40.8	187.00
33	146.15	12.11	3.727	0.20(0.10)	0.52	41.2	10.00
34	145.42	12.29	3.696	0.20(0.11)	0.53	41.3	184.00
35	144.68	12.43	3.671	0.20(0.11)	0.53	41.5	208.00
36	142.78	12.77	3.615	0.20(0.11)	0.53	41.6	147.00
37	142.56	12.82	3.608	0.20(0.11)	0.53	41.7	184.00
38	139.63	13.32	3.530	0.20(0.11)	0.53	41.8	152.00
39	124.90	16.29	3.144	0.20(0.11)	0.53	42.5	144.00
40	117.25	18.03	2.967	0.20(0.11)	0.53	42.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 226.00 = 3435.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	136.72	5.42	5.911	0.20(0.10)	0.51	22.6	215.00
2	144.44	6.15	5.494	0.20(0.10)	0.51	25.9	183.00
3	146.97	6.39	5.376	0.20(0.10)	0.51	27.0	195.00
4	149.69	6.68	5.239	0.20(0.10)	0.51	28.3	170.00
5	152.25	6.96	5.118	0.20(0.10)	0.51	29.6	175.00
6	152.56	7.00	5.103	0.20(0.10)	0.51	29.8	161.00
7	155.37	7.33	4.970	0.20(0.10)	0.51	31.3	174.00
8	156.11	7.42	4.934	0.20(0.10)	0.51	31.7	59.00
9	157.65	7.62	4.860	0.20(0.10)	0.51	32.7	150.00
10	157.98	7.67	4.844	0.20(0.10)	0.51	32.9	192.00
11	158.15	7.69	4.835	0.20(0.10)	0.51	33.0	173.00
12	160.91	8.14	4.681	0.20(0.10)	0.51	34.9	14.00
13	163.52	8.58	4.542	0.20(0.10)	0.51	36.8	223.00
14	163.55	8.58	4.541	0.20(0.10)	0.51	36.8	167.00
15	164.03	8.69	4.508	0.20(0.10)	0.52	37.3	199.00
16	164.44	8.79	4.478	0.20(0.10)	0.52	37.7	154.00
17	164.63	8.84	4.463	0.20(0.10)	0.52	37.9	191.10
18	165.60	9.15	4.376	0.20(0.10)	0.52	39.0	201.00
19	165.62	9.16	4.374	0.20(0.10)	0.52	39.0	190.00
20	165.74	9.22	4.357	0.20(0.10)	0.52	39.3	64.00
21	165.83	9.30	4.335	0.20(0.10)	0.52	39.5	200.00
22	165.90	9.39	4.311	0.20(0.10)	0.52	39.8	220.00
23	165.89	9.51	4.280	0.20(0.10)	0.52	40.1	19.00
24	165.79	9.86	4.194	0.20(0.10)	0.52	41.0	213.00
25	165.71	9.96	4.169	0.20(0.10)	0.52	41.3	16.00
26	165.62	10.03	4.152	0.20(0.10)	0.52	41.5	168.00
27	165.43	10.14	4.127	0.20(0.10)	0.52	41.7	169.00
28	164.38	10.69	4.004	0.20(0.10)	0.52	42.9	179.00
29	163.26	11.19	3.900	0.20(0.11)	0.53	43.9	181.00
30	162.89	11.33	3.873	0.20(0.11)	0.53	44.2	160.00
31	162.79	11.36	3.866	0.20(0.11)	0.53	44.2	159.00
32	162.79	11.36	3.866	0.20(0.11)	0.53	44.2	17.00
33	162.45	11.45	3.849	0.20(0.11)	0.53	44.4	211.00
34	160.82	11.80	3.782	0.20(0.11)	0.53	44.8	187.00
35	159.34	12.11	3.727	0.20(0.11)	0.53	45.1	10.00
36	158.50	12.29	3.696	0.20(0.11)	0.53	45.3	184.00
37	157.67	12.43	3.671	0.20(0.11)	0.53	45.4	208.00
38	155.56	12.77	3.615	0.20(0.11)	0.53	45.6	147.00
39	155.31	12.82	3.608	0.20(0.11)	0.53	45.6	184.00
40	152.10	13.32	3.530	0.20(0.11)	0.53	45.8	152.00
41	135.96	16.29	3.144	0.20(0.11)	0.53	46.5	144.00
42	127.66	18.03	2.967	0.20(0.11)	0.53	46.6	147.00

TOTAL AREA(ACRES) = 46.6

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 165.90 Tc(MIN.) = 9.393
EFFECTIVE AREA(ACRES) = 39.78 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 46.6
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 226.00 = 3435.00 FEET.

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****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  60.97
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     165.90
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      136.72    5.42    5.907  0.20( 0.10) 0.51      22.6     215.00
      2      144.44    6.16    5.492  0.20( 0.10) 0.51      25.9     183.00
      3      146.97    6.40    5.373  0.20( 0.10) 0.51      27.0     195.00
      4      149.69    6.69    5.237  0.20( 0.10) 0.51      28.3     170.00
      5      152.25    6.97    5.116  0.20( 0.10) 0.51      29.6     175.00
      6      152.56    7.00    5.101  0.20( 0.10) 0.51      29.8     161.00
      7      155.37    7.33    4.968  0.20( 0.10) 0.51      31.3     174.00
      8      156.11    7.43    4.932  0.20( 0.10) 0.51      31.7      59.00
      9      157.65    7.63    4.858  0.20( 0.10) 0.51      32.7     150.00
     10      157.98    7.67    4.841  0.20( 0.10) 0.51      32.9     192.00
     11      158.15    7.70    4.833  0.20( 0.10) 0.51      33.0     173.00
     12      160.91    8.14    4.679  0.20( 0.10) 0.51      34.9      14.00
     13      163.52    8.58    4.540  0.20( 0.10) 0.51      36.8     223.00
     14      163.55    8.59    4.539  0.20( 0.10) 0.51      36.8     167.00
     15      164.03    8.69    4.507  0.20( 0.10) 0.52      37.3     199.00
     16      164.44    8.80    4.476  0.20( 0.10) 0.52      37.7     154.00
     17      164.63    8.85    4.461  0.20( 0.10) 0.52      37.9     191.10
     18      165.60    9.16    4.375  0.20( 0.10) 0.52      39.0     201.00
     19      165.62    9.16    4.373  0.20( 0.10) 0.52      39.0     190.00
     20      165.74    9.23    4.355  0.20( 0.10) 0.52      39.3      64.00
     21      165.83    9.31    4.333  0.20( 0.10) 0.52      39.5     200.00
     22      165.90    9.40    4.310  0.20( 0.10) 0.52      39.8     220.00
     23      165.89    9.52    4.279  0.20( 0.10) 0.52      40.1      19.00
     24      165.79    9.86    4.193  0.20( 0.10) 0.52      41.0     213.00
     25      165.71    9.96    4.168  0.20( 0.10) 0.52      41.3      16.00
     26      165.62   10.04    4.151  0.20( 0.10) 0.52      41.5     168.00
     27      165.43   10.14    4.125  0.20( 0.10) 0.52      41.7     169.00
     28      164.38   10.69    4.002  0.20( 0.10) 0.52      42.9     179.00
     29      163.26   11.20    3.898  0.20( 0.11) 0.53      43.9     181.00
     30      162.89   11.33    3.872  0.20( 0.11) 0.53      44.2     160.00
     31      162.79   11.37    3.865  0.20( 0.11) 0.53      44.2     159.00
     32      162.79   11.37    3.865  0.20( 0.11) 0.53      44.2      17.00
     33      162.45   11.46    3.848  0.20( 0.11) 0.53      44.4     211.00
     34      160.82   11.81    3.781  0.20( 0.11) 0.53      44.8     187.00
     35      159.34   12.12    3.726  0.20( 0.11) 0.53      45.1      10.00
     36      158.50   12.29    3.695  0.20( 0.11) 0.53      45.3     184.00
     37      157.67   12.44    3.670  0.20( 0.11) 0.53      45.4     208.00
     38      155.56   12.78    3.614  0.20( 0.11) 0.53      45.6     147.00
     39      155.31   12.82    3.607  0.20( 0.11) 0.53      45.6     184.00
     40      152.10   13.32    3.529  0.20( 0.11) 0.53      45.8     152.00
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41	135.96	16.30	3.144	0.20(0.11)	0.53	46.5	144.00
42	127.66	18.04	2.966	0.20(0.11)	0.53	46.6	147.00

LONGEST FLOWPATH FROM NODE 147.00 TO NODE 230.00 = 3455.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	220.77	5.06	6.144	0.20(0.11)	0.57	34.1	140.00
2	233.32	5.78	5.696	0.20(0.12)	0.58	39.0	104.00
3	241.31	6.24	5.450	0.20(0.12)	0.58	42.3	88.00
4	242.93	6.33	5.403	0.20(0.11)	0.57	43.0	63.00
5	245.41	6.48	5.335	0.20(0.11)	0.57	44.1	47.00
6	246.17	6.52	5.314	0.20(0.11)	0.57	44.5	45.00
7	255.55	7.09	5.067	0.20(0.11)	0.57	49.0	59.00
8	257.51	7.21	5.015	0.20(0.12)	0.58	50.0	95.00
9	260.01	7.38	4.950	0.20(0.12)	0.58	51.3	118.00
10	263.73	7.63	4.857	0.20(0.12)	0.58	53.3	138.00
11	270.49	8.09	4.697	0.20(0.12)	0.58	57.0	141.00
12	275.76	8.47	4.576	0.20(0.12)	0.58	59.9	31.00
13	278.27	8.65	4.519	0.20(0.12)	0.58	61.4	85.00
14	279.94	8.78	4.482	0.20(0.12)	0.58	62.4	38.00
15	280.09	8.79	4.478	0.20(0.12)	0.58	62.4	97.00
16	280.17	8.80	4.476	0.20(0.12)	0.58	62.5	136.00
17	280.96	8.89	4.450	0.20(0.12)	0.58	63.1	80.00
18	281.48	8.95	4.431	0.20(0.12)	0.58	63.6	6.00
19	284.38	9.32	4.330	0.20(0.12)	0.58	66.1	92.00
20	284.46	9.33	4.327	0.20(0.12)	0.58	66.1	35.00
21	284.99	9.42	4.305	0.20(0.12)	0.58	66.7	25.00
22	285.12	9.44	4.299	0.20(0.12)	0.58	66.8	24.00
23	285.99	9.59	4.261	0.20(0.12)	0.58	67.7	46.00
24	286.31	9.65	4.245	0.20(0.12)	0.58	68.1	129.00
25	287.68	9.95	4.172	0.20(0.12)	0.58	69.9	64.00
26	288.15	10.07	4.143	0.20(0.12)	0.58	70.6	32.00
27	288.21	10.09	4.139	0.20(0.12)	0.58	70.7	61.00
28	288.42	10.16	4.121	0.20(0.12)	0.58	71.1	134.00
29	288.59	10.24	4.104	0.20(0.12)	0.58	71.5	116.00
30	288.63	10.26	4.098	0.20(0.12)	0.58	71.6	78.00
31	288.45	10.83	3.974	0.20(0.12)	0.58	74.2	14.00
32	288.44	10.87	3.965	0.20(0.12)	0.58	74.4	76.00
33	288.39	10.94	3.950	0.20(0.12)	0.58	74.8	82.00
34	288.26	11.06	3.927	0.20(0.12)	0.58	75.2	67.00
35	288.04	11.21	3.895	0.20(0.12)	0.58	75.9	53.00
36	287.86	11.30	3.879	0.20(0.12)	0.58	76.2	43.00
37	287.62	11.38	3.863	0.20(0.12)	0.58	76.6	33.00
38	287.54	11.40	3.858	0.20(0.12)	0.58	76.6	56.00
39	287.13	11.50	3.839	0.20(0.12)	0.58	77.0	41.00
40	286.74	11.58	3.825	0.20(0.12)	0.58	77.2	114.00
41	286.32	11.65	3.810	0.20(0.12)	0.58	77.4	100.00
42	283.32	12.14	3.722	0.20(0.12)	0.58	78.7	13.00
43	283.12	12.17	3.717	0.20(0.12)	0.58	78.8	127.00
44	282.45	12.27	3.700	0.20(0.12)	0.58	79.0	123.00
45	281.74	12.37	3.683	0.20(0.12)	0.58	79.2	97.00
46	280.35	12.54	3.654	0.20(0.12)	0.58	79.6	19.00
47	279.63	12.63	3.638	0.20(0.12)	0.58	79.7	29.00
48	278.69	12.74	3.620	0.20(0.12)	0.58	79.9	33.00
49	278.65	12.74	3.620	0.20(0.12)	0.58	79.9	120.00
50	277.61	12.85	3.602	0.20(0.12)	0.58	80.1	73.00
51	277.49	12.86	3.600	0.20(0.12)	0.58	80.1	111.00
52	271.23	13.51	3.501	0.20(0.12)	0.58	80.8	16.00
53	268.30	13.82	3.455	0.20(0.12)	0.58	81.1	17.00
54	263.77	14.31	3.387	0.20(0.12)	0.58	81.6	22.00
55	263.03	14.39	3.376	0.20(0.12)	0.58	81.6	10.00
56	260.89	14.60	3.348	0.20(0.12)	0.58	81.7	7.00
57	250.90	15.61	3.222	0.20(0.12)	0.58	82.1	4.00
58	236.23	17.22	3.046	0.20(0.12)	0.58	82.3	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 230.00 = 4035.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	353.63	5.06	6.144	0.20(0.11)	0.55	55.2	140.00

2	363.79	5.42	5.907	0.20(0.11)	0.55	59.2	215.00
3	373.77	5.78	5.696	0.20(0.11)	0.55	63.2	104.00
4	384.34	6.16	5.492	0.20(0.11)	0.55	67.6	183.00
5	386.62	6.24	5.450	0.20(0.11)	0.55	68.6	88.00
6	389.24	6.33	5.403	0.20(0.11)	0.55	69.7	63.00
7	390.97	6.40	5.373	0.20(0.11)	0.55	70.5	195.00
8	393.13	6.48	5.335	0.20(0.11)	0.55	71.5	47.00
9	394.30	6.52	5.314	0.20(0.11)	0.55	72.0	45.00
10	398.66	6.69	5.237	0.20(0.11)	0.55	74.1	170.00
11	405.84	6.97	5.116	0.20(0.11)	0.55	77.7	175.00
12	406.74	7.00	5.101	0.20(0.11)	0.55	78.1	161.00
13	408.82	7.09	5.067	0.20(0.11)	0.55	79.2	59.00
14	411.85	7.21	5.015	0.20(0.11)	0.55	80.7	95.00
15	414.69	7.33	4.968	0.20(0.11)	0.55	82.2	174.00
16	415.75	7.38	4.950	0.20(0.11)	0.55	82.8	118.00
17	416.81	7.43	4.932	0.20(0.11)	0.55	83.4	59.00
18	421.36	7.63	4.858	0.20(0.11)	0.55	85.9	150.00
19	421.39	7.63	4.857	0.20(0.11)	0.55	85.9	138.00
20	422.33	7.67	4.841	0.20(0.11)	0.55	86.5	192.00
21	422.85	7.70	4.833	0.20(0.11)	0.55	86.8	173.00
22	431.08	8.09	4.697	0.20(0.11)	0.55	91.6	141.00
23	432.14	8.14	4.679	0.20(0.11)	0.55	92.3	14.00
24	438.60	8.47	4.576	0.20(0.11)	0.55	96.2	31.00
25	440.84	8.58	4.540	0.20(0.11)	0.55	97.6	223.00
26	440.92	8.59	4.539	0.20(0.11)	0.55	97.7	167.00
27	442.11	8.65	4.519	0.20(0.11)	0.55	98.5	85.00
28	442.85	8.69	4.507	0.20(0.11)	0.55	99.0	199.00
29	444.31	8.78	4.482	0.20(0.11)	0.55	99.9	38.00
30	444.50	8.79	4.478	0.20(0.11)	0.55	100.1	97.00
31	444.59	8.80	4.476	0.20(0.11)	0.55	100.2	154.00
32	444.62	8.80	4.476	0.20(0.11)	0.55	100.2	136.00
33	445.24	8.85	4.461	0.20(0.11)	0.55	100.7	191.10
34	445.72	8.89	4.450	0.20(0.11)	0.55	101.1	80.00
35	446.45	8.95	4.431	0.20(0.11)	0.56	101.8	6.00
36	448.68	9.16	4.375	0.20(0.11)	0.56	103.9	201.00
37	448.75	9.16	4.373	0.20(0.11)	0.56	104.0	190.00
38	449.38	9.23	4.355	0.20(0.11)	0.56	104.7	64.00
39	450.12	9.31	4.333	0.20(0.11)	0.56	105.5	200.00
40	450.23	9.32	4.330	0.20(0.11)	0.56	105.6	92.00
41	450.31	9.33	4.327	0.20(0.11)	0.56	105.7	35.00
42	450.78	9.40	4.310	0.20(0.11)	0.56	106.3	220.00
43	450.89	9.42	4.305	0.20(0.11)	0.56	106.5	25.00
44	451.01	9.44	4.299	0.20(0.11)	0.56	106.7	24.00
45	451.47	9.52	4.279	0.20(0.11)	0.56	107.4	19.00
46	451.86	9.59	4.261	0.20(0.11)	0.56	108.0	46.00
47	452.17	9.65	4.245	0.20(0.11)	0.56	108.6	129.00
48	453.08	9.86	4.193	0.20(0.11)	0.56	110.4	213.00
49	453.40	9.95	4.172	0.20(0.11)	0.56	111.2	64.00
50	453.45	9.96	4.168	0.20(0.11)	0.56	111.3	16.00
51	453.63	10.04	4.151	0.20(0.11)	0.56	111.9	168.00
52	453.71	10.07	4.143	0.20(0.11)	0.56	112.2	32.00
53	453.74	10.09	4.139	0.20(0.11)	0.56	112.3	61.00
54	453.80	10.14	4.125	0.20(0.11)	0.56	112.7	169.00
55	453.82	10.16	4.121	0.20(0.11)	0.56	112.9	134.00
56	453.84	10.24	4.104	0.20(0.11)	0.56	113.4	116.00
57	453.83	10.26	4.098	0.20(0.11)	0.56	113.6	78.00
58	452.87	10.69	4.002	0.20(0.11)	0.56	116.5	179.00
59	452.54	10.83	3.974	0.20(0.11)	0.56	117.4	14.00
60	452.43	10.87	3.965	0.20(0.11)	0.56	117.7	76.00
61	452.21	10.94	3.950	0.20(0.11)	0.56	118.2	82.00
62	451.83	11.06	3.927	0.20(0.11)	0.56	118.9	67.00
63	451.32	11.20	3.898	0.20(0.11)	0.56	119.8	181.00
64	451.26	11.21	3.895	0.20(0.11)	0.56	119.9	53.00
65	450.85	11.30	3.879	0.20(0.11)	0.56	120.3	43.00
66	450.64	11.33	3.872	0.20(0.11)	0.56	120.5	160.00
67	450.45	11.37	3.865	0.20(0.11)	0.56	120.7	159.00
68	450.44	11.37	3.865	0.20(0.11)	0.56	120.7	17.00
69	450.36	11.38	3.863	0.20(0.11)	0.56	120.8	33.00
70	450.20	11.40	3.858	0.20(0.11)	0.56	120.9	56.00
71	449.75	11.46	3.848	0.20(0.11)	0.56	121.2	211.00
72	449.38	11.50	3.839	0.20(0.11)	0.56	121.4	41.00

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    73      448.63   11.58    3.825  0.20( 0.11) 0.56     121.7     114.00
    74      447.87   11.65    3.810  0.20( 0.11) 0.56     122.0     100.00
    75      446.17   11.81    3.781  0.20( 0.11) 0.56     122.6     187.00
    76      442.78   12.12    3.726  0.20( 0.11) 0.56     123.8      10.00
    77      442.55   12.14    3.722  0.20( 0.11) 0.56     123.9      13.00
    78      442.21   12.17    3.717  0.20( 0.11) 0.56     124.0     127.00
    79      441.08   12.27    3.700  0.20( 0.11) 0.56     124.3     123.00
    80      440.75   12.29    3.695  0.20( 0.11) 0.56     124.4     184.00
    81      439.83   12.37    3.683  0.20( 0.11) 0.56     124.6      97.00
    82      438.81   12.44    3.670  0.20( 0.11) 0.56     124.8     208.00
    83      437.42   12.54    3.654  0.20( 0.11) 0.56     125.0      19.00
    84      436.11   12.63    3.638  0.20( 0.11) 0.56     125.3      29.00
    85      434.50   12.74    3.620  0.20( 0.11) 0.56     125.5      33.00
    86      434.43   12.74    3.620  0.20( 0.11) 0.56     125.5     120.00
    87      433.86   12.78    3.614  0.20( 0.11) 0.56     125.6     147.00
    88      433.20   12.82    3.607  0.20( 0.11) 0.56     125.7     184.00
    89      432.72   12.85    3.602  0.20( 0.11) 0.56     125.7      73.00
    90      432.53   12.86    3.600  0.20( 0.11) 0.56     125.7     111.00
    91      425.14   13.32    3.529  0.20( 0.11) 0.56     126.4     152.00
    92      422.31   13.51    3.501  0.20( 0.11) 0.56     126.6      16.00
    93      417.68   13.82    3.455  0.20( 0.11) 0.56     127.0      17.00
    94      410.49   14.31    3.387  0.20( 0.11) 0.56     127.6      22.00
    95      409.34   14.39    3.376  0.20( 0.11) 0.56     127.7      10.00
    96      406.04   14.60    3.348  0.20( 0.11) 0.56     127.8       7.00
    97      390.59   15.61    3.222  0.20( 0.11) 0.56     128.4       4.00
    98      380.59   16.30    3.144  0.20( 0.11) 0.56     128.7     144.00
    99      367.80   17.22    3.046  0.20( 0.11) 0.56     128.8       1.00
    **      357.46   18.04    2.966  0.20( 0.11) 0.56     128.9     147.00
  TOTAL AREA(ACRES) =       128.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      453.84  Tc(MIN.) =   10.236
  EFFECTIVE AREA(ACRES) =    113.42  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      128.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      128.9  TC(MIN.) =     10.24
  EFFECTIVE AREA(ACRES) =    113.42  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.557
  PEAK FLOW RATE(CFS)   =     453.84

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      353.63    5.06    6.144  0.20( 0.11) 0.55      55.2     140.00
      2      363.79    5.42    5.907  0.20( 0.11) 0.55      59.2     215.00
      3      373.77    5.78    5.696  0.20( 0.11) 0.55      63.2     104.00
      4      384.34    6.16    5.492  0.20( 0.11) 0.55      67.6     183.00
      5      386.62    6.24    5.450  0.20( 0.11) 0.55      68.6      88.00
      6      389.24    6.33    5.403  0.20( 0.11) 0.55      69.7      63.00
      7      390.97    6.40    5.373  0.20( 0.11) 0.55      70.5     195.00
      8      393.13    6.48    5.335  0.20( 0.11) 0.55      71.5      47.00
      9      394.30    6.52    5.314  0.20( 0.11) 0.55      72.0      45.00
     10      398.66    6.69    5.237  0.20( 0.11) 0.55      74.1     170.00
     11      405.84    6.97    5.116  0.20( 0.11) 0.55      77.7     175.00
     12      406.74    7.00    5.101  0.20( 0.11) 0.55      78.1     161.00
     13      408.82    7.09    5.067  0.20( 0.11) 0.55      79.2      59.00
     14      411.85    7.21    5.015  0.20( 0.11) 0.55      80.7      95.00
     15      414.69    7.33    4.968  0.20( 0.11) 0.55      82.2     174.00
     16      415.75    7.38    4.950  0.20( 0.11) 0.55      82.8     118.00
     17      416.81    7.43    4.932  0.20( 0.11) 0.55      83.4      59.00
     18      421.36    7.63    4.858  0.20( 0.11) 0.55      85.9     150.00
     19      421.39    7.63    4.857  0.20( 0.11) 0.55      85.9     138.00
```

20	422.33	7.67	4.841	0.20(0.11)	0.55	86.5	192.00
21	422.85	7.70	4.833	0.20(0.11)	0.55	86.8	173.00
22	431.08	8.09	4.697	0.20(0.11)	0.55	91.6	141.00
23	432.14	8.14	4.679	0.20(0.11)	0.55	92.3	14.00
24	438.60	8.47	4.576	0.20(0.11)	0.55	96.2	31.00
25	440.84	8.58	4.540	0.20(0.11)	0.55	97.6	223.00
26	440.92	8.59	4.539	0.20(0.11)	0.55	97.7	167.00
27	442.11	8.65	4.519	0.20(0.11)	0.55	98.5	85.00
28	442.85	8.69	4.507	0.20(0.11)	0.55	99.0	199.00
29	444.31	8.78	4.482	0.20(0.11)	0.55	99.9	38.00
30	444.50	8.79	4.478	0.20(0.11)	0.55	100.1	97.00
31	444.59	8.80	4.476	0.20(0.11)	0.55	100.2	154.00
32	444.62	8.80	4.476	0.20(0.11)	0.55	100.2	136.00
33	445.24	8.85	4.461	0.20(0.11)	0.55	100.7	191.10
34	445.72	8.89	4.450	0.20(0.11)	0.55	101.1	80.00
35	446.45	8.95	4.431	0.20(0.11)	0.56	101.8	6.00
36	448.68	9.16	4.375	0.20(0.11)	0.56	103.9	201.00
37	448.75	9.16	4.373	0.20(0.11)	0.56	104.0	190.00
38	449.38	9.23	4.355	0.20(0.11)	0.56	104.7	64.00
39	450.12	9.31	4.333	0.20(0.11)	0.56	105.5	200.00
40	450.23	9.32	4.330	0.20(0.11)	0.56	105.6	92.00
41	450.31	9.33	4.327	0.20(0.11)	0.56	105.7	35.00
42	450.78	9.40	4.310	0.20(0.11)	0.56	106.3	220.00
43	450.89	9.42	4.305	0.20(0.11)	0.56	106.5	25.00
44	451.01	9.44	4.299	0.20(0.11)	0.56	106.7	24.00
45	451.47	9.52	4.279	0.20(0.11)	0.56	107.4	19.00
46	451.86	9.59	4.261	0.20(0.11)	0.56	108.0	46.00
47	452.17	9.65	4.245	0.20(0.11)	0.56	108.6	129.00
48	453.08	9.86	4.193	0.20(0.11)	0.56	110.4	213.00
49	453.40	9.95	4.172	0.20(0.11)	0.56	111.2	64.00
50	453.45	9.96	4.168	0.20(0.11)	0.56	111.3	16.00
51	453.63	10.04	4.151	0.20(0.11)	0.56	111.9	168.00
52	453.71	10.07	4.143	0.20(0.11)	0.56	112.2	32.00
53	453.74	10.09	4.139	0.20(0.11)	0.56	112.3	61.00
54	453.80	10.14	4.125	0.20(0.11)	0.56	112.7	169.00
55	453.82	10.16	4.121	0.20(0.11)	0.56	112.9	134.00
56	453.84	10.24	4.104	0.20(0.11)	0.56	113.4	116.00
57	453.83	10.26	4.098	0.20(0.11)	0.56	113.6	78.00
58	452.87	10.69	4.002	0.20(0.11)	0.56	116.5	179.00
59	452.54	10.83	3.974	0.20(0.11)	0.56	117.4	14.00
60	452.43	10.87	3.965	0.20(0.11)	0.56	117.7	76.00
61	452.21	10.94	3.950	0.20(0.11)	0.56	118.2	82.00
62	451.83	11.06	3.927	0.20(0.11)	0.56	118.9	67.00
63	451.32	11.20	3.898	0.20(0.11)	0.56	119.8	181.00
64	451.26	11.21	3.895	0.20(0.11)	0.56	119.9	53.00
65	450.85	11.30	3.879	0.20(0.11)	0.56	120.3	43.00
66	450.64	11.33	3.872	0.20(0.11)	0.56	120.5	160.00
67	450.45	11.37	3.865	0.20(0.11)	0.56	120.7	159.00
68	450.44	11.37	3.865	0.20(0.11)	0.56	120.7	17.00
69	450.36	11.38	3.863	0.20(0.11)	0.56	120.8	33.00
70	450.20	11.40	3.858	0.20(0.11)	0.56	120.9	56.00
71	449.75	11.46	3.848	0.20(0.11)	0.56	121.2	211.00
72	449.38	11.50	3.839	0.20(0.11)	0.56	121.4	41.00
73	448.63	11.58	3.825	0.20(0.11)	0.56	121.7	114.00
74	447.87	11.65	3.810	0.20(0.11)	0.56	122.0	100.00
75	446.17	11.81	3.781	0.20(0.11)	0.56	122.6	187.00
76	442.78	12.12	3.726	0.20(0.11)	0.56	123.8	10.00
77	442.55	12.14	3.722	0.20(0.11)	0.56	123.9	13.00
78	442.21	12.17	3.717	0.20(0.11)	0.56	124.0	127.00
79	441.08	12.27	3.700	0.20(0.11)	0.56	124.3	123.00
80	440.75	12.29	3.695	0.20(0.11)	0.56	124.4	184.00
81	439.83	12.37	3.683	0.20(0.11)	0.56	124.6	97.00
82	438.81	12.44	3.670	0.20(0.11)	0.56	124.8	208.00
83	437.42	12.54	3.654	0.20(0.11)	0.56	125.0	19.00
84	436.11	12.63	3.638	0.20(0.11)	0.56	125.3	29.00
85	434.50	12.74	3.620	0.20(0.11)	0.56	125.5	33.00
86	434.43	12.74	3.620	0.20(0.11)	0.56	125.5	120.00
87	433.86	12.78	3.614	0.20(0.11)	0.56	125.6	147.00
88	433.20	12.82	3.607	0.20(0.11)	0.56	125.7	184.00
89	432.72	12.85	3.602	0.20(0.11)	0.56	125.7	73.00
90	432.53	12.86	3.600	0.20(0.11)	0.56	125.7	111.00

91	425.14	13.32	3.529	0.20(0.11) 0.56	126.4	152.00
92	422.31	13.51	3.501	0.20(0.11) 0.56	126.6	16.00
93	417.68	13.82	3.455	0.20(0.11) 0.56	127.0	17.00
94	410.49	14.31	3.387	0.20(0.11) 0.56	127.6	22.00
95	409.34	14.39	3.376	0.20(0.11) 0.56	127.7	10.00
96	406.04	14.60	3.348	0.20(0.11) 0.56	127.8	7.00
97	390.59	15.61	3.222	0.20(0.11) 0.56	128.4	4.00
98	380.59	16.30	3.144	0.20(0.11) 0.56	128.7	144.00
99	367.80	17.22	3.046	0.20(0.11) 0.56	128.8	1.00
**	357.46	18.04	2.966	0.20(0.11) 0.56	128.9	147.00

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A' (CONTINUE)                                 *
 ************************************************************************

  FILE NAME: EAST-2.DAT
  TIME/DATE OF STUDY: 21:01 10/31/2021
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ==================  ======  =====  ====  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.24   RAINFALL INTENSITY(INCH/HR) =  4.10
  EFFECTIVE AREA(ACRES) =   113.42
  TOTAL AREA(ACRES) =   128.90        PEAK FLOW RATE(CFS) =    453.80
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.56
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  69.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.81
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     453.80
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.60      0.20     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.448
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.92      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.23
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.93
  Tc(MIN.) =    8.90
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    3.53
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       5.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   4.60
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.84
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   10.18
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.84

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.349
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    91    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =   10.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.041
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.84   10.18    4.117  0.20( 0.18) 0.90       1.5     231.00
      2        3.44   10.51    4.041  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.18    4.117  0.20( 0.15) 0.76       2.5     231.00
      2        9.16   10.51    4.041  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.23    Tc(MIN.) =    10.18
  EFFECTIVE AREA(ACRES) =       2.46   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.23
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.46
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.23

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.55
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.55

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.45    4.056  0.20( 0.15) 0.76       2.5     231.00
      1        9.16   10.78    3.983  0.20( 0.15) 0.76       2.5     234.00
      2        2.55    6.80    5.187  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.80    5.187  0.20( 0.14) 0.72       2.2     237.00
      2       11.21   10.45    4.056  0.20( 0.15) 0.73       3.0     231.00
      3       11.11   10.78    3.983  0.20( 0.15) 0.73       3.0     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.21    Tc(MIN.) =    10.45
  EFFECTIVE AREA(ACRES) =       3.02   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.21
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =       3.02
  TOTAL STREAM AREA(ACRES) =       3.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.21

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.82    5.179  0.20( 0.14) 0.72       2.2     237.00
      1       11.21   10.47    4.052  0.20( 0.15) 0.73       3.0     231.00
      1       11.11   10.80    3.979  0.20( 0.15) 0.73       3.0     234.00
      2        2.71    5.00    6.187  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.00    6.187  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.82    5.179  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.47    4.052  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.80    3.979  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.98    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =       3.51   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.66
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.98
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.04    6.158  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.86    5.161  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.51    4.043  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.84    3.971  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      453.80   10.48    4.049  0.20( 0.11) 0.56     113.4     230.00
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      347.01    5.04    6.158  0.20( 0.11) 0.56      56.6     219.00
      2      393.61    6.86    5.161  0.20( 0.11) 0.56      76.9     237.00
      3      466.78   10.48    4.049  0.20( 0.11) 0.56     116.9     230.00
      4      466.08   10.51    4.043  0.20( 0.11) 0.56     116.9     231.00
      5      457.66   10.84    3.971  0.20( 0.11) 0.56     117.0     234.00
    TOTAL AREA(ACRES) =       132.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      466.78  Tc(MIN.) =   10.481
  EFFECTIVE AREA(ACRES) =    116.92  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      132.4
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  87.0 INCH PIPE IS  70.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.99
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     466.78
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =     116.92
  TOTAL STREAM AREA(ACRES) =     132.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     466.78

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.445
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.51      0.20      0.400    91    6.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.25
  RAINFALL INTENSITY(INCH/HR) =   5.45
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      347.01    5.07    6.139  0.20( 0.11) 0.56      56.6     219.00
      1      393.61    6.89    5.149  0.20( 0.11) 0.56      76.9     237.00
      1      466.78   10.51    4.043  0.20( 0.11) 0.56     116.9     230.00
      1      466.08   10.53    4.037  0.20( 0.11) 0.56     116.9     231.00
      1      457.66   10.87    3.965  0.20( 0.11) 0.56     117.0     234.00
      2        2.46    6.25    5.445  0.20( 0.08) 0.40       0.5     241.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      349.27    5.07    6.139  0.20( 0.11) 0.56      57.1     219.00
      2      379.68    6.25    5.445  0.20( 0.11) 0.56      70.3     241.00
      3      395.93    6.89    5.149  0.20( 0.11) 0.56      77.4     237.00
      4      468.60   10.51    4.043  0.20( 0.11) 0.56     117.4     230.00
      5      467.90   10.53    4.037  0.20( 0.11) 0.56     117.4     231.00
      6      459.44   10.87    3.965  0.20( 0.11) 0.56     117.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     468.60    Tc(MIN.) =    10.51
  EFFECTIVE AREA(ACRES) =     117.43   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =      132.9
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.868
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.39      0.20     0.200    91    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   7.91   Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.25      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =      10.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.35
  FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.19      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.81
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.8  TC(MIN.) =     15.51
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =      10.81
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A' - WITH 2 FLOW-BY DETENTION BASINS          *
 ************************************************************************

  FILE NAME: EAST-B.DAT
  TIME/DATE OF STUDY: 14:18 11/01/2021
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.989
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.940
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20      0.600    91   10.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      2.65
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  511.00  DOWNSTREAM ELEVATION(FEET) =  508.30
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =   12.66
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.633
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.18      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =      1.95    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  15.84
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   508.30  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.16
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.97
  RAINFALL INTENSITY(INCH/HR) =   3.58
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.95
  TOTAL STREAM AREA(ACRES) =       1.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.16

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    510.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.883
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.04      0.20     0.600    91    9.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.81
  TOTAL AREA(ACRES) =      1.04   PEAK FLOW RATE(CFS) =      3.81

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  510.10  DOWNSTREAM ELEVATION(FEET) =  507.50
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.54
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.14
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   1.53   Tc(MIN.) =   11.41
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.857
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.03      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.03      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       6.96

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.66
  FLOW VELOCITY(FEET/SEC.) =  2.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     545.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.41
 RAINFALL INTENSITY(INCH/HR) =   3.86
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.07
 TOTAL STREAM AREA(ACRES) =       2.07
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.96

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.16   12.97    3.583  0.20( 0.12) 0.60       1.9       1.00
     2        6.96   11.41    3.857  0.20( 0.12) 0.60       2.1       4.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.81   11.41    3.857  0.20( 0.12) 0.60       3.8       4.00
     2       12.62   12.97    3.583  0.20( 0.12) 0.60       4.0       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.81    Tc(MIN.) =    11.41
 EFFECTIVE AREA(ACRES) =       3.79   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        4.0
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     655.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   506.50
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.15
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.81
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.45
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.45
 RAINFALL INTENSITY(INCH/HR) =   3.85
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       3.79
 TOTAL STREAM AREA(ACRES) =       4.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.81

****************************************************************************
```

```
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    513.50  DOWNSTREAM(FEET) =    509.30

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.945
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.71      0.20     0.500    91    8.94
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.77
 TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.77

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  509.30  DOWNSTREAM ELEVATION(FEET) =  506.50
 STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.37
   HALFSTREET FLOOD WIDTH(FEET) =   14.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
 STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =   10.46
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.053
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        1.26      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =    1.26      SUBAREA RUNOFF(CFS) =    4.48
 EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       7.01

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.43
 FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.01

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.81   11.45    3.848  0.20( 0.12) 0.60       3.8       4.00
      1       12.62   13.02    3.576  0.20( 0.12) 0.60       4.0       1.00
      2        7.01   10.46    4.053  0.20( 0.10) 0.50       2.0       7.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       19.36   10.46    4.053  0.20( 0.11) 0.56       5.4       7.00
      2       19.46   11.45    3.848  0.20( 0.11) 0.57       5.8       4.00
      3       18.78   13.02    3.576  0.20( 0.11) 0.57       6.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.46    Tc(MIN.) =    11.45
  EFFECTIVE AREA(ACRES) =       5.76   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        6.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.50  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.46
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   3.84
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       5.76
  TOTAL STREAM AREA(ACRES) =       5.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.46

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.225
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.356
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    91    9.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.64

**************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  509.40  DOWNSTREAM ELEVATION(FEET) =  506.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.01
  STREET FLOW TRAVEL TIME(MIN.) =   1.05   Tc(MIN.) =   10.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.096
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.75      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.75      SUBAREA RUNOFF(CFS) =    2.68
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  3.20   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     12.00 =     490.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   4.10
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.36   10.48    4.048  0.20( 0.11) 0.56       5.4       7.00
      1       19.46   11.47    3.844  0.20( 0.11) 0.57       5.8       4.00
      1       18.78   13.04    3.573  0.20( 0.11) 0.57       6.0       1.00
      2        5.17   10.27    4.096  0.20( 0.11) 0.55       1.4      10.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.36   10.27    4.096  0.20( 0.11) 0.56       6.8      10.00
      2       24.46   10.48    4.048  0.20( 0.11) 0.56       6.9       7.00
      3       24.30   11.47    3.844  0.20( 0.11) 0.56       7.2       4.00
      4       23.27   13.04    3.573  0.20( 0.11) 0.56       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.46    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       6.87   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   503.00
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.46
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       6.87
  TOTAL STREAM AREA(ACRES) =       7.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.46

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    503.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.17      0.20     0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.94
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.20      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.11
 EFFECTIVE AREA(ACRES) =      0.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.05

****************************************************************************
 FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.37
 TOTAL STREAM AREA(ACRES) =       0.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.36   10.53    4.039  0.20( 0.11) 0.56       6.8       10.00
     1       24.46   10.74    3.993  0.20( 0.11) 0.56       6.9        7.00
     1       24.30   11.73    3.796  0.20( 0.11) 0.56       7.2        4.00
     1       23.27   13.29    3.533  0.20( 0.11) 0.56       7.4        1.00
     2        2.05    5.00    6.187  0.20( 0.02) 0.10       0.4        6.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.96    5.00    6.187  0.20( 0.10) 0.51       3.6        6.00
     2       25.70   10.53    4.039  0.20( 0.11) 0.54       7.1       10.00
     3       25.78   10.74    3.993  0.20( 0.11) 0.54       7.2        7.00
     4       25.55   11.73    3.796  0.20( 0.11) 0.54       7.6        4.00
     5       24.44   13.29    3.533  0.20( 0.11) 0.54       7.8        1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      25.78    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =       7.24   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        7.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   503.00  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.89
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.78
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       7.24
  TOTAL STREAM AREA(ACRES) =       7.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.78

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.988
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.107
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20      0.100    91    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.79
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.79

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.99
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
  EFFECTIVE STREAM AREA(ACRES) =       0.39
  TOTAL STREAM AREA(ACRES) =       0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.96    5.03    6.166  0.20( 0.10) 0.51       3.6       6.00
      1       25.70   10.55    4.033  0.20( 0.11) 0.54       7.1      10.00
      1       25.78   10.77    3.987  0.20( 0.11) 0.54       7.2       7.00
      1       25.55   11.76    3.791  0.20( 0.11) 0.54       7.6       4.00
      1       24.44   13.32    3.529  0.20( 0.11) 0.54       7.8       1.00
      2        1.79    6.99    5.107  0.20( 0.02) 0.10       0.4      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.51    5.03    6.166  0.20( 0.10) 0.48       3.9       6.00
      2       23.78    6.99    5.107  0.20( 0.10) 0.49       5.2      14.00
      3       27.11   10.55    4.033  0.20( 0.10) 0.51       7.5      10.00
      4       27.17   10.77    3.987  0.20( 0.10) 0.52       7.6       7.00
      5       26.88   11.76    3.791  0.20( 0.10) 0.52       8.0       4.00
      6       25.67   13.32    3.529  0.20( 0.10) 0.52       8.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.17    Tc(MIN.) =    10.77
  EFFECTIVE AREA(ACRES) =       7.63   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.00 =     880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.17
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.00  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.033
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.409
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    9.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.70
  TOTAL STREAM AREA(ACRES) =       0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.50  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.344
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.324
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.93      0.20     0.600    91    9.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.52
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.52

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.34
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.93
  TOTAL STREAM AREA(ACRES) =       0.93
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.71    9.03    4.409  0.20( 0.10) 0.50       0.7      16.00
      2        3.52    9.34    4.324  0.20( 0.12) 0.60       0.9      17.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
```

```
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
      1        6.18    9.03    4.409  0.20( 0.11) 0.56       1.6      16.00
      2        6.18    9.34    4.324  0.20( 0.11) 0.56       1.6      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.18    Tc(MIN.) =     9.03
  EFFECTIVE AREA(ACRES) =       1.60   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.6
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.94
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.18
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     21.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.31
  RAINFALL INTENSITY(INCH/HR) =   4.33
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.18

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    503.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.617
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.861
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.22      0.20     0.100    91    7.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.96

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.70  DOWNSTREAM ELEVATION(FEET) =  501.00
```

```
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    6.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    8.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.612
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.14      SUBAREA RUNOFF(CFS) =    0.58
  EFFECTIVE AREA(ACRES) =      0.36    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   7.17
  FLOW VELOCITY(FEET/SEC.) =  2.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.35
  RAINFALL INTENSITY(INCH/HR) =   4.61
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.36
  TOTAL STREAM AREA(ACRES) =       0.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.18    9.31    4.332  0.20( 0.11) 0.56       1.6      16.00
      1        6.18    9.62    4.251  0.20( 0.11) 0.56       1.6      17.00
      2        1.49    8.35    4.612  0.20( 0.02) 0.10       0.4      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.35    4.612  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.31    4.332  0.20( 0.09) 0.47       2.0      16.00
      3        7.55    9.62    4.251  0.20( 0.09) 0.47       2.0      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       7.58    Tc(MIN.) =     9.31
  EFFECTIVE AREA(ACRES) =       1.96   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        2.0
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   500.50
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.54
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.58
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.40    8.77    4.483  0.20( 0.09) 0.46       1.8      19.00
      2        7.58    9.74    4.224  0.20( 0.09) 0.47       2.0      16.00
      3        7.55   10.05    4.148  0.20( 0.09) 0.47       2.0      17.00
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     22.00 =     525.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.51    5.07    6.139  0.20( 0.10) 0.48       3.9       6.00
      2       23.78    7.03    5.091  0.20( 0.10) 0.49       5.2      14.00
      3       27.11   10.59    4.025  0.20( 0.10) 0.51       7.5      10.00
      4       27.17   10.80    3.979  0.20( 0.10) 0.52       7.6       7.00
      5       26.88   11.79    3.784  0.20( 0.10) 0.52       8.0       4.00
      6       25.67   13.36    3.523  0.20( 0.10) 0.52       8.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.40    5.07    6.139  0.20( 0.10) 0.48       4.9       6.00
      2       30.52    7.03    5.091  0.20( 0.10) 0.48       6.7      14.00
      3       32.81    8.77    4.483  0.20( 0.10) 0.49       8.1      19.00
      4       33.89    9.74    4.224  0.20( 0.10) 0.50       8.9      16.00
      5       34.15   10.05    4.148  0.20( 0.10) 0.50       9.2      17.00
      6       34.43   10.59    4.025  0.20( 0.10) 0.51       9.5      10.00
      7       34.41   10.80    3.979  0.20( 0.10) 0.51       9.6       7.00
      8       33.75   11.79    3.784  0.20( 0.10) 0.51       9.9       4.00
      9       32.06   13.36    3.523  0.20( 0.10) 0.51      10.2       1.00
    TOTAL AREA(ACRES) =        10.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.43  Tc(MIN.) =   10.589
  EFFECTIVE AREA(ACRES) =      9.51  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       10.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     22.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

```
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     24.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   498.20
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.88
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.43
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   11.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.68
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =       9.51
  TOTAL STREAM AREA(ACRES) =      10.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.43

******************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     23.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    500.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.998
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.727
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.40      0.20     0.200    91    8.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.69

******************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  500.20  DOWNSTREAM ELEVATION(FEET) =  498.20
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
```

```
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.30
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.67
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.32      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.22
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
  FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     24.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.290
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.54
  EFFECTIVE AREA(ACRES) =      1.12   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       4.29

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.47
  RAINFALL INTENSITY(INCH/HR) =   4.29
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.29

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.40    6.23    5.455  0.20( 0.10) 0.48       4.9       6.00
      1       30.52    8.13    4.682  0.20( 0.10) 0.48       6.7      14.00
      1       32.81    9.87    4.191  0.20( 0.10) 0.49       8.1      19.00
      1       33.89   10.83    3.974  0.20( 0.10) 0.50       8.9      16.00
      1       34.15   11.14    3.910  0.20( 0.10) 0.50       9.2      17.00
```

```
     1       34.43   11.68    3.805  0.20( 0.10) 0.51       9.5       10.00
     1       34.41   11.89    3.766  0.20( 0.10) 0.51       9.6        7.00
     1       33.75   12.88    3.597  0.20( 0.10) 0.51       9.9        4.00
     1       32.06   14.46    3.368  0.20( 0.10) 0.51      10.2        1.00
     2        4.29    9.47    4.290  0.20( 0.03) 0.16       1.1       13.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.99    6.23    5.455  0.20( 0.09) 0.44       5.6        6.00
      2       34.55    8.13    4.682  0.20( 0.09) 0.44       7.6       14.00
      3       36.58    9.47    4.290  0.20( 0.09) 0.45       8.9       13.00
      4       37.00    9.87    4.191  0.20( 0.09) 0.45       9.3       19.00
      5       37.86   10.83    3.974  0.20( 0.09) 0.46      10.0       16.00
      6       38.06   11.14    3.910  0.20( 0.09) 0.47      10.3       17.00
      7       38.23   11.68    3.805  0.20( 0.09) 0.47      10.6       10.00
      8       38.17   11.89    3.766  0.20( 0.09) 0.47      10.7        7.00
      9       37.34   12.88    3.597  0.20( 0.09) 0.47      11.1        4.00
     10       35.42   14.46    3.368  0.20( 0.10) 0.48      11.3        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.23    Tc(MIN.) =    11.68
  EFFECTIVE AREA(ACRES) =      10.63   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     24.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   498.20  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.23
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.81
  RAINFALL INTENSITY(INCH/HR) =   3.78
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      10.63
  TOTAL STREAM AREA(ACRES) =      11.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.23

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    511.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.14      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.14   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    511.00  DOWNSTREAM(FEET) =    509.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00   CHANNEL SLOPE =  0.0083
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.670
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.64      0.20      0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.64
  AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   0.82
  Tc(MIN.) =    5.82
  SUBAREA AREA(ACRES) =     0.64       SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =      0.78     AREA-AVERAGED Fm(INCH/HR) =   0.15
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.76
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   4.14
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     27.00 =     360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.87
  PIPE TRAVEL TIME(MIN.) =   1.01    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE     25.00 TO NODE     28.00 =     815.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.83
  RAINFALL INTENSITY(INCH/HR) =   5.17
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.87

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.99    6.36    5.390  0.20( 0.09) 0.44       5.6       6.00
     1       34.55    8.26    4.640  0.20( 0.09) 0.44       7.6      14.00
     1       36.58    9.60    4.257  0.20( 0.09) 0.45       8.9      13.00
     1       37.00   10.00    4.160  0.20( 0.09) 0.45       9.3      19.00
     1       37.86   10.96    3.947  0.20( 0.09) 0.46      10.0      16.00
     1       38.06   11.27    3.884  0.20( 0.09) 0.47      10.3      17.00
     1       38.23   11.81    3.781  0.20( 0.09) 0.47      10.6      10.00
     1       38.17   12.02    3.743  0.20( 0.09) 0.47      10.7       7.00
     1       37.34   13.01    3.577  0.20( 0.09) 0.47      11.1       4.00
     1       35.42   14.59    3.350  0.20( 0.10) 0.48      11.3       1.00
     2        3.87    6.83    5.174  0.20( 0.15) 0.76       0.8      25.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.36    5.390  0.20( 0.09) 0.47       6.4       6.00
     2       35.74    6.83    5.174  0.20( 0.10) 0.48       6.9      25.00
     3       38.01    8.26    4.640  0.20( 0.09) 0.47       8.4      14.00
     4       39.75    9.60    4.257  0.20( 0.10) 0.48       9.7      13.00
     5       40.09   10.00    4.160  0.20( 0.10) 0.48      10.0      19.00
     6       40.79   10.96    3.947  0.20( 0.10) 0.48      10.8      16.00
     7       40.94   11.27    3.884  0.20( 0.10) 0.49      11.1      17.00
     8       41.03   11.81    3.781  0.20( 0.10) 0.49      11.4      10.00
     9       40.94   12.02    3.743  0.20( 0.10) 0.49      11.5       7.00
    10       39.99   13.01    3.577  0.20( 0.10) 0.49      11.8       4.00
    11       37.89   14.59    3.350  0.20( 0.10) 0.50      12.1       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      41.03    Tc(MIN.) =    11.81
 EFFECTIVE AREA(ACRES) =      11.41   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       12.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    1435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   497.10
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      41.03
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.88
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.88
 RAINFALL INTENSITY(INCH/HR) =   3.77
 AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.49
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  EFFECTIVE STREAM AREA(ACRES) =      11.41
  TOTAL STREAM AREA(ACRES) =      12.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      41.03

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    507.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.71      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.83
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.83

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  507.00  DOWNSTREAM ELEVATION(FEET) =  497.10
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   12.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =   10.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.123
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.46      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.26
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       7.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     665.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   4.12
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.17
 TOTAL STREAM AREA(ACRES) =       2.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       34.75    6.44    5.354  0.20( 0.09) 0.47       6.4       6.00
     1       35.74    6.91    5.142  0.20( 0.10) 0.48       6.9      25.00
     1       38.01    8.34    4.616  0.20( 0.09) 0.47       8.4      14.00
     1       39.75    9.67    4.239  0.20( 0.10) 0.48       9.7      13.00
     1       40.09   10.07    4.143  0.20( 0.10) 0.48      10.0      19.00
     1       40.79   11.03    3.933  0.20( 0.10) 0.48      10.8      16.00
     1       40.94   11.34    3.870  0.20( 0.10) 0.49      11.1      17.00
     1       41.03   11.88    3.768  0.20( 0.10) 0.49      11.4      10.00
     1       40.94   12.09    3.730  0.20( 0.10) 0.49      11.5       7.00
     1       39.99   13.08    3.565  0.20( 0.10) 0.49      11.8       4.00
     1       37.89   14.66    3.341  0.20( 0.10) 0.50      12.1       1.00
     2        7.82   10.15    4.123  0.20( 0.12) 0.60       2.2      29.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       41.23    6.44    5.354  0.20( 0.10) 0.50       7.7       6.00
     2       42.42    6.91    5.142  0.20( 0.10) 0.50       8.4      25.00
     3       45.22    8.34    4.616  0.20( 0.10) 0.50      10.2      14.00
     4       47.41    9.67    4.239  0.20( 0.10) 0.50      11.8      13.00
     5       47.88   10.07    4.143  0.20( 0.10) 0.50      12.2      19.00
     6       47.97   10.15    4.123  0.20( 0.10) 0.50      12.3      29.00
     7       48.24   11.03    3.933  0.20( 0.10) 0.50      13.0      16.00
     8       48.26   11.34    3.870  0.20( 0.10) 0.51      13.2      17.00
     9       48.15   11.88    3.768  0.20( 0.10) 0.51      13.6      10.00
    10       47.99   12.09    3.730  0.20( 0.10) 0.51      13.7       7.00
    11       46.71   13.08    3.565  0.20( 0.10) 0.51      14.0       4.00
    12       44.18   14.66    3.341  0.20( 0.10) 0.51      14.2       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      48.26    Tc(MIN.) =    11.34
 EFFECTIVE AREA(ACRES) =      13.23   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =       14.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     31.00 =    1475.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.10  DOWNSTREAM(FEET) =   495.20
 FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.74
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      48.26
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.65
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.65
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      13.23
  TOTAL STREAM AREA(ACRES) =      14.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.26

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    498.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.250
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.001
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.24      0.20     0.100    91    7.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      0.24   PEAK FLOW RATE(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.25
  RAINFALL INTENSITY(INCH/HR) =   5.00
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.24
  TOTAL STREAM AREA(ACRES) =       0.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.20  DOWNSTREAM(FEET) =    495.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.262
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.439
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.25      0.20     0.100    91    6.26
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.26
  RAINFALL INTENSITY(INCH/HR) =   5.44
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.22

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.23    6.76    5.205  0.20( 0.10) 0.50       7.7       6.00
      1       42.42    7.23    5.009  0.20( 0.10) 0.50       8.4      25.00
      1       45.22    8.66    4.518  0.20( 0.10) 0.50      10.2      14.00
      1       47.41    9.99    4.162  0.20( 0.10) 0.50      11.8      13.00
      1       47.88   10.39    4.070  0.20( 0.10) 0.50      12.2      19.00
      1       47.97   10.47    4.051  0.20( 0.10) 0.50      12.3      29.00
      1       48.24   11.34    3.869  0.20( 0.10) 0.50      13.0      16.00
      1       48.26   11.65    3.810  0.20( 0.10) 0.51      13.2      17.00
      1       48.15   12.20    3.712  0.20( 0.10) 0.51      13.6      10.00
      1       47.99   12.41    3.675  0.20( 0.10) 0.51      13.7       7.00
      1       46.71   13.40    3.517  0.20( 0.10) 0.51      14.0       4.00
      1       44.18   14.98    3.300  0.20( 0.10) 0.51      14.2       1.00
      2        1.08    7.25    5.001  0.20( 0.02) 0.10       0.2      24.00
      3        1.22    6.26    5.439  0.20( 0.02) 0.10       0.2      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.26    5.439  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.76    5.205  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.23    5.009  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.25    5.001  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.66    4.518  0.20( 0.10) 0.48      10.7      14.00
      6       49.24    9.99    4.162  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.39    4.070  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.47    4.051  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.34    3.869  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.65    3.810  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.20    3.712  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.41    3.675  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.40    3.517  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   14.98    3.300  0.20( 0.10) 0.50      14.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      49.93    Tc(MIN.) =    11.34
  EFFECTIVE AREA(ACRES) =      13.49   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.20  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.93
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.80  DOWNSTREAM(FEET) =    515.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.459
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.578
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.20      0.20     0.600    91    8.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.81
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.81

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  515.40  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   255.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.89
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    9.16
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.372
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      2.19    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  6.26   DEPTH*VELOCITY(FT*FT/SEC.) =   2.09
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.16
  RAINFALL INTENSITY(INCH/HR) =   4.37
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.19
  TOTAL STREAM AREA(ACRES) =       2.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.38

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.90  DOWNSTREAM(FEET) =    502.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.692
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.236
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.73      0.20     0.600    91    6.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.36
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.36

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.50  DOWNSTREAM ELEVATION(FEET) =  495.50
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.32
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   0.39   Tc(MIN.) =    7.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.070
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.92
  EFFECTIVE AREA(ACRES) =      1.16    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  5.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE     35.00 TO NODE     37.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.08
  RAINFALL INTENSITY(INCH/HR) =   5.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.16
  TOTAL STREAM AREA(ACRES) =       1.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.17

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.38    9.16    4.372  0.20( 0.12) 0.60       2.2      33.00
      2        5.17    7.08    5.070  0.20( 0.12) 0.60       1.2      35.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.70    7.08    5.070  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.16    4.372  0.20( 0.12) 0.60       3.4      33.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.82    Tc(MIN.) =     9.16
  EFFECTIVE AREA(ACRES) =       3.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        3.4
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     37.00 =     555.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.50  DOWNSTREAM(FEET) =   494.70
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.82
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.70    7.22    5.012  0.20( 0.12) 0.60       2.9      35.00
      2       12.82    9.31    4.334  0.20( 0.12) 0.60       3.4      33.00
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     38.00 =     620.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.17    6.34    5.401  0.20( 0.09) 0.47       7.6      31.00
      2       43.44    6.84    5.172  0.20( 0.09) 0.47       8.2       6.00
      3       44.61    7.30    4.980  0.20( 0.10) 0.48       8.9      25.00
      4       44.66    7.33    4.971  0.20( 0.10) 0.48       8.9      24.00
      5       47.20    8.73    4.496  0.20( 0.10) 0.48      10.7      14.00
      6       49.24   10.06    4.144  0.20( 0.10) 0.48      12.3      13.00
      7       49.67   10.46    4.053  0.20( 0.10) 0.48      12.7      19.00
      8       49.75   10.54    4.035  0.20( 0.10) 0.48      12.8      29.00
      9       49.93   11.42    3.855  0.20( 0.10) 0.49      13.5      16.00
     10       49.93   11.73    3.796  0.20( 0.10) 0.49      13.7      17.00
     11       49.78   12.27    3.699  0.20( 0.10) 0.49      14.1      10.00
     12       49.61   12.48    3.663  0.20( 0.10) 0.49      14.2       7.00
     13       48.26   13.48    3.506  0.20( 0.10) 0.50      14.5       4.00
     14       45.62   15.05    3.290  0.20( 0.10) 0.50      14.7       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.21    6.34    5.401  0.20( 0.10) 0.50      10.1      31.00
      2       55.86    6.84    5.172  0.20( 0.10) 0.51      10.9       6.00
      3       57.11    7.22    5.012  0.20( 0.10) 0.51      11.6      35.00
      4       57.32    7.30    4.980  0.20( 0.10) 0.51      11.7      25.00
      5       57.36    7.33    4.971  0.20( 0.10) 0.51      11.8      24.00
      6       59.99    8.73    4.496  0.20( 0.10) 0.51      13.9      14.00
      7       60.90    9.31    4.334  0.20( 0.10) 0.51      14.7      33.00
      8       61.48   10.06    4.144  0.20( 0.10) 0.51      15.6      13.00
      9       61.64   10.46    4.053  0.20( 0.10) 0.51      16.0      19.00
     10       61.66   10.54    4.035  0.20( 0.10) 0.51      16.1      29.00
     11       61.30   11.42    3.855  0.20( 0.10) 0.51      16.8      16.00
     12       61.12   11.73    3.796  0.20( 0.10) 0.51      17.1      17.00
     13       60.67   12.27    3.699  0.20( 0.10) 0.51      17.4      10.00
     14       60.39   12.48    3.663  0.20( 0.10) 0.51      17.5       7.00
     15       58.56   13.48    3.506  0.20( 0.10) 0.52      17.9       4.00
     16       55.27   15.05    3.290  0.20( 0.10) 0.52      18.1       1.00
    TOTAL AREA(ACRES) =        18.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       61.66  Tc(MIN.) =   10.545
  EFFECTIVE AREA(ACRES) =     16.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     38.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
```

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==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   494.70  DOWNSTREAM(FEET) =   465.00
  FLOW LENGTH(FEET) =   695.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.06
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.66
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   11.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.19
  RAINFALL INTENSITY(INCH/HR) =   3.90
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      16.12
  TOTAL STREAM AREA(ACRES) =      18.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      61.66

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    494.70  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.639
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.776
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.34      0.20      0.100    91    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.76

******************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  465.00
  STREET LENGTH(FEET) =   415.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

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 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.92
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    8.34
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.10
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
 STREET FLOW TRAVEL TIME(MIN.) =   1.69   Tc(MIN.) =    7.33
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.971
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.52      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.32
 EFFECTIVE AREA(ACRES) =      0.86    AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   9.51
 FLOW VELOCITY(FEET/SEC.) =  4.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
 LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.33
 RAINFALL INTENSITY(INCH/HR) =   4.97
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.86
 TOTAL STREAM AREA(ACRES) =       0.86
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       54.21    7.01    5.099  0.20( 0.10) 0.50      10.1      31.00
     1       55.86    7.50    4.903  0.20( 0.10) 0.51      10.9       6.00
     1       57.11    7.89    4.765  0.20( 0.10) 0.51      11.6      35.00
     1       57.32    7.97    4.737  0.20( 0.10) 0.51      11.7      25.00
     1       57.36    7.99    4.729  0.20( 0.10) 0.51      11.8      24.00
     1       59.99    9.39    4.311  0.20( 0.10) 0.51      13.9      14.00
     1       60.90    9.95    4.171  0.20( 0.10) 0.51      14.7      33.00
     1       61.48   10.71    4.000  0.20( 0.10) 0.51      15.6      13.00
     1       61.64   11.10    3.918  0.20( 0.10) 0.51      16.0      19.00
     1       61.66   11.19    3.900  0.20( 0.10) 0.51      16.1      29.00
     1       61.30   12.06    3.736  0.20( 0.10) 0.51      16.8      16.00
     1       61.12   12.37    3.682  0.20( 0.10) 0.51      17.1      17.00
     1       60.67   12.94    3.589  0.20( 0.10) 0.51      17.4      10.00
     1       60.39   13.15    3.555  0.20( 0.10) 0.51      17.5       7.00
     1       58.56   14.14    3.410  0.20( 0.10) 0.52      17.9       4.00
     1       55.27   15.72    3.209  0.20( 0.10) 0.52      18.1       1.00
     2        3.83    7.33    4.971  0.20( 0.02) 0.10       0.9      38.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       57.97    7.01    5.099  0.20( 0.09) 0.47      10.9      31.00
```

```
      2       59.10    7.33    4.971  0.20( 0.09) 0.47      11.5       38.00
      3       59.64    7.50    4.903  0.20( 0.10) 0.48      11.8        6.00
      4       60.78    7.89    4.765  0.20( 0.10) 0.48      12.5       35.00
      5       60.97    7.97    4.737  0.20( 0.10) 0.48      12.6       25.00
      6       61.01    7.99    4.729  0.20( 0.10) 0.48      12.6       24.00
      7       63.31    9.39    4.311  0.20( 0.10) 0.48      14.7       14.00
      8       64.12    9.95    4.171  0.20( 0.10) 0.48      15.6       33.00
      9       64.56   10.71    4.000  0.20( 0.10) 0.49      16.5       13.00
     10       64.65   11.10    3.918  0.20( 0.10) 0.49      16.9       19.00
     11       64.66   11.19    3.900  0.20( 0.10) 0.49      17.0       29.00
     12       64.17   12.06    3.736  0.20( 0.10) 0.49      17.7       16.00
     13       63.95   12.37    3.682  0.20( 0.10) 0.49      17.9       17.00
     14       63.43   12.94    3.589  0.20( 0.10) 0.49      18.3       10.00
     15       63.12   13.15    3.555  0.20( 0.10) 0.49      18.4        7.00
     16       61.18   14.14    3.410  0.20( 0.10) 0.50      18.7        4.00
     17       57.73   15.72    3.209  0.20( 0.10) 0.50      18.9        1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.66    Tc(MIN.) =    11.19
  EFFECTIVE AREA(ACRES) =      16.98   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       18.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     40.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   465.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.33
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.66
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    483.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.234
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.649
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "2 DWELLINGS/ACRE"          D        0.84      0.20     0.700    91    8.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.700
  SUBAREA RUNOFF(CFS) =      3.41
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      3.41

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  483.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.80
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.21
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    9.70
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.232
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.83      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.83      SUBAREA RUNOFF(CFS) =    6.77
  EFFECTIVE AREA(ACRES) =      2.67    AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.63
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =       9.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  4.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.82
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.70
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.63
  EFFECTIVE STREAM AREA(ACRES) =       2.67
  TOTAL STREAM AREA(ACRES) =       2.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.87

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.549
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.26      0.20     0.600    91    8.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      5.02
  TOTAL AREA(ACRES) =      1.26   PEAK FLOW RATE(CFS) =      5.02

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  472.00
  STREET LENGTH(FEET) =   240.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.26
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   0.94   Tc(MIN.) =    9.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.284
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.97      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.97      SUBAREA RUNOFF(CFS) =    3.65
  EFFECTIVE AREA(ACRES) =      2.23    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       8.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
  FLOW VELOCITY(FEET/SEC.) =  4.43   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
  LONGEST FLOWPATH FROM NODE     43.00 TO NODE     45.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   4.28
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       2.23
  TOTAL STREAM AREA(ACRES) =       2.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
    1        9.87    9.70    4.232  0.20( 0.13) 0.63       2.7      41.00
    2        8.37    9.50    4.284  0.20( 0.11) 0.56       2.2      43.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       18.16    9.50    4.284  0.20( 0.12) 0.60       4.8      43.00
      2       18.14    9.70    4.232  0.20( 0.12) 0.60       4.9      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.16    Tc(MIN.) =     9.50
  EFFECTIVE AREA(ACRES) =       4.84   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.91
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.16
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.84
  TOTAL STREAM AREA(ACRES) =       4.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.16

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    472.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.21      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.17
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      1.17
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.21
 TOTAL STREAM AREA(ACRES) =       0.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

****************************************************************************
 FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    473.00  DOWNSTREAM(FEET) =    464.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.134
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.682
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"        D        1.45      0.20      0.600    91    8.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      5.95
 TOTAL AREA(ACRES) =      1.45   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.13
 RAINFALL INTENSITY(INCH/HR) =   4.68
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.45
 TOTAL STREAM AREA(ACRES) =       1.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.95

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       18.16    9.85    4.194  0.20( 0.12) 0.60       4.8      43.00
     1       18.14   10.06    4.146  0.20( 0.12) 0.60       4.9      41.00
     2        1.17    5.00    6.187  0.20( 0.02) 0.10       0.2      45.00
     3        5.95    8.13    4.682  0.20( 0.12) 0.60       1.5      46.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       19.75    5.00    6.187  0.20( 0.11) 0.57       3.6      45.00
     2       23.46    8.13    4.682  0.20( 0.12) 0.58       5.7      46.00
```

```
     3       24.26    9.85    4.194  0.20( 0.12) 0.58       6.5      43.00
     4       24.17   10.06    4.146  0.20( 0.12) 0.58       6.6      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.26    Tc(MIN.) =     9.85
  EFFECTIVE AREA(ACRES) =       6.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        6.6
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =     925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.65
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.26
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.92
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.75    5.07    6.139  0.20( 0.11) 0.57       3.6      45.00
      2       23.46    8.20    4.660  0.20( 0.12) 0.58       5.7      46.00
      3       24.26    9.92    4.178  0.20( 0.12) 0.58       6.5      43.00
      4       24.17   10.12    4.130  0.20( 0.12) 0.58       6.6      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =     975.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       57.97    7.07    5.075  0.20( 0.09) 0.47      10.9      31.00
      2       59.10    7.38    4.949  0.20( 0.09) 0.47      11.5      38.00
      3       59.64    7.56    4.882  0.20( 0.10) 0.48      11.8       6.00
      4       60.78    7.94    4.745  0.20( 0.10) 0.48      12.5      35.00
      5       60.97    8.03    4.717  0.20( 0.10) 0.48      12.6      25.00
      6       61.01    8.05    4.710  0.20( 0.10) 0.48      12.6      24.00
      7       63.31    9.45    4.296  0.20( 0.10) 0.48      14.7      14.00
      8       64.12   10.00    4.158  0.20( 0.10) 0.48      15.6      33.00
      9       64.56   10.76    3.988  0.20( 0.10) 0.49      16.5      13.00
     10       64.65   11.16    3.907  0.20( 0.10) 0.49      16.9      19.00
     11       64.66   11.24    3.890  0.20( 0.10) 0.49      17.0      29.00
     12       64.17   12.11    3.726  0.20( 0.10) 0.49      17.7      16.00
     13       63.95   12.43    3.673  0.20( 0.10) 0.49      17.9      17.00
     14       63.43   12.99    3.580  0.20( 0.10) 0.49      18.3      10.00
     15       63.12   13.20    3.547  0.20( 0.10) 0.49      18.4       7.00
     16       61.18   14.20    3.403  0.20( 0.10) 0.50      18.7       4.00
     17       57.73   15.78    3.202  0.20( 0.10) 0.50      18.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       70.22    5.07    6.139  0.20( 0.10) 0.50      11.4      45.00
      2       80.08    7.07    5.075  0.20( 0.10) 0.51      15.8      31.00
      3       81.59    7.38    4.949  0.20( 0.10) 0.51      16.6      38.00
      4       82.34    7.56    4.882  0.20( 0.10) 0.51      17.0       6.00
      5       83.94    7.94    4.745  0.20( 0.10) 0.51      18.0      35.00
      6       84.23    8.03    4.717  0.20( 0.10) 0.51      18.1      25.00
```

```
      7       84.29    8.05    4.710  0.20( 0.10) 0.51      18.2       24.00
      8       84.72    8.20    4.660  0.20( 0.10) 0.51      18.5       46.00
      9       87.35    9.45    4.296  0.20( 0.10) 0.51      21.0       14.00
     10       88.26    9.92    4.178  0.20( 0.10) 0.51      22.0       43.00
     11       88.34   10.00    4.158  0.20( 0.10) 0.51      22.1       33.00
     12       88.36   10.12    4.130  0.20( 0.10) 0.51      22.3       41.00
     13       87.87   10.76    3.988  0.20( 0.10) 0.51      23.0       13.00
     14       87.48   11.16    3.907  0.20( 0.10) 0.51      23.5       19.00
     15       87.39   11.24    3.890  0.20( 0.10) 0.51      23.5       29.00
     16       85.91   12.11    3.726  0.20( 0.10) 0.52      24.3       16.00
     17       85.37   12.43    3.673  0.20( 0.10) 0.52      24.5       17.00
     18       84.29   12.99    3.580  0.20( 0.10) 0.52      24.8       10.00
     19       83.78   13.20    3.547  0.20( 0.10) 0.52      24.9        7.00
     20       80.97   14.20    3.403  0.20( 0.10) 0.52      25.3        4.00
     21       76.32   15.78    3.202  0.20( 0.10) 0.52      25.5        1.00
   TOTAL AREA(ACRES) =        25.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       88.36  Tc(MIN.) =   10.123
  EFFECTIVE AREA(ACRES) =     22.27  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =    2460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.40  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.36
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    2585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.23
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.51
  EFFECTIVE STREAM AREA(ACRES) =      22.27
  TOTAL STREAM AREA(ACRES) =      25.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      88.36

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.20  DOWNSTREAM(FEET) =    484.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.203
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.468
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.27      0.20     0.200    91    6.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.32
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      1.32

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  484.70  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   610.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   2.60   Tc(MIN.) =    8.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.476
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.58      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.58      SUBAREA RUNOFF(CFS) =    2.32
  EFFECTIVE AREA(ACRES) =      0.85    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.39

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   9.04
  FLOW VELOCITY(FEET/SEC.) =  4.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     50.00 =     910.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
```

PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	70.22	5.18	6.063	0.20(0.10)	0.50	11.4	45.00
1	80.08	7.18	5.030	0.20(0.10)	0.51	15.8	31.00
1	81.59	7.49	4.908	0.20(0.10)	0.51	16.6	38.00
1	82.34	7.67	4.843	0.20(0.10)	0.51	17.0	6.00
1	83.94	8.05	4.709	0.20(0.10)	0.51	18.0	35.00
1	84.23	8.13	4.682	0.20(0.10)	0.51	18.1	25.00
1	84.29	8.16	4.675	0.20(0.10)	0.51	18.2	24.00
1	84.72	8.31	4.626	0.20(0.10)	0.51	18.5	46.00
1	87.35	9.56	4.269	0.20(0.10)	0.51	21.0	14.00
1	88.26	10.03	4.153	0.20(0.10)	0.51	22.0	43.00
1	88.34	10.11	4.133	0.20(0.10)	0.51	22.1	33.00
1	88.36	10.23	4.106	0.20(0.10)	0.51	22.3	41.00
1	87.87	10.87	3.966	0.20(0.10)	0.51	23.0	13.00
1	87.48	11.26	3.885	0.20(0.10)	0.51	23.5	19.00
1	87.39	11.35	3.869	0.20(0.10)	0.51	23.5	29.00
1	85.91	12.22	3.708	0.20(0.10)	0.52	24.3	16.00
1	85.37	12.53	3.655	0.20(0.10)	0.52	24.5	17.00
1	84.29	13.10	3.563	0.20(0.10)	0.52	24.8	10.00
1	83.78	13.31	3.531	0.20(0.10)	0.52	24.9	7.00
1	80.97	14.30	3.388	0.20(0.10)	0.52	25.3	4.00
1	76.32	15.89	3.190	0.20(0.10)	0.52	25.5	1.00
2	3.39	8.80	4.476	0.20(0.04)	0.20	0.9	32.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.93	5.18	6.063	0.20(0.10)	0.49	11.9	45.00
2	83.20	7.18	5.030	0.20(0.10)	0.49	16.5	31.00
3	84.76	7.49	4.908	0.20(0.10)	0.49	17.3	38.00
4	85.54	7.67	4.843	0.20(0.10)	0.49	17.7	6.00
5	87.21	8.05	4.709	0.20(0.10)	0.50	18.7	35.00
6	87.51	8.13	4.682	0.20(0.10)	0.50	18.9	25.00
7	87.58	8.16	4.675	0.20(0.10)	0.50	19.0	24.00
8	88.03	8.31	4.626	0.20(0.10)	0.50	19.3	46.00
9	89.15	8.80	4.476	0.20(0.10)	0.50	20.4	32.00
10	90.59	9.56	4.269	0.20(0.10)	0.50	21.9	14.00
11	91.40	10.03	4.153	0.20(0.10)	0.50	22.8	43.00
12	91.47	10.11	4.133	0.20(0.10)	0.50	22.9	33.00
13	91.47	10.23	4.106	0.20(0.10)	0.50	23.1	41.00
14	90.88	10.87	3.966	0.20(0.10)	0.50	23.9	13.00
15	90.42	11.26	3.885	0.20(0.10)	0.50	24.3	19.00
16	90.31	11.35	3.869	0.20(0.10)	0.50	24.4	29.00
17	88.72	12.22	3.708	0.20(0.10)	0.51	25.1	16.00
18	88.13	12.53	3.655	0.20(0.10)	0.51	25.3	17.00
19	86.99	13.10	3.563	0.20(0.10)	0.51	25.7	10.00
20	86.45	13.31	3.531	0.20(0.10)	0.51	25.8	7.00
21	83.53	14.30	3.388	0.20(0.10)	0.51	26.1	4.00
22	78.73	15.89	3.190	0.20(0.10)	0.51	26.4	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 91.47 Tc(MIN.) = 10.11
EFFECTIVE AREA(ACRES) = 22.95 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 26.4
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 50.00 = 2585.00 FEET.

****
FLOW PROCESS FROM NODE 50.00 TO NODE 70.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 457.00 DOWNSTREAM(FEET) = 454.50

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.49
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.47
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    502.70  DOWNSTREAM(FEET) =    499.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.72      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.72   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  499.60  DOWNSTREAM ELEVATION(FEET) =  496.50
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.95
  STREET FLOW TRAVEL TIME(MIN.) =   1.96   Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    4.08
```

```
  EFFECTIVE AREA(ACRES) =      1.93    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.31
  FLOW VELOCITY(FEET/SEC.) =  2.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     52.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.47
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.845
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.66      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    5.60
  EFFECTIVE AREA(ACRES) =      3.59   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   496.50  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =   500.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.10
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   12.20
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.20
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.59
  TOTAL STREAM AREA(ACRES) =       3.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.10

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    487.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.414
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.592
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.70
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.70

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  487.40  DOWNSTREAM ELEVATION(FEET) =  478.50
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =    9.14
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.380
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.67      0.20      0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      1.34    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.80
  FLOW VELOCITY(FEET/SEC.) =  4.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.14
  RAINFALL INTENSITY(INCH/HR) =   4.38
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.34
  TOTAL STREAM AREA(ACRES) =       1.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.14
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.10   12.20    3.711  0.20( 0.10) 0.50       3.6      22.00
     2        5.14    9.14    4.380  0.20( 0.12) 0.60       1.3      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.88    9.14    4.380  0.20( 0.11) 0.53       4.0      53.00
     2       16.43   12.20    3.711  0.20( 0.11) 0.53       4.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.43    Tc(MIN.) =    12.20
 EFFECTIVE AREA(ACRES) =       4.93   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     55.00 =    1100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   476.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.56
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.43
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.23
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.23
 RAINFALL INTENSITY(INCH/HR) =   3.71
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.53
 EFFECTIVE STREAM AREA(ACRES) =       4.93
 TOTAL STREAM AREA(ACRES) =       4.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.43

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 ELEVATION DATA: UPSTREAM(FEET) =    496.00  DOWNSTREAM(FEET) =    489.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.381
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.602
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91    8.38
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.15
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.15

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  489.00  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   10.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.47
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    9.35
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.322
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.12      SUBAREA RUNOFF(CFS) =    4.24
  EFFECTIVE AREA(ACRES) =      1.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  5.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.35
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.90
  TOTAL STREAM AREA(ACRES) =       1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.88    9.16    4.373  0.20( 0.11) 0.53       4.0      53.00
      1       16.43   12.23    3.707  0.20( 0.11) 0.53       4.9      22.00
```

```
     2        7.19    9.35    4.322  0.20( 0.12) 0.60       1.9      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.00    9.16    4.373  0.20( 0.11) 0.55       5.9      53.00
      2       23.10    9.35    4.322  0.20( 0.11) 0.55       6.0      56.00
      3       22.57   12.23    3.707  0.20( 0.11) 0.55       6.8      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.10    Tc(MIN.) =     9.35
  EFFECTIVE AREA(ACRES) =       5.98   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     58.00 =    1125.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     60.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.50  DOWNSTREAM(FEET) =   474.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.38
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.10
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.40
  RAINFALL INTENSITY(INCH/HR) =   4.31
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       5.98
  TOTAL STREAM AREA(ACRES) =       6.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.10

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.11      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.61
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.61
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     60.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.11
 TOTAL STREAM AREA(ACRES) =       0.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.61

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       23.00    9.22    4.359  0.20( 0.11) 0.55       5.9      53.00
     1       23.10    9.40    4.308  0.20( 0.11) 0.55       6.0      56.00
     1       22.57   12.28    3.698  0.20( 0.11) 0.55       6.8      22.00
     2        0.61    5.00    6.187  0.20( 0.02) 0.10       0.1      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       18.47    5.00    6.187  0.20( 0.11) 0.54       3.3      59.00
     2       23.43    9.22    4.359  0.20( 0.11) 0.55       6.0      53.00
     3       23.52    9.40    4.308  0.20( 0.11) 0.55       6.1      56.00
     4       22.93   12.28    3.698  0.20( 0.11) 0.54       6.9      22.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.52    Tc(MIN.) =     9.40
 EFFECTIVE AREA(ACRES) =       6.09   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        6.9
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     60.00 =    1170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     60.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   474.50  DOWNSTREAM(FEET) =   457.20
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.57
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.52
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.84
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.84
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       6.09
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```
  TOTAL STREAM AREA(ACRES) =       6.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.52

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.50  DOWNSTREAM(FEET) =    469.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.636
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.64
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.64

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  469.50  DOWNSTREAM ELEVATION(FEET) =  457.20
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    8.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.558
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.86      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.86      SUBAREA RUNOFF(CFS) =    3.43
  EFFECTIVE AREA(ACRES) =      1.48    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.27
  FLOW VELOCITY(FEET/SEC.) =  4.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.52
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.48
  TOTAL STREAM AREA(ACRES) =       1.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.91

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.47    5.47    5.878  0.20( 0.11) 0.54       3.3      59.00
      1       23.43    9.65    4.245  0.20( 0.11) 0.55       6.0      53.00
      1       23.52    9.84    4.198  0.20( 0.11) 0.55       6.1      56.00
      1       22.93   12.72    3.624  0.20( 0.11) 0.54       6.9      22.00
      2        5.91    8.52    4.558  0.20( 0.12) 0.60       1.5      61.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.47    5.878  0.20( 0.11) 0.55       4.3      59.00
      2       28.01    8.52    4.558  0.20( 0.11) 0.56       6.8      61.00
      3       28.93    9.65    4.245  0.20( 0.11) 0.56       7.5      53.00
      4       28.96    9.84    4.198  0.20( 0.11) 0.56       7.6      56.00
      5       27.60   12.72    3.624  0.20( 0.11) 0.55       8.4      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.96    Tc(MIN.) =     9.84
  EFFECTIVE AREA(ACRES) =       7.57   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     63.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.20  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.96
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.85
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   4.19
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       7.57
```

```
  TOTAL STREAM AREA(ACRES) =       8.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.96

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.688
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.68      0.20     0.600    91    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.89
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.89

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  466.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.35
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.40
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.597
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.76      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.76      SUBAREA RUNOFF(CFS) =    3.06
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.39
  FLOW VELOCITY(FEET/SEC.) =  4.74   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.40
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.39    5.48    5.869  0.20( 0.11) 0.55       4.3      59.00
      1       28.01    8.54    4.553  0.20( 0.11) 0.56       6.8      61.00
      1       28.93    9.67    4.241  0.20( 0.11) 0.56       7.5      53.00
      1       28.96    9.85    4.195  0.20( 0.11) 0.56       7.6      56.00
      1       27.60   12.73    3.622  0.20( 0.11) 0.55       8.4      22.00
      2        5.80    8.40    4.597  0.20( 0.12) 0.60       1.4      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.25    5.48    5.869  0.20( 0.11) 0.56       5.2      59.00
      2       33.59    8.40    4.597  0.20( 0.11) 0.56       8.1      64.00
      3       33.75    8.54    4.553  0.20( 0.11) 0.56       8.2      61.00
      4       34.27    9.67    4.241  0.20( 0.11) 0.56       8.9      53.00
      5       34.24    9.85    4.195  0.20( 0.11) 0.56       9.0      56.00
      6       32.14   12.73    3.622  0.20( 0.11) 0.56       9.9      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.27    Tc(MIN.) =     9.67
  EFFECTIVE AREA(ACRES) =       8.92   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        9.9
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     66.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   455.00
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.70
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.27
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.95
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.95
  RAINFALL INTENSITY(INCH/HR) =   4.17
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
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  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       8.92
  TOTAL STREAM AREA(ACRES) =       9.86
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.27

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   205.00
  ELEVATION DATA: UPSTREAM(FEET) =    460.50  DOWNSTREAM(FEET) =    458.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.363
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.608
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.30
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.30

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  458.00  DOWNSTREAM ELEVATION(FEET) =  455.00
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.13
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.56
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =    9.79
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.209
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.66
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.32
  FLOW VELOCITY(FEET/SEC.) =  2.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE     67.00 TO NODE     69.00 =     425.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.79
 RAINFALL INTENSITY(INCH/HR) =   4.21
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.56
 EFFECTIVE STREAM AREA(ACRES) =       1.02
 TOTAL STREAM AREA(ACRES) =       1.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.76

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     69.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   125.00
 ELEVATION DATA: UPSTREAM(FEET) =    457.20  DOWNSTREAM(FEET) =    455.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.15      0.20      0.100    91    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.83
 TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
 FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.15
 TOTAL STREAM AREA(ACRES) =       0.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       28.25    5.78    5.692  0.20( 0.11) 0.56       5.2      59.00
     1       33.59    8.68    4.510  0.20( 0.11) 0.56       8.1      64.00
     1       33.75    8.82    4.468  0.20( 0.11) 0.56       8.2      61.00
     1       34.27    9.95    4.171  0.20( 0.11) 0.56       8.9      53.00
     1       34.24   10.14    4.127  0.20( 0.11) 0.56       9.0      56.00
     1       32.14   13.03    3.574  0.20( 0.11) 0.56       9.9      22.00
     2        3.76    9.79    4.209  0.20( 0.11) 0.56       1.0      67.00
     3        0.83    5.00    6.187  0.20( 0.02) 0.10       0.2      63.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       30.27    5.00    6.187  0.20( 0.11) 0.55       5.2      63.00
    2       32.04    5.78    5.692  0.20( 0.11) 0.55       5.9      59.00
    3       37.78    8.68    4.510  0.20( 0.11) 0.56       9.1      64.00
    4       37.96    8.82    4.468  0.20( 0.11) 0.56       9.3      61.00
    5       38.53    9.79    4.209  0.20( 0.11) 0.56      10.0      67.00
    6       38.56    9.95    4.171  0.20( 0.11) 0.56      10.1      53.00
    7       38.48   10.14    4.127  0.20( 0.11) 0.56      10.2      56.00
    8       35.80   13.03    3.574  0.20( 0.11) 0.55      11.0      22.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.56    Tc(MIN.) =     9.95
  EFFECTIVE AREA(ACRES) =      10.09   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       11.0
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     69.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   455.00  DOWNSTREAM(FEET) =   454.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.56
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.99
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.27    5.05    6.154  0.20( 0.11) 0.55       5.2      63.00
      2       32.04    5.83    5.666  0.20( 0.11) 0.55       5.9      59.00
      3       37.78    8.73    4.497  0.20( 0.11) 0.56       9.1      64.00
      4       37.96    8.87    4.455  0.20( 0.11) 0.56       9.3      61.00
      5       38.53    9.84    4.198  0.20( 0.11) 0.56      10.0      67.00
      6       38.56    9.99    4.161  0.20( 0.11) 0.56      10.1      53.00
      7       38.48   10.18    4.117  0.20( 0.11) 0.56      10.2      56.00
      8       35.80   13.07    3.567  0.20( 0.11) 0.55      11.0      22.00
  LONGEST FLOWPATH FROM NODE     22.00 TO NODE     70.00 =    1755.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.93    5.23    6.027  0.20( 0.10) 0.49      11.9      45.00
      2       83.20    7.23    5.009  0.20( 0.10) 0.49      16.5      31.00
      3       84.76    7.54    4.889  0.20( 0.10) 0.49      17.3      38.00
      4       85.54    7.72    4.824  0.20( 0.10) 0.49      17.7       6.00
      5       87.21    8.10    4.692  0.20( 0.10) 0.50      18.7      35.00
      6       87.51    8.19    4.665  0.20( 0.10) 0.50      18.9      25.00
      7       87.58    8.21    4.658  0.20( 0.10) 0.50      19.0      24.00
      8       88.03    8.36    4.609  0.20( 0.10) 0.50      19.3      46.00
      9       89.15    8.85    4.461  0.20( 0.10) 0.50      20.4      32.00
     10       90.59    9.61    4.256  0.20( 0.10) 0.50      21.9      14.00
     11       91.40   10.08    4.141  0.20( 0.10) 0.50      22.8      43.00
     12       91.47   10.16    4.121  0.20( 0.10) 0.50      22.9      33.00
     13       91.47   10.28    4.094  0.20( 0.10) 0.50      23.1      41.00
     14       90.88   10.92    3.955  0.20( 0.10) 0.50      23.9      13.00
     15       90.42   11.31    3.875  0.20( 0.10) 0.50      24.3      19.00
     16       90.31   11.40    3.859  0.20( 0.10) 0.50      24.4      29.00
     17       88.72   12.27    3.699  0.20( 0.10) 0.51      25.1      16.00
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```
    18       88.13   12.58    3.646  0.20( 0.10) 0.51      25.3      17.00
    19       86.99   13.15    3.555  0.20( 0.10) 0.51      25.7      10.00
    20       86.45   13.36    3.523  0.20( 0.10) 0.51      25.8       7.00
    21       83.53   14.36    3.381  0.20( 0.10) 0.51      26.1       4.00
    22       78.73   15.95    3.183  0.20( 0.10) 0.51      26.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      102.10    5.05    6.154  0.20( 0.10) 0.51      16.6      63.00
      2      103.63    5.23    6.027  0.20( 0.10) 0.51      17.3      45.00
      3      108.03    5.83    5.666  0.20( 0.10) 0.51      19.2      59.00
      4      118.01    7.23    5.009  0.20( 0.10) 0.51      24.0      31.00
      5      120.19    7.54    4.889  0.20( 0.10) 0.51      25.2      38.00
      6      121.33    7.72    4.824  0.20( 0.10) 0.51      25.8       6.00
      7      123.75    8.10    4.692  0.20( 0.10) 0.51      27.2      35.00
      8      124.21    8.19    4.665  0.20( 0.10) 0.51      27.5      25.00
      9      124.33    8.21    4.658  0.20( 0.10) 0.51      27.5      24.00
     10      125.08    8.36    4.609  0.20( 0.10) 0.51      28.1      46.00
     11      126.65    8.73    4.497  0.20( 0.10) 0.52      29.2      64.00
     12      127.08    8.85    4.461  0.20( 0.10) 0.52      29.6      32.00
     13      127.14    8.87    4.455  0.20( 0.10) 0.52      29.7      61.00
     14      128.98    9.61    4.256  0.20( 0.10) 0.52      31.7      14.00
     15      129.52    9.84    4.198  0.20( 0.10) 0.52      32.3      67.00
     16      129.82    9.99    4.161  0.20( 0.10) 0.52      32.7      53.00
     17      129.92   10.08    4.141  0.20( 0.10) 0.52      32.9      43.00
     18      129.96   10.16    4.121  0.20( 0.10) 0.52      33.1      33.00
     19      129.95   10.18    4.117  0.20( 0.10) 0.52      33.2      56.00
     20      129.85   10.28    4.094  0.20( 0.10) 0.52      33.3      41.00
     21      128.67   10.92    3.955  0.20( 0.10) 0.52      34.3      13.00
     22      127.85   11.31    3.875  0.20( 0.10) 0.52      34.8      19.00
     23      127.66   11.40    3.859  0.20( 0.10) 0.52      34.9      29.00
     24      125.26   12.27    3.699  0.20( 0.10) 0.52      35.9      16.00
     25      124.38   12.58    3.646  0.20( 0.10) 0.52      36.2      17.00
     26      122.94   13.07    3.567  0.20( 0.10) 0.52      36.7      22.00
     27      122.66   13.15    3.555  0.20( 0.10) 0.52      36.7      10.00
     28      121.79   13.36    3.523  0.20( 0.10) 0.52      36.8       7.00
     29      117.40   14.36    3.381  0.20( 0.10) 0.52      37.2       4.00
     30      110.55   15.95    3.183  0.20( 0.10) 0.52      37.4       1.00
    TOTAL AREA(ACRES) =        37.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      129.96  Tc(MIN.) =   10.161
  EFFECTIVE AREA(ACRES) =     33.12  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =       37.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   454.50  DOWNSTREAM(FEET) =   450.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.63
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.96
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     71.00 =    2745.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.24
  RAINFALL INTENSITY(INCH/HR) =   4.10
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =      33.12
  TOTAL STREAM AREA(ACRES) =      37.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     129.96

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    464.00  DOWNSTREAM(FEET) =    450.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.272
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.003
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.38      0.20      0.100    91    5.27
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.05
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      2.05

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     71.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.27
  RAINFALL INTENSITY(INCH/HR) =   6.00
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      102.10    5.13    6.098  0.20( 0.10) 0.51      16.6      63.00
      1      103.63    5.32    5.973  0.20( 0.10) 0.51      17.3      45.00
      1      108.03    5.91    5.623  0.20( 0.10) 0.51      19.2      59.00
      1      118.01    7.31    4.979  0.20( 0.10) 0.51      24.0      31.00
      1      120.19    7.62    4.860  0.20( 0.10) 0.51      25.2      38.00
      1      121.33    7.80    4.797  0.20( 0.10) 0.51      25.8       6.00
      1      123.75    8.18    4.667  0.20( 0.10) 0.51      27.2      35.00
      1      124.21    8.26    4.640  0.20( 0.10) 0.51      27.5      25.00
      1      124.33    8.28    4.633  0.20( 0.10) 0.51      27.5      24.00
      1      125.08    8.44    4.585  0.20( 0.10) 0.51      28.1      46.00
      1      126.65    8.80    4.474  0.20( 0.10) 0.52      29.2      64.00
      1      127.08    8.93    4.439  0.20( 0.10) 0.52      29.6      32.00
      1      127.14    8.95    4.433  0.20( 0.10) 0.52      29.7      61.00
      1      128.98    9.68    4.236  0.20( 0.10) 0.52      31.7      14.00
      1      129.52    9.92    4.179  0.20( 0.10) 0.52      32.3      67.00
```

1	129.82	10.07	4.142	0.20(0.10)	0.52	32.7	53.00
1	129.92	10.15	4.123	0.20(0.10)	0.52	32.9	43.00
1	129.96	10.24	4.104	0.20(0.10)	0.52	33.1	33.00
1	129.95	10.26	4.099	0.20(0.10)	0.52	33.2	56.00
1	129.85	10.36	4.076	0.20(0.10)	0.52	33.3	41.00
1	128.67	10.99	3.939	0.20(0.10)	0.52	34.3	13.00
1	127.85	11.39	3.860	0.20(0.10)	0.52	34.8	19.00
1	127.66	11.48	3.844	0.20(0.10)	0.52	34.9	29.00
1	125.26	12.35	3.685	0.20(0.10)	0.52	35.9	16.00
1	124.38	12.66	3.633	0.20(0.10)	0.52	36.2	17.00
1	122.94	13.15	3.555	0.20(0.10)	0.52	36.7	22.00
1	122.66	13.23	3.543	0.20(0.10)	0.52	36.7	10.00
1	121.79	13.44	3.511	0.20(0.10)	0.52	36.8	7.00
1	117.40	14.43	3.370	0.20(0.10)	0.52	37.2	4.00
1	110.55	16.02	3.174	0.20(0.10)	0.52	37.4	1.00
2	2.05	5.27	6.003	0.20(0.02)	0.10	0.4	47.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.12	5.13	6.098	0.20(0.10)	0.50	17.0	63.00
2	105.31	5.27	6.003	0.20(0.10)	0.50	17.5	47.00
3	105.66	5.32	5.973	0.20(0.10)	0.50	17.6	45.00
4	109.95	5.91	5.623	0.20(0.10)	0.50	19.6	59.00
5	119.70	7.31	4.979	0.20(0.10)	0.50	24.4	31.00
6	121.85	7.62	4.860	0.20(0.10)	0.51	25.5	38.00
7	122.96	7.80	4.797	0.20(0.10)	0.51	26.1	6.00
8	125.34	8.18	4.667	0.20(0.10)	0.51	27.6	35.00
9	125.79	8.26	4.640	0.20(0.10)	0.51	27.8	25.00
10	125.90	8.28	4.633	0.20(0.10)	0.51	27.9	24.00
11	126.64	8.44	4.585	0.20(0.10)	0.51	28.4	46.00
12	128.17	8.80	4.474	0.20(0.10)	0.51	29.6	64.00
13	128.59	8.93	4.439	0.20(0.10)	0.51	30.0	32.00
14	128.65	8.95	4.433	0.20(0.10)	0.51	30.0	61.00
15	130.42	9.68	4.236	0.20(0.10)	0.51	32.1	14.00
16	130.94	9.92	4.179	0.20(0.10)	0.51	32.7	67.00
17	131.23	10.07	4.142	0.20(0.10)	0.51	33.1	53.00
18	131.33	10.15	4.123	0.20(0.10)	0.51	33.3	43.00
19	131.35	10.24	4.104	0.20(0.10)	0.51	33.5	33.00
20	131.34	10.26	4.099	0.20(0.10)	0.51	33.5	56.00
21	131.24	10.36	4.076	0.20(0.10)	0.51	33.7	41.00
22	130.01	10.99	3.939	0.20(0.10)	0.51	34.7	13.00
23	129.16	11.39	3.860	0.20(0.10)	0.51	35.2	19.00
24	128.97	11.48	3.844	0.20(0.10)	0.51	35.3	29.00
25	126.51	12.35	3.685	0.20(0.10)	0.51	36.3	16.00
26	125.62	12.66	3.633	0.20(0.10)	0.52	36.6	17.00
27	124.14	13.15	3.555	0.20(0.10)	0.52	37.1	22.00
28	123.87	13.23	3.543	0.20(0.10)	0.52	37.1	10.00
29	122.98	13.44	3.511	0.20(0.10)	0.52	37.2	7.00
30	118.54	14.43	3.370	0.20(0.10)	0.52	37.5	4.00
31	111.63	16.02	3.174	0.20(0.10)	0.52	37.8	1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 131.35 Tc(MIN.) = 10.24
EFFECTIVE AREA(ACRES) = 33.50 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.51
TOTAL AREA(ACRES) = 37.8
LONGEST FLOWPATH FROM NODE 1.00 TO NODE 71.00 = 2745.00 FEET.

****
FLOW PROCESS FROM NODE 71.00 TO NODE 86.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 450.00 DOWNSTREAM(FEET) = 448.00
FLOW LENGTH(FEET) = 50.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.3 INCHES

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.15
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.35
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     72.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    516.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.821
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.469
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91    8.82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.42
  TOTAL AREA(ACRES) =      1.13   PEAK FLOW RATE(CFS) =      4.42

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  516.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.22
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.107
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    4.66
  EFFECTIVE AREA(ACRES) =      2.43    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
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  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  4.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.64
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.22
  RAINFALL INTENSITY(INCH/HR) =   4.11
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.43
  TOTAL STREAM AREA(ACRES) =       2.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.72

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.678
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.511
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.69      0.20     0.600    91    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.73
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.73

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  507.00
  STREET LENGTH(FEET) =   365.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =   10.34
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.081
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.13      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    4.03
 EFFECTIVE AREA(ACRES) =      1.82    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
 FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
 LONGEST FLOWPATH FROM NODE     73.00 TO NODE     75.00 =     620.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.34
 RAINFALL INTENSITY(INCH/HR) =   4.08
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       1.82
 TOTAL STREAM AREA(ACRES) =       1.82
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.72   10.22    4.107  0.20( 0.12) 0.60       2.4      33.00
     2        6.49   10.34    4.081  0.20( 0.12) 0.60       1.8      73.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.18   10.22    4.107  0.20( 0.12) 0.60       4.2      33.00
     2       15.15   10.34    4.081  0.20( 0.12) 0.60       4.2      73.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.18    Tc(MIN.) =    10.22
 EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        4.2
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     75.00 =     635.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     75.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   507.00  DOWNSTREAM(FEET) =   500.00
 FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.30
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.18
 PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   10.91
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.96
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.23
  TOTAL STREAM AREA(ACRES) =       4.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.18

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.00  DOWNSTREAM(FEET) =    503.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.961
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.740
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    91    7.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.25

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.20  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    9.05
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.403
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    3.01
  EFFECTIVE AREA(ACRES) =      1.32    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       5.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     76.00 TO NODE     80.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.05
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.32
  TOTAL STREAM AREA(ACRES) =       1.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.09

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    503.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.365
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.956
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    91    7.37
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.14
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.14

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  503.00  DOWNSTREAM ELEVATION(FEET) =  500.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.08   Tc(MIN.) =    8.45
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.582
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.09
  EFFECTIVE AREA(ACRES) =      1.26    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.45
  RAINFALL INTENSITY(INCH/HR) =   4.58
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.26
  TOTAL STREAM AREA(ACRES) =       1.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.18   10.91    3.958  0.20( 0.12) 0.60       4.2      33.00
      1       15.15   11.02    3.935  0.20( 0.12) 0.60       4.2      73.00
      2        5.09    9.05    4.403  0.20( 0.12) 0.60       1.3      76.00
      3        5.07    8.45    4.582  0.20( 0.11) 0.56       1.3      78.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       23.68    8.45    4.582  0.20( 0.12) 0.59       5.8      78.00
      2       24.02    9.05    4.403  0.20( 0.12) 0.59       6.1      76.00
      3       24.10   10.91    3.958  0.20( 0.12) 0.59       6.8      33.00
      4       24.02   11.02    3.935  0.20( 0.12) 0.59       6.8      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.10    Tc(MIN.) =    10.91
  EFFECTIVE AREA(ACRES) =       6.81   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.8
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     80.00 =    1015.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     81.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   489.70
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.85
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.10
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     81.00 =    1200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     81.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.10
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.918
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        3.28      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    3.28      SUBAREA RUNOFF(CFS) =   11.03
  EFFECTIVE AREA(ACRES) =     10.09   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.69
  TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      34.32

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       35.68    8.64    4.522  0.20( 0.14) 0.70       9.0      78.00
      2       35.51    9.25    4.350  0.20( 0.14) 0.70       9.4      76.00
      3       34.32   11.10    3.918  0.20( 0.14) 0.69      10.1      33.00
      4       34.18   11.21    3.895  0.20( 0.14) 0.69      10.1      73.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      35.68  Tc(MIN.) =    8.64
  AREA-AVERAGED Fm(INCH/HR) =  0.14  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70  EFFECTIVE AREA(ACRES) =       9.05

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     85.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   489.70  DOWNSTREAM(FEET) =   448.60
  FLOW LENGTH(FEET) =   520.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.70
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.68
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       9.05
  TOTAL STREAM AREA(ACRES) =      10.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.68
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    503.00  DOWNSTREAM(FEET) =    494.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.062
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.706
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.87      0.20     0.600    91    8.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.59
  TOTAL AREA(ACRES) =      0.87   PEAK FLOW RATE(CFS) =      3.59

****************************************************************************
  FLOW PROCESS FROM NODE     83.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  494.50  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   570.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.60
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    9.76
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.217
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.57      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.57      SUBAREA RUNOFF(CFS) =    2.15
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  5.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  LONGEST FLOWPATH FROM NODE     82.00 TO NODE     85.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.76
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.36

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     84.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.00  DOWNSTREAM(FEET) =    481.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.288
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.60
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.60

****************************************************************************
  FLOW PROCESS FROM NODE     84.00 TO NODE     85.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  481.00  DOWNSTREAM ELEVATION(FEET) =  448.60
  STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.86
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.74
  STREET FLOW TRAVEL TIME(MIN.) =   1.11   Tc(MIN.) =    7.69
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.835
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.38      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.86
  EFFECTIVE AREA(ACRES) =      1.94    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       8.23
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.74
  FLOW VELOCITY(FEET/SEC.) =  6.37   DEPTH*VELOCITY(FT*FT/SEC.) =   2.10
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     85.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     85.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.69
  RAINFALL INTENSITY(INCH/HR) =   4.83
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.94
  TOTAL STREAM AREA(ACRES) =       1.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.68    9.08    4.395  0.20( 0.14) 0.70       9.0      78.00
      1       35.51    9.69    4.236  0.20( 0.14) 0.70       9.4      76.00
      1       34.32   11.54    3.831  0.20( 0.14) 0.69      10.1      33.00
      1       34.18   11.66    3.810  0.20( 0.14) 0.69      10.1      73.00
      2        5.36    9.76    4.217  0.20( 0.08) 0.40       1.4      82.00
      3        8.23    7.69    4.835  0.20( 0.12) 0.60       1.9      80.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.42    7.69    4.835  0.20( 0.13) 0.65      10.7      80.00
      2       48.35    9.08    4.395  0.20( 0.13) 0.65      12.3      78.00
      3       48.04    9.69    4.236  0.20( 0.13) 0.65      12.7      76.00
      4       47.98    9.76    4.217  0.20( 0.13) 0.65      12.8      82.00
      5       45.66   11.54    3.831  0.20( 0.13) 0.65      13.5      33.00
      6       45.46   11.66    3.810  0.20( 0.13) 0.65      13.5      73.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.35    Tc(MIN.) =     9.08
  EFFECTIVE AREA(ACRES) =      12.33   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.65
  TOTAL AREA(ACRES) =       13.5
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     85.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.60  DOWNSTREAM(FEET) =   448.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.44
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.35
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.16
  LONGEST FLOWPATH FROM NODE     33.00 TO NODE     86.00 =    1770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  11
----------------------------------------------------------------------------
```

>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.42	7.77	4.806	0.20(0.13)	0.65	10.7	80.00
2	48.35	9.16	4.373	0.20(0.13)	0.65	12.3	78.00
3	48.04	9.77	4.216	0.20(0.13)	0.65	12.7	76.00
4	47.98	9.84	4.198	0.20(0.13)	0.65	12.8	82.00
5	45.66	11.62	3.816	0.20(0.13)	0.65	13.5	33.00
6	45.46	11.74	3.795	0.20(0.13)	0.65	13.5	73.00

LONGEST FLOWPATH FROM NODE 33.00 TO NODE 86.00 = 1770.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.12	5.17	6.069	0.20(0.10)	0.50	17.0	63.00
2	105.31	5.31	5.976	0.20(0.10)	0.50	17.5	47.00
3	105.66	5.36	5.947	0.20(0.10)	0.50	17.6	45.00
4	109.95	5.95	5.600	0.20(0.10)	0.50	19.6	59.00
5	119.70	7.35	4.963	0.20(0.10)	0.50	24.4	31.00
6	121.85	7.66	4.846	0.20(0.10)	0.51	25.5	38.00
7	122.96	7.84	4.782	0.20(0.10)	0.51	26.1	6.00
8	125.34	8.22	4.653	0.20(0.10)	0.51	27.6	35.00
9	125.79	8.30	4.627	0.20(0.10)	0.51	27.8	25.00
10	125.90	8.33	4.620	0.20(0.10)	0.51	27.9	24.00
11	126.64	8.48	4.573	0.20(0.10)	0.51	28.4	46.00
12	128.17	8.84	4.462	0.20(0.10)	0.51	29.6	64.00
13	128.59	8.97	4.427	0.20(0.10)	0.51	30.0	32.00
14	128.65	8.99	4.422	0.20(0.10)	0.51	30.0	61.00
15	130.42	9.72	4.227	0.20(0.10)	0.51	32.1	14.00
16	130.94	9.96	4.170	0.20(0.10)	0.51	32.7	67.00
17	131.23	10.11	4.133	0.20(0.10)	0.51	33.1	53.00
18	131.33	10.19	4.114	0.20(0.10)	0.51	33.3	43.00
19	131.35	10.28	4.095	0.20(0.10)	0.51	33.5	33.00
20	131.34	10.30	4.090	0.20(0.10)	0.51	33.5	56.00
21	131.24	10.40	4.068	0.20(0.10)	0.51	33.7	41.00
22	130.01	11.03	3.931	0.20(0.10)	0.51	34.7	13.00
23	129.16	11.43	3.853	0.20(0.10)	0.51	35.2	19.00
24	128.97	11.51	3.836	0.20(0.10)	0.51	35.3	29.00
25	126.51	12.39	3.679	0.20(0.10)	0.51	36.3	16.00
26	125.62	12.70	3.627	0.20(0.10)	0.52	36.6	17.00
27	124.14	13.19	3.549	0.20(0.10)	0.52	37.1	22.00
28	123.87	13.27	3.537	0.20(0.10)	0.52	37.1	10.00
29	122.98	13.48	3.505	0.20(0.10)	0.52	37.2	7.00
30	118.54	14.48	3.365	0.20(0.10)	0.52	37.5	4.00
31	111.63	16.07	3.170	0.20(0.10)	0.52	37.8	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 86.00 = 2795.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	143.35	5.17	6.069	0.20(0.11)	0.54	24.2	63.00
2	144.99	5.31	5.976	0.20(0.11)	0.54	24.8	47.00
3	145.48	5.36	5.947	0.20(0.11)	0.54	25.0	45.00
4	151.53	5.95	5.600	0.20(0.11)	0.55	27.8	59.00
5	165.06	7.35	4.963	0.20(0.11)	0.55	34.6	31.00
6	167.99	7.66	4.846	0.20(0.11)	0.55	36.1	38.00
7	168.96	7.77	4.806	0.20(0.11)	0.55	36.6	80.00
8	169.47	7.84	4.782	0.20(0.11)	0.55	37.0	6.00
9	172.38	8.22	4.653	0.20(0.11)	0.55	38.8	35.00
10	172.95	8.30	4.627	0.20(0.11)	0.55	39.2	25.00
11	173.09	8.33	4.620	0.20(0.11)	0.55	39.3	24.00
12	174.04	8.48	4.573	0.20(0.11)	0.55	40.0	46.00
13	176.08	8.84	4.462	0.20(0.11)	0.55	41.6	64.00
14	176.67	8.97	4.427	0.20(0.11)	0.55	42.1	32.00
15	176.75	8.99	4.422	0.20(0.11)	0.55	42.2	61.00
16	177.42	9.16	4.373	0.20(0.11)	0.55	42.9	78.00
17	178.48	9.72	4.227	0.20(0.11)	0.55	44.8	14.00
18	178.56	9.77	4.216	0.20(0.11)	0.55	44.9	76.00

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     19      178.66    9.84    4.198  0.20( 0.11) 0.55      45.2      82.00
     20      178.77    9.96    4.170  0.20( 0.11) 0.55      45.5      67.00
     21      178.85   10.11    4.133  0.20( 0.11) 0.55      46.0      53.00
     22      178.85   10.19    4.114  0.20( 0.11) 0.55      46.2      43.00
     23      178.76   10.28    4.095  0.20( 0.11) 0.55      46.5      33.00
     24      178.73   10.30    4.090  0.20( 0.11) 0.55      46.5      56.00
     25      178.49   10.40    4.068  0.20( 0.11) 0.55      46.7      41.00
     26      176.44   11.03    3.931  0.20( 0.11) 0.55      47.9      13.00
     27      175.07   11.43    3.853  0.20( 0.11) 0.55      48.6      19.00
     28      174.77   11.51    3.836  0.20( 0.11) 0.55      48.7      29.00
     29      174.33   11.62    3.816  0.20( 0.11) 0.55      48.9      33.00
     30      173.81   11.74    3.795  0.20( 0.11) 0.55      49.0      73.00
     31      170.53   12.39    3.679  0.20( 0.11) 0.55      49.8      16.00
     32      168.99   12.70    3.627  0.20( 0.11) 0.55      50.1      17.00
     33      166.55   13.19    3.549  0.20( 0.11) 0.55      50.5      22.00
     34      166.13   13.27    3.537  0.20( 0.11) 0.55      50.6      10.00
     35      164.85   13.48    3.505  0.20( 0.11) 0.55      50.7       7.00
     36      158.67   14.48    3.365  0.20( 0.11) 0.55      51.0       4.00
     37      149.34   16.07    3.170  0.20( 0.11) 0.55      51.3       1.00
   TOTAL AREA(ACRES) =        51.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      178.85  Tc(MIN.) =   10.110
  EFFECTIVE AREA(ACRES) =     45.99  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       51.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     87.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   448.00  DOWNSTREAM(FEET) =   447.50
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.84
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     178.85
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   10.12
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     87.00 =    2805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     87.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   10.10   RAINFALL INTENSITY(INCH/HR) =  4.14
  EFFECTIVE AREA(ACRES) =    31.11
  TOTAL AREA(ACRES) =    34.70        PEAK FLOW RATE(CFS) =    121.00
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.55
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE     87.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.93
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     121.00
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.46
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.46
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =      31.11
  TOTAL STREAM AREA(ACRES) =      34.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     121.00

****************************************************************************
  FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   365.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.43      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.32
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   439.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    5.43
  LONGEST FLOWPATH FROM NODE     88.00 TO NODE     90.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.43
  RAINFALL INTENSITY(INCH/HR) =   5.90
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
```

```
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.32

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      121.00   10.46    4.054  0.20( 0.11) 0.55      31.1       1.00
     2        2.32    5.43    5.899  0.20( 0.18) 0.90       0.4      88.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       94.61    5.43    5.899  0.20( 0.11) 0.56      16.6      88.00
     2      122.57   10.46    4.054  0.20( 0.11) 0.55      31.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     122.57    Tc(MIN.) =    10.46
 EFFECTIVE AREA(ACRES) =      31.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =       35.1
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     90.00 =    3170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     90.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.12
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     122.57
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.59
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     85.00 TO NODE     91.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
 ELEVATION DATA: UPSTREAM(FEET) =    448.60  DOWNSTREAM(FEET) =    444.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.327
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.406
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.29      0.20     0.100    91    6.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.41
 TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.41

****************************************************************************
 FLOW PROCESS FROM NODE     91.00 TO NODE     95.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  444.10  DOWNSTREAM ELEVATION(FEET) =  442.20
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    7.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.735
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.28      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.19
  EFFECTIVE AREA(ACRES) =      0.57    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
  FLOW VELOCITY(FEET/SEC.) =  2.09   DEPTH*VELOCITY(FT*FT/SEC.) =   0.67
  LONGEST FLOWPATH FROM NODE     85.00 TO NODE     95.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.57
  TOTAL STREAM AREA(ACRES) =       0.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    466.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.349
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
```

```
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.58      0.20     0.900    91    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    466.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0567
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.24      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.00
  AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   0.62
  Tc(MIN.) =    7.97
  SUBAREA AREA(ACRES) =     1.24       SUBAREA RUNOFF(CFS) =    5.09
  EFFECTIVE AREA(ACRES) =      1.82     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       7.46

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   9.92
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     94.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     95.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   444.20
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.46
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    8.65
  LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     95.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.65
  RAINFALL INTENSITY(INCH/HR) =   4.52
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.82
  TOTAL STREAM AREA(ACRES) =       1.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.46

  ** CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        2.42    7.97    4.735  0.20( 0.02) 0.10       0.6      85.00
    2        7.46    8.65    4.520  0.20( 0.18) 0.90       1.8      92.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        9.64    7.97    4.735  0.20( 0.14) 0.70       2.2      85.00
    2        9.77    8.65    4.520  0.20( 0.14) 0.71       2.4      92.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       9.77    Tc(MIN.) =     8.65
 EFFECTIVE AREA(ACRES) =       2.39   AREA-AVERAGED Fm(INCH/HR) =  0.14
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
 TOTAL AREA(ACRES) =        2.4
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     95.00 =     895.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   444.20  DOWNSTREAM(FEET) =   435.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  23.55
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.77
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    8.67
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        9.64    8.00    4.728  0.20( 0.14) 0.70       2.2      85.00
    2        9.77    8.67    4.513  0.20( 0.14) 0.71       2.4      92.00
 LONGEST FLOWPATH FROM NODE     92.00 TO NODE     96.00 =     925.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       94.61    5.57    5.815  0.20( 0.11) 0.56      16.6      88.00
    2      122.57   10.59    4.025  0.20( 0.11) 0.55      31.5       1.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      102.92    5.57    5.815  0.20( 0.11) 0.57      18.2      88.00
    2      117.77    8.00    4.728  0.20( 0.11) 0.57      26.1      85.00
    3      121.66    8.67    4.513  0.20( 0.11) 0.57      28.2      92.00
    4      131.26   10.59    4.025  0.20( 0.11) 0.57      33.9       1.00
   TOTAL AREA(ACRES) =        37.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      131.26  Tc(MIN.) =   10.588
 EFFECTIVE AREA(ACRES) =     33.93  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =       37.5
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     96.00 =    3310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE     96.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     96.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   435.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.46
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.26
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.66
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      33.93
  TOTAL STREAM AREA(ACRES) =      37.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     131.26

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    453.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.838
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.782
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.14      0.20     0.900    91    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.72
  TOTAL AREA(ACRES) =      1.14   PEAK FLOW RATE(CFS) =      4.72

****************************************************************************
  FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    453.00  DOWNSTREAM(FEET) =    447.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0343
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.681
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        5.08      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.78
  AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   0.30
  Tc(MIN.) =    8.14
  SUBAREA AREA(ACRES) =     5.08       SUBAREA RUNOFF(CFS) =   20.58
  EFFECTIVE AREA(ACRES) =      6.22     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        6.2         PEAK FLOW RATE(CFS) =      25.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =  11.15
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE     99.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE    102.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   447.00  DOWNSTREAM(FEET) =   432.50
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.20
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.20
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    102.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   4.66
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       6.22
  TOTAL STREAM AREA(ACRES) =       6.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.20

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    454.00  DOWNSTREAM(FEET) =    446.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.95      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
```

```
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.95   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  446.00  DOWNSTREAM ELEVATION(FEET) =  440.20
  STREET LENGTH(FEET) =   480.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   16.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   11.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.924
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.69      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.69      SUBAREA RUNOFF(CFS) =    5.82
  EFFECTIVE AREA(ACRES) =      2.64    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        2.6        PEAK FLOW RATE(CFS) =       9.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  17.95
  FLOW VELOCITY(FEET/SEC.) =  3.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    102.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.07
  RAINFALL INTENSITY(INCH/HR) =   3.92
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       2.64
  TOTAL STREAM AREA(ACRES) =       2.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      102.92    5.65    5.768  0.20( 0.11) 0.57      18.2      88.00
      1      117.77    8.07    4.702  0.20( 0.11) 0.57      26.1      85.00
      1      121.66    8.75    4.491  0.20( 0.11) 0.57      28.2      92.00
      1      131.26   10.66    4.009  0.20( 0.11) 0.57      33.9       1.00
```

```
      2       25.20    8.20    4.659  0.20( 0.18) 0.90       6.2      97.00
      3        9.07   11.07    3.924  0.20( 0.11) 0.54       2.6     100.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      131.45    5.65    5.768  0.20( 0.13) 0.63      23.8      88.00
      2      150.76    8.07    4.702  0.20( 0.13) 0.63      34.1      85.00
      3      151.73    8.20    4.659  0.20( 0.13) 0.63      34.7      97.00
      4      154.14    8.75    4.491  0.20( 0.12) 0.62      36.5      92.00
      5      161.72   10.66    4.009  0.20( 0.12) 0.61      42.7       1.00
      6      158.53   11.07    3.924  0.20( 0.12) 0.61      42.8     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     161.72    Tc(MIN.) =    10.66
  EFFECTIVE AREA(ACRES) =      42.69   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       46.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    102.00 =    3395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   432.50  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.42
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     161.72
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.74
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =      42.69
  TOTAL STREAM AREA(ACRES) =      46.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     161.72

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.44      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.38
```

```
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.38
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   6.02
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.44
  TOTAL STREAM AREA(ACRES) =       0.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      131.45    5.73    5.721  0.20( 0.13) 0.63      23.8      88.00
      1      150.76    8.15    4.676  0.20( 0.13) 0.63      34.1      85.00
      1      151.73    8.28    4.633  0.20( 0.13) 0.63      34.7      97.00
      1      154.14    8.83    4.467  0.20( 0.12) 0.62      36.5      92.00
      1      161.72   10.74    3.992  0.20( 0.12) 0.61      42.7       1.00
      1      158.53   11.15    3.908  0.20( 0.12) 0.61      42.8     100.00
      2        2.38    5.24    6.021  0.20( 0.18) 0.90       0.4     104.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      129.05    5.24    6.021  0.20( 0.13) 0.63      22.2     104.00
      2      133.70    5.73    5.721  0.20( 0.13) 0.63      24.2      88.00
      3      152.59    8.15    4.676  0.20( 0.13) 0.63      34.6      85.00
      4      153.55    8.28    4.633  0.20( 0.13) 0.63      35.1      97.00
      5      155.89    8.83    4.467  0.20( 0.13) 0.63      37.0      92.00
      6      163.28   10.74    3.992  0.20( 0.12) 0.62      43.1       1.00
      7      160.05   11.15    3.908  0.20( 0.12) 0.62      43.2     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     163.28    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      43.13   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       46.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    106.00 =    3485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.00  DOWNSTREAM(FEET) =   420.30
  FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.55
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     163.28
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   11.04
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.04
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      43.13
  TOTAL STREAM AREA(ACRES) =      46.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     163.28

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE    107.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    442.20  DOWNSTREAM(FEET) =    433.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.686
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.748
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    5.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  433.60  DOWNSTREAM ELEVATION(FEET) =  420.30
  STREET LENGTH(FEET) =   300.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.75
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```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =    6.98
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.112
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.35      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    1.60
  EFFECTIVE AREA(ACRES) =      0.67    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     95.00 TO NODE    108.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.67
  TOTAL STREAM AREA(ACRES) =       0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.07

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      129.05    5.56    5.821  0.20( 0.13) 0.63      22.2     104.00
      1      133.70    6.04    5.551  0.20( 0.13) 0.63      24.2      88.00
      1      152.59    8.46    4.579  0.20( 0.13) 0.63      34.6      85.00
      1      153.55    8.59    4.539  0.20( 0.13) 0.63      35.1      97.00
      1      155.89    9.13    4.382  0.20( 0.13) 0.63      37.0      92.00
      1      163.28   11.04    3.931  0.20( 0.12) 0.62      43.1       1.00
      1      160.05   11.45    3.850  0.20( 0.12) 0.62      43.2     100.00
      2        3.07    6.98    5.112  0.20( 0.02) 0.10       0.7      95.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      131.84    5.56    5.821  0.20( 0.12) 0.62      22.7     104.00
      2      136.59    6.04    5.551  0.20( 0.12) 0.62      24.8      88.00
      3      144.08    6.98    5.112  0.20( 0.12) 0.62      28.9      95.00
      4      155.34    8.46    4.579  0.20( 0.12) 0.62      35.2      85.00
      5      156.27    8.59    4.539  0.20( 0.12) 0.62      35.8      97.00
      6      158.52    9.13    4.382  0.20( 0.12) 0.62      37.6      92.00
      7      165.63   11.04    3.931  0.20( 0.12) 0.61      43.8       1.00
      8      162.35   11.45    3.850  0.20( 0.12) 0.61      43.9     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     165.63    Tc(MIN.) =    11.04
  EFFECTIVE AREA(ACRES) =      43.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       47.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    108.00 =    3830.00 FEET.
```

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****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.30  DOWNSTREAM(FEET) =   406.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  44.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     165.63
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.06
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     97.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    478.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.858
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.775
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.93      0.20     0.900    91    7.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.85
  TOTAL AREA(ACRES) =      0.93   PEAK FLOW RATE(CFS) =      3.85

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    418.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.0933
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.554
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.84      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.05
  AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   0.68
  Tc(MIN.) =    8.54
  SUBAREA AREA(ACRES) =     0.84       SUBAREA RUNOFF(CFS) =    3.31
  EFFECTIVE AREA(ACRES) =      1.77     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       6.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
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  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =  11.75
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    110.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   412.60
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.97
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   10.19
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.19
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.77
  TOTAL STREAM AREA(ACRES) =       1.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.97

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.20  DOWNSTREAM(FEET) =    414.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.277
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.342
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.61      0.20     0.500    91    9.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      0.61   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  414.70  DOWNSTREAM ELEVATION(FEET) =  412.60
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
```

```
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.40   Tc(MIN.) =   10.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.005
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.44      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.55
  EFFECTIVE AREA(ACRES) =      1.05    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.69

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.79
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.85
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.68
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.05
  TOTAL STREAM AREA(ACRES) =       1.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.97   10.19    4.116  0.20( 0.18) 0.90       1.8      97.00
      2        3.69   10.68    4.005  0.20( 0.10) 0.50       1.0     111.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.59   10.19    4.116  0.20( 0.15) 0.76       2.8      97.00
      2       10.46   10.68    4.005  0.20( 0.15) 0.75       2.8     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.59    Tc(MIN.) =    10.19
  EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    113.00 =    1305.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
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```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.60  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.59
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    427.60  DOWNSTREAM(FEET) =    421.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.655
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.518
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.78      0.20     0.600    91    8.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.09
  TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.09

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  421.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.76   Tc(MIN.) =    9.42
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.304
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
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```
  "5-7 DWELLINGS/ACRE"       D        0.49      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.49      SUBAREA RUNOFF(CFS) =    1.85
  EFFECTIVE AREA(ACRES) =      1.27    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       4.79

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.42
  RAINFALL INTENSITY(INCH/HR) =   4.30
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    426.50  DOWNSTREAM(FEET) =    420.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.259
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.997
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    7.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.22
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.22

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  420.00  DOWNSTREAM ELEVATION(FEET) =  413.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.81
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    8.08
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.701
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.77      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.50    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       6.21

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.44
  FLOW VELOCITY(FEET/SEC.) =  4.32   DEPTH*VELOCITY(FT*FT/SEC.) =   1.48
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.08
  RAINFALL INTENSITY(INCH/HR) =   4.70
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.79    9.42    4.304  0.20( 0.11) 0.56       1.3     114.00
      2        6.21    8.08    4.701  0.20( 0.10) 0.50       1.5     116.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.71    8.08    4.701  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.42    4.304  0.20( 0.11) 0.53       2.8     114.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.71    Tc(MIN.) =     8.08
  EFFECTIVE AREA(ACRES) =       2.59   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        2.8
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    118.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   413.00  DOWNSTREAM(FEET) =   412.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.71
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.18
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.71    8.18    4.665  0.20( 0.11) 0.53       2.6     116.00
      2       10.47    9.53    4.276  0.20( 0.11) 0.53       2.8     114.00
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    119.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       10.59   10.30    4.088  0.20( 0.15) 0.76       2.8      97.00
      2       10.46   10.80    3.980  0.20( 0.15) 0.75       2.8     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.35    8.18    4.665  0.20( 0.13) 0.63       4.8     116.00
      2       20.72    9.53    4.276  0.20( 0.13) 0.64       5.3     114.00
      3       20.58   10.30    4.088  0.20( 0.13) 0.64       5.5      97.00
      4       20.19   10.80    3.980  0.20( 0.13) 0.64       5.6     111.00
    TOTAL AREA(ACRES) =          5.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       20.72  Tc(MIN.) =    9.527
  EFFECTIVE AREA(ACRES) =      5.33  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    119.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    122.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.00  DOWNSTREAM(FEET) =   411.00
  FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.72
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    9.78
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.64
  EFFECTIVE STREAM AREA(ACRES) =       5.33
  TOTAL STREAM AREA(ACRES) =       5.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.72

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.70  DOWNSTREAM(FEET) =    413.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.942
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.434
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.63      0.20     0.500    91    8.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  413.90  DOWNSTREAM ELEVATION(FEET) =  411.00
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =   10.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.952
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.92      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.92      SUBAREA RUNOFF(CFS) =    3.19
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.37

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.14
  FLOW VELOCITY(FEET/SEC.) =  2.60   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    122.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.93
  RAINFALL INTENSITY(INCH/HR) =   3.95
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.55
  TOTAL STREAM AREA(ACRES) =       1.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.44    4.584  0.20( 0.13) 0.63       4.8     116.00
      1       20.72    9.78    4.212  0.20( 0.13) 0.64       5.3     114.00
      1       20.58   10.56    4.032  0.20( 0.13) 0.64       5.5      97.00
      1       20.19   11.05    3.927  0.20( 0.13) 0.64       5.6     111.00
      2        5.37   10.93    3.952  0.20( 0.10) 0.50       1.5     120.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.18    8.44    4.584  0.20( 0.12) 0.61       6.0     116.00
      2       25.86    9.78    4.212  0.20( 0.12) 0.61       6.7     114.00
      3       25.88   10.56    4.032  0.20( 0.12) 0.61       7.0      97.00
      4       25.66   10.93    3.952  0.20( 0.12) 0.61       7.1     120.00
      5       25.53   11.05    3.927  0.20( 0.12) 0.61       7.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.88    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =       7.04   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    122.00 =    1470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   411.00  DOWNSTREAM(FEET) =   410.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.88
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =   10.73
  RAINFALL INTENSITY(INCH/HR) =   3.99
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       7.04
  TOTAL STREAM AREA(ACRES) =       7.14
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      25.88

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    125.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.685
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.749
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.38      0.20     0.100    91    5.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.96
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.96

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   5.75
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.38
  TOTAL STREAM AREA(ACRES) =       0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.96

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.80  DOWNSTREAM(FEET) =    415.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.517
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.560
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap     SCS   Tc
        LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.73      0.20     0.500    91    8.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.93
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.93

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  62
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  415.20  DOWNSTREAM ELEVATION(FEET) =  410.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.61
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.90
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.13      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.98
  EFFECTIVE AREA(ACRES) =      1.86    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    125.00 =     655.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.64
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.013
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.30      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    1.06
  EFFECTIVE AREA(ACRES) =      2.16   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       7.61

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.64
  RAINFALL INTENSITY(INCH/HR) =   4.01
  AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       2.16
  TOTAL STREAM AREA(ACRES) =       2.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.18    8.61    4.531  0.20( 0.12) 0.61       6.0     116.00
      1       25.86    9.95    4.171  0.20( 0.12) 0.61       6.7     114.00
      1       25.88   10.73    3.995  0.20( 0.12) 0.61       7.0      97.00
      1       25.66   11.11    3.917  0.20( 0.12) 0.61       7.1     120.00
      1       25.53   11.23    3.893  0.20( 0.12) 0.61       7.1     111.00
      2        1.96    5.68    5.749  0.20( 0.02) 0.10       0.4     118.00
      3        7.61   10.64    4.013  0.20( 0.10) 0.50       2.2     123.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.03    5.68    5.749  0.20( 0.11) 0.55       5.5     118.00
      2       33.69    8.61    4.531  0.20( 0.11) 0.56       8.1     116.00
      3       34.67    9.95    4.171  0.20( 0.11) 0.56       9.1     114.00
      4       34.85   10.64    4.013  0.20( 0.11) 0.57       9.5     123.00
      5       34.81   10.73    3.995  0.20( 0.11) 0.57       9.6      97.00
      6       34.41   11.11    3.917  0.20( 0.11) 0.57       9.7     120.00
      7       34.22   11.23    3.893  0.20( 0.11) 0.57       9.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.85    Tc(MIN.) =    10.64
  EFFECTIVE AREA(ACRES) =       9.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    125.00 =    1560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.90
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.66
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    126.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.90  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.18
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.85
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  10
----------------------------------------------------------------------------
```

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  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    433.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.396
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.59      0.20     0.900    91    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.24
  TOTAL AREA(ACRES) =      0.59   PEAK FLOW RATE(CFS) =      2.24

********************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    131.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  433.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   460.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.85
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.73   Tc(MIN.) =   10.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.979
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.49      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    5.20
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.56
  FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.80
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.61
  EFFECTIVE STREAM AREA(ACRES) =       2.08
  TOTAL STREAM AREA(ACRES) =       2.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.22

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.30  DOWNSTREAM(FEET) =    425.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.179
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.029
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91    7.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.11
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      3.11

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.00  DOWNSTREAM ELEVATION(FEET) =  412.50
  STREET LENGTH(FEET) =   290.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =    8.27
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.637
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.89      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.89      SUBAREA RUNOFF(CFS) =    3.63
```

```
  EFFECTIVE AREA(ACRES) =      1.59    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       6.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  12.21
  FLOW VELOCITY(FEET/SEC.) =  4.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    129.00 TO NODE    131.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.27
  RAINFALL INTENSITY(INCH/HR) =   4.64
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.59
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.22   10.80    3.979  0.20( 0.12) 0.61       2.1     127.00
      2        6.49    8.27    4.637  0.20( 0.10) 0.50       1.6     129.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.96    8.27    4.637  0.20( 0.11) 0.56       3.2     129.00
      2       12.77   10.80    3.979  0.20( 0.11) 0.56       3.7     127.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.96    Tc(MIN.) =     8.27
  EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        3.7
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =     760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   412.50  DOWNSTREAM(FEET) =   409.20
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.12
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.96
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.32
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       12.96    8.32    4.621  0.20( 0.11) 0.56       3.2     129.00
    2       12.77   10.85    3.968  0.20( 0.11) 0.56       3.7     127.00
 LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =     805.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       29.03    6.01    5.567  0.20( 0.11) 0.55       5.5     118.00
    2       33.69    8.92    4.440  0.20( 0.11) 0.56       8.1     116.00
    3       34.67   10.26    4.098  0.20( 0.11) 0.56       9.1     114.00
    4       34.85   10.95    3.948  0.20( 0.11) 0.57       9.5     123.00
    5       34.81   11.04    3.930  0.20( 0.11) 0.57       9.6      97.00
    6       34.41   11.41    3.855  0.20( 0.11) 0.57       9.7     120.00
    7       34.22   11.53    3.832  0.20( 0.11) 0.57       9.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       40.36    6.01    5.567  0.20( 0.11) 0.55       7.8     118.00
    2       45.69    8.32    4.621  0.20( 0.11) 0.56      10.8     129.00
    3       46.61    8.92    4.440  0.20( 0.11) 0.56      11.4     116.00
    4       47.49   10.26    4.098  0.20( 0.11) 0.56      12.7     114.00
    5       47.59   10.85    3.968  0.20( 0.11) 0.57      13.2     127.00
    6       47.55   10.95    3.948  0.20( 0.11) 0.57      13.2     123.00
    7       47.45   11.04    3.930  0.20( 0.11) 0.57      13.2      97.00
    8       46.80   11.41    3.855  0.20( 0.11) 0.57      13.3     120.00
    9       46.54   11.53    3.832  0.20( 0.11) 0.57      13.4     111.00
  TOTAL AREA(ACRES) =        13.4

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       47.59  Tc(MIN.) =   10.855
 EFFECTIVE AREA(ACRES) =     13.15  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
 TOTAL AREA(ACRES) =       13.4
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    132.00 =    1695.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   409.20  DOWNSTREAM(FEET) =   408.90
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.51
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.59
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.99
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.99
 RAINFALL INTENSITY(INCH/HR) =   3.94
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      13.15
  TOTAL STREAM AREA(ACRES) =      13.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.59

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.403
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.370
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    6.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.49
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.49

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.40
  RAINFALL INTENSITY(INCH/HR) =   5.37
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.36    6.15    5.494  0.20( 0.11) 0.55       7.8     118.00
      1       45.69    8.46    4.579  0.20( 0.11) 0.56      10.8     129.00
      1       46.61    9.05    4.403  0.20( 0.11) 0.56      11.4     116.00
      1       47.49   10.39    4.068  0.20( 0.11) 0.56      12.7     114.00
      1       47.59   10.99    3.941  0.20( 0.11) 0.57      13.2     127.00
      1       47.55   11.09    3.921  0.20( 0.11) 0.57      13.2     123.00
      1       47.45   11.17    3.903  0.20( 0.11) 0.57      13.2      97.00
      1       46.80   11.55    3.830  0.20( 0.11) 0.57      13.3     120.00
      1       46.54   11.67    3.807  0.20( 0.11) 0.57      13.4     111.00
      2        1.49    6.40    5.370  0.20( 0.02) 0.10       0.3     138.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.83    6.15    5.494  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    6.40    5.370  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    8.46    4.579  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.05    4.403  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   10.39    4.068  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   10.99    3.941  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.09    3.921  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.17    3.903  0.20( 0.11) 0.56      13.6      97.00
```

```
      9       47.87   11.55    3.830  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   11.67    3.807  0.20( 0.11) 0.55      13.7     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.69    Tc(MIN.) =    10.99
  EFFECTIVE AREA(ACRES) =      13.46   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =       13.7
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    133.00 =    1755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.90  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =   295.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.69
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   11.64
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    135.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    437.00  DOWNSTREAM(FEET) =    432.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.282
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.634
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.46      0.20     0.500    91    8.28
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      1.88

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  432.50  DOWNSTREAM ELEVATION(FEET) =  417.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    9.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
  STREET FLOW TRAVEL TIME(MIN.) =   1.28   Tc(MIN.) =    9.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.268
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.17      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    4.37
  EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.09

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.62
  FLOW VELOCITY(FEET/SEC.) =  4.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.56
  RAINFALL INTENSITY(INCH/HR) =   4.27
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       1.63
  TOTAL STREAM AREA(ACRES) =       1.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.09

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    137.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    436.50  DOWNSTREAM(FEET) =    425.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.304
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.980
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.21
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      3.21

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    138.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  425.50  DOWNSTREAM ELEVATION(FEET) =  417.00
```

```
  STREET LENGTH(FEET) =   220.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.64
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   0.88   Tc(MIN.) =    8.18
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.666
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.70      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.88
  EFFECTIVE AREA(ACRES) =      1.43    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.97
  FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    136.00 TO NODE    138.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    138.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.18
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.43
  TOTAL STREAM AREA(ACRES) =       1.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.09    9.56    4.268  0.20( 0.11) 0.57       1.6     134.00
      2        5.88    8.18    4.666  0.20( 0.10) 0.50       1.4     136.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.59    8.18    4.666  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.56    4.268  0.20( 0.11) 0.54       3.1     134.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.59    Tc(MIN.) =     8.18
```

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  EFFECTIVE AREA(ACRES) =       2.83   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    138.00 =     605.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   407.40
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.59
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.59    8.25    4.643  0.20( 0.11) 0.54       2.8     136.00
      2       11.46    9.63    4.251  0.20( 0.11) 0.54       3.1     134.00
  LONGEST FLOWPATH FROM NODE    134.00 TO NODE    139.00 =     680.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.83    6.83    5.175  0.20( 0.11) 0.53       8.1     118.00
      2       42.44    7.08    5.069  0.20( 0.11) 0.53       8.4     138.00
      3       46.96    9.11    4.388  0.20( 0.11) 0.54      11.1     129.00
      4       47.83    9.70    4.231  0.20( 0.11) 0.55      11.7     116.00
      5       48.62   11.04    3.929  0.20( 0.11) 0.55      13.0     114.00
      6       48.69   11.64    3.813  0.20( 0.11) 0.55      13.5     127.00
      7       48.64   11.73    3.795  0.20( 0.11) 0.55      13.5     123.00
      8       48.54   11.82    3.779  0.20( 0.11) 0.56      13.6      97.00
      9       47.87   12.20    3.712  0.20( 0.11) 0.55      13.6     120.00
     10       47.60   12.32    3.691  0.20( 0.11) 0.55      13.7     111.00
  LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.55    6.83    5.175  0.20( 0.11) 0.53      10.4     118.00
      2       53.32    7.08    5.069  0.20( 0.11) 0.53      10.8     138.00
      3       56.65    8.25    4.643  0.20( 0.11) 0.54      12.8     136.00
      4       58.47    9.11    4.388  0.20( 0.11) 0.54      14.0     129.00
      5       59.18    9.63    4.251  0.20( 0.11) 0.54      14.7     134.00
      6       59.23    9.70    4.231  0.20( 0.11) 0.54      14.8     116.00
      7       59.19   11.04    3.929  0.20( 0.11) 0.55      16.0     114.00
      8       58.94   11.64    3.813  0.20( 0.11) 0.55      16.5     127.00
      9       58.84   11.73    3.795  0.20( 0.11) 0.55      16.6     123.00
     10       58.69   11.82    3.779  0.20( 0.11) 0.55      16.6      97.00
     11       57.83   12.20    3.712  0.20( 0.11) 0.55      16.7     120.00
     12       57.51   12.32    3.691  0.20( 0.11) 0.55      16.7     111.00
    TOTAL AREA(ACRES) =        16.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       59.23  Tc(MIN.) =    9.704
  EFFECTIVE AREA(ACRES) =     14.78  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       16.7
```

```
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    139.00 =    2050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    139.00 TO NODE    139.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.40  DOWNSTREAM(FEET) =   406.50
 FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.31
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      59.23
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       52.55    7.16    5.035  0.20( 0.11) 0.53      10.4     118.00
     2       53.32    7.41    4.937  0.20( 0.11) 0.53      10.8     138.00
     3       56.65    8.58    4.540  0.20( 0.11) 0.54      12.8     136.00
     4       58.47    9.44    4.300  0.20( 0.11) 0.54      14.0     129.00
     5       59.18    9.95    4.171  0.20( 0.11) 0.54      14.7     134.00
     6       59.23   10.02    4.153  0.20( 0.11) 0.54      14.8     116.00
     7       59.19   11.36    3.865  0.20( 0.11) 0.55      16.0     114.00
     8       58.94   11.96    3.754  0.20( 0.11) 0.55      16.5     127.00
     9       58.84   12.05    3.737  0.20( 0.11) 0.55      16.6     123.00
    10       58.69   12.15    3.720  0.20( 0.11) 0.55      16.6      97.00
    11       57.83   12.53    3.655  0.20( 0.11) 0.55      16.7     120.00
    12       57.51   12.65    3.635  0.20( 0.11) 0.55      16.7     111.00
 LONGEST FLOWPATH FROM NODE     97.00 TO NODE    140.00 =    2210.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      131.84    5.58    5.808  0.20( 0.12) 0.62      22.7     104.00
     2      136.59    6.06    5.540  0.20( 0.12) 0.62      24.8      88.00
     3      144.08    7.00    5.103  0.20( 0.12) 0.62      28.9      95.00
     4      155.34    8.48    4.572  0.20( 0.12) 0.62      35.2      85.00
     5      156.27    8.61    4.532  0.20( 0.12) 0.62      35.8      97.00
     6      158.52    9.15    4.376  0.20( 0.12) 0.62      37.6      92.00
     7      165.63   11.06    3.927  0.20( 0.12) 0.61      43.8       1.00
     8      162.35   11.47    3.846  0.20( 0.12) 0.61      43.9     100.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      179.22    5.58    5.808  0.20( 0.12) 0.60      30.9     104.00
     2      185.63    6.06    5.540  0.20( 0.12) 0.60      33.6      88.00
     3      196.12    7.00    5.103  0.20( 0.12) 0.60      39.1      95.00
     4      197.89    7.16    5.035  0.20( 0.12) 0.60      40.0     118.00
     5      200.56    7.41    4.937  0.20( 0.12) 0.60      41.5     138.00
     6      211.69    8.48    4.572  0.20( 0.12) 0.60      47.8      85.00
     7      212.74    8.58    4.540  0.20( 0.12) 0.60      48.4     136.00
     8      212.97    8.61    4.532  0.20( 0.12) 0.60      48.6      97.00
     9      216.38    9.15    4.376  0.20( 0.12) 0.60      51.2      92.00
```

```
     10      218.05    9.44    4.300  0.20( 0.12) 0.60      52.6     129.00
     11      220.67    9.95    4.171  0.20( 0.12) 0.60      54.9     134.00
     12      221.01   10.02    4.153  0.20( 0.12) 0.59      55.2     116.00
     13      224.83   11.06    3.927  0.20( 0.12) 0.59      59.6       1.00
     14      222.36   11.36    3.865  0.20( 0.12) 0.59      59.9     114.00
     15      221.50   11.47    3.846  0.20( 0.12) 0.59      60.0     100.00
     16      217.31   11.96    3.754  0.20( 0.12) 0.59      60.4     127.00
     17      216.45   12.05    3.737  0.20( 0.12) 0.59      60.5     123.00
     18      215.57   12.15    3.720  0.20( 0.12) 0.59      60.5      97.00
     19      211.89   12.53    3.655  0.20( 0.12) 0.59      60.6     120.00
     20      210.69   12.65    3.635  0.20( 0.12) 0.59      60.6     111.00
    TOTAL AREA(ACRES) =        64.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      224.83  Tc(MIN.) =   11.057
  EFFECTIVE AREA(ACRES) =     59.56  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =       64.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    140.00 =    3885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.50  DOWNSTREAM(FEET) =   406.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  69.0 INCH PIPE IS  51.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.80
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     224.83
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   11.22
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.22
  RAINFALL INTENSITY(INCH/HR) =   3.89
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =      59.56
  TOTAL STREAM AREA(ACRES) =      64.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     224.83

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    143.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   105.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.80  DOWNSTREAM(FEET) =    417.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.12      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.67
  TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.67

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.12
  TOTAL STREAM AREA(ACRES) =       0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.67

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.00  DOWNSTREAM(FEET) =    426.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.229
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.455
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.25      0.20     0.200    91    6.23
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  426.40  DOWNSTREAM ELEVATION(FEET) =  417.50
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =    8.03
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.52      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.19
  EFFECTIVE AREA(ACRES) =      0.77    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.24

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.98
  FLOW VELOCITY(FEET/SEC.) =  3.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.03
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.716
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.63      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.63      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.40   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       5.89

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    143.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.03
  RAINFALL INTENSITY(INCH/HR) =   4.72
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.40
  TOTAL STREAM AREA(ACRES) =       1.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      179.22    5.76    5.708  0.20( 0.12) 0.60      30.9     104.00
      1      185.63    6.24    5.452  0.20( 0.12) 0.60      33.6      88.00
      1      196.12    7.17    5.035  0.20( 0.12) 0.60      39.1      95.00
      1      197.89    7.33    4.969  0.20( 0.12) 0.60      40.0     118.00
      1      200.56    7.58    4.875  0.20( 0.12) 0.60      41.5     138.00
      1      211.69    8.64    4.522  0.20( 0.12) 0.60      47.8      85.00
      1      212.74    8.75    4.490  0.20( 0.12) 0.60      48.4     136.00
      1      212.97    8.77    4.483  0.20( 0.12) 0.60      48.6      97.00
      1      216.38    9.32    4.331  0.20( 0.12) 0.60      51.2      92.00
      1      218.05    9.60    4.257  0.20( 0.12) 0.60      52.6     129.00
      1      220.67   10.11    4.133  0.20( 0.12) 0.60      54.9     134.00
      1      221.01   10.19    4.115  0.20( 0.12) 0.59      55.2     116.00
      1      224.83   11.22    3.894  0.20( 0.12) 0.59      59.6       1.00
      1      222.36   11.53    3.834  0.20( 0.12) 0.59      59.9     114.00
```

```
     1      221.50   11.63    3.815  0.20( 0.12) 0.59      60.0     100.00
     1      217.31   12.12    3.725  0.20( 0.12) 0.59      60.4     127.00
     1      216.45   12.22    3.708  0.20( 0.12) 0.59      60.5     123.00
     1      215.57   12.32    3.691  0.20( 0.12) 0.59      60.5      97.00
     1      211.89   12.69    3.628  0.20( 0.12) 0.59      60.6     120.00
     1      210.69   12.82    3.608  0.20( 0.12) 0.59      60.6     111.00
     2        0.67    5.00    6.187  0.20( 0.02) 0.10       0.1     140.00
     3        5.89    8.03    4.716  0.20( 0.04) 0.20       1.4     141.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      174.53    5.00    6.187  0.20( 0.12) 0.58      27.8     140.00
      2      184.95    5.76    5.708  0.20( 0.12) 0.58      32.0     104.00
      3      191.51    6.24    5.452  0.20( 0.12) 0.58      34.8      88.00
      4      202.28    7.17    5.035  0.20( 0.12) 0.58      40.4      95.00
      5      204.09    7.33    4.969  0.20( 0.12) 0.58      41.4     118.00
      6      206.83    7.58    4.875  0.20( 0.12) 0.58      43.0     138.00
      7      211.67    8.03    4.716  0.20( 0.12) 0.58      45.7     141.00
      8      217.82    8.64    4.522  0.20( 0.12) 0.59      49.3      85.00
      9      218.83    8.75    4.490  0.20( 0.12) 0.59      50.0     136.00
     10      219.05    8.77    4.483  0.20( 0.12) 0.59      50.1      97.00
     11      222.25    9.32    4.331  0.20( 0.12) 0.59      52.8      92.00
     12      223.83    9.60    4.257  0.20( 0.12) 0.59      54.1     129.00
     13      226.27   10.11    4.133  0.20( 0.12) 0.58      56.4     134.00
     14      226.59   10.19    4.115  0.20( 0.12) 0.58      56.8     116.00
     15      230.11   11.22    3.894  0.20( 0.12) 0.58      61.1       1.00
     16      227.55   11.53    3.834  0.20( 0.12) 0.58      61.4     114.00
     17      226.67   11.63    3.815  0.20( 0.12) 0.58      61.5     100.00
     18      222.35   12.12    3.725  0.20( 0.12) 0.58      61.9     127.00
     19      221.47   12.22    3.708  0.20( 0.12) 0.58      62.0     123.00
     20      220.56   12.32    3.691  0.20( 0.12) 0.58      62.0      97.00
     21      216.80   12.69    3.628  0.20( 0.12) 0.58      62.1     120.00
     22      215.57   12.82    3.608  0.20( 0.12) 0.58      62.1     111.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     230.11    Tc(MIN.) =    11.22
  EFFECTIVE AREA(ACRES) =      61.08   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       65.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    143.00 =    3990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  48.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.36
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     230.11
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    145.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   390.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.861
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.772
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.96      0.20     0.600    91   11.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.96   PEAK FLOW RATE(CFS) =      3.16

********************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.20
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.96
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.25
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   1.35   Tc(MIN.) =   13.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.546
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.82      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.82      SUBAREA RUNOFF(CFS) =    5.61
  EFFECTIVE AREA(ACRES) =      2.78    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       8.57

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  17.60
  FLOW VELOCITY(FEET/SEC.) =  3.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    146.00 =     620.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    155.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.20  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.57
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.26
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    148.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.978
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.751
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    91   11.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.87
  TOTAL AREA(ACRES) =      0.27   PEAK FLOW RATE(CFS) =      0.87

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    149.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    512.00  DOWNSTREAM(FEET) =    508.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0160
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.574
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.27      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =   13.03
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.82
  EFFECTIVE AREA(ACRES) =      0.54     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =   4.27
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    149.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   508.00  DOWNSTREAM(FEET) =   506.30
  FLOW LENGTH(FEET) =   335.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   14.73
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.73
  RAINFALL INTENSITY(INCH/HR) =   3.33
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.54
  TOTAL STREAM AREA(ACRES) =       0.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    513.00  DOWNSTREAM(FEET) =    509.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.912
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.443
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    8.91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.62
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.41

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65   14.73    3.331  0.20( 0.18) 0.90       0.5     147.00
      2        2.41    8.91    4.443  0.20( 0.12) 0.60       0.6      10.00
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.76    8.91    4.443  0.20( 0.14) 0.70       0.9      10.00
      2        3.44   14.73    3.331  0.20( 0.15) 0.74       1.2     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.76    Tc(MIN.) =     8.91
  EFFECTIVE AREA(ACRES) =       0.95   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    150.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.30  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.76
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    9.13
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.76    9.13    4.382  0.20( 0.14) 0.70       0.9      10.00
      2        3.44   14.95    3.303  0.20( 0.15) 0.74       1.2     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.57   13.26    3.539  0.20( 0.12) 0.60       2.8     144.00
  LONGEST FLOWPATH FROM NODE    144.00 TO NODE    155.00 =     660.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
    TOTAL AREA(ACRES) =         3.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       12.11  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      3.88  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   180.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    513.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.637
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.854
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.08      0.20     0.500    91    7.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.08   PEAK FLOW RATE(CFS) =      0.34

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   513.00  DOWNSTREAM(FEET) =   509.70
  FLOW LENGTH(FEET) =   330.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.61
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.34
  PIPE TRAVEL TIME(MIN.) =   2.10    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.74
  RAINFALL INTENSITY(INCH/HR) =   4.22
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       0.08
  TOTAL STREAM AREA(ACRES) =       0.08
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.34

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    515.00  DOWNSTREAM(FEET) =    512.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.266
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.69      0.20     0.500    91    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.59

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  512.00  DOWNSTREAM ELEVATION(FEET) =  509.70
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =   10.10
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =   10.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.095
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.11      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.40
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  2.86   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  LONGEST FLOWPATH FROM NODE    152.00 TO NODE    154.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.28
  RAINFALL INTENSITY(INCH/HR) =   4.09
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.88
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.34    9.74    4.222  0.20( 0.10) 0.50       0.1     147.00
      2        2.88   10.28    4.095  0.20( 0.09) 0.44       0.8     152.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.16    9.74    4.222  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.28    4.095  0.20( 0.09) 0.45       0.9     152.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.22    Tc(MIN.) =    10.28
  EFFECTIVE AREA(ACRES) =       0.88   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        0.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    154.00 =     510.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   509.70  DOWNSTREAM(FEET) =   506.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.22
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.16    9.79    4.210  0.20( 0.09) 0.45       0.8     147.00
      2        3.22   10.33    4.083  0.20( 0.09) 0.45       0.9     152.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     545.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.12    9.13    4.382  0.20( 0.13) 0.63       2.9      10.00
      2       12.11   13.26    3.539  0.20( 0.13) 0.64       3.9     144.00
      3       11.42   14.95    3.303  0.20( 0.13) 0.64       3.9     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.19    9.13    4.382  0.20( 0.12) 0.59       3.6      10.00
      2       14.44    9.79    4.210  0.20( 0.12) 0.59       3.9     147.00
      3       14.62   10.33    4.083  0.20( 0.12) 0.59       4.0     152.00
      4       14.88   13.26    3.539  0.20( 0.12) 0.60       4.8     144.00
      5       14.01   14.95    3.303  0.20( 0.12) 0.61       4.8     147.00
    TOTAL AREA(ACRES) =         4.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       14.88  Tc(MIN.) =   13.258
  EFFECTIVE AREA(ACRES) =      4.76  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    155.00 =     940.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    155.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   506.00  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.21
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.88
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   13.66
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.66
  RAINFALL INTENSITY(INCH/HR) =   3.48
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       4.76
  TOTAL STREAM AREA(ACRES) =       4.82
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.88

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.018
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.175
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.23      0.20     0.200    91    5.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.02
 RAINFALL INTENSITY(INCH/HR) =   6.17
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.23
 TOTAL STREAM AREA(ACRES) =       0.23
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.27

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.19    9.53    4.275  0.20( 0.12) 0.59       3.6      10.00
     1       14.44   10.19    4.114  0.20( 0.12) 0.59       3.9     147.00
     1       14.62   10.73    3.996  0.20( 0.12) 0.59       4.0     152.00
     1       14.88   13.66    3.479  0.20( 0.12) 0.60       4.8     144.00
     1       14.01   15.36    3.253  0.20( 0.12) 0.61       4.8     147.00
     2        1.27    5.02    6.175  0.20( 0.04) 0.20       0.2     150.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.16    5.02    6.175  0.20( 0.11) 0.55       2.1     150.00
     2       15.07    9.53    4.275  0.20( 0.11) 0.57       3.9      10.00
     3       15.29   10.19    4.114  0.20( 0.11) 0.57       4.1     147.00
     4       15.44   10.73    3.996  0.20( 0.11) 0.57       4.3     152.00
     5       15.60   13.66    3.479  0.20( 0.12) 0.58       5.0     144.00
     6       14.67   15.36    3.253  0.20( 0.12) 0.59       5.1     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.60    Tc(MIN.) =    13.66
 EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =        5.1
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    156.00 =    1160.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.48
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.60
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.69
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   13.69
 RAINFALL INTENSITY(INCH/HR) =   3.47
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.58
 EFFECTIVE STREAM AREA(ACRES) =       4.99
 TOTAL STREAM AREA(ACRES) =       5.05
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.60
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE    157.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    501.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.813
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.30      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.30
  TOTAL STREAM AREA(ACRES) =       0.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.16    5.05    6.150  0.20( 0.11) 0.55       2.1     150.00
      1       15.07    9.57    4.266  0.20( 0.11) 0.57       3.9      10.00
      1       15.29   10.23    4.106  0.20( 0.11) 0.57       4.1     147.00
      1       15.44   10.76    3.988  0.20( 0.11) 0.57       4.3     152.00
      1       15.60   13.69    3.474  0.20( 0.12) 0.58       5.0     144.00
      1       14.67   15.39    3.249  0.20( 0.12) 0.59       5.1     147.00
      2        1.56    5.58    5.813  0.20( 0.04) 0.20       0.3      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.65    5.05    6.150  0.20( 0.10) 0.51       2.4     150.00
      2       14.05    5.58    5.813  0.20( 0.10) 0.51       2.6      14.00
      3       16.21    9.57    4.266  0.20( 0.11) 0.54       4.2      10.00
      4       16.38   10.23    4.106  0.20( 0.11) 0.55       4.4     147.00
      5       16.51   10.76    3.988  0.20( 0.11) 0.55       4.6     152.00
      6       16.52   13.69    3.474  0.20( 0.11) 0.56       5.3     144.00
      7       15.54   15.39    3.249  0.20( 0.11) 0.57       5.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.52    Tc(MIN.) =    13.69
  EFFECTIVE AREA(ACRES) =       5.29   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =        5.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    157.00 =    1185.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    158.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.00  DOWNSTREAM(FEET) =   495.00
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.52
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   13.97
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.97
  RAINFALL INTENSITY(INCH/HR) =   3.43
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.56
  EFFECTIVE STREAM AREA(ACRES) =       5.29
  TOTAL STREAM AREA(ACRES) =       5.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.52

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    509.70  DOWNSTREAM(FEET) =    502.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.553
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.826
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.26      0.20     0.200    91    5.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    158.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  502.00  DOWNSTREAM ELEVATION(FEET) =  495.00
  STREET LENGTH(FEET) =   195.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

```
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    7.40
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.36
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
 STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    6.52
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.314
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.26      0.20     0.100    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.26      SUBAREA RUNOFF(CFS) =    1.24
 EFFECTIVE AREA(ACRES) =      0.52    AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
 TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       2.47

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
 FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
 LONGEST FLOWPATH FROM NODE    154.00 TO NODE    158.00 =     420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    158.00 TO NODE    158.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.52
 RAINFALL INTENSITY(INCH/HR) =   5.31
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.15
 EFFECTIVE STREAM AREA(ACRES) =       0.52
 TOTAL STREAM AREA(ACRES) =       0.52
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.47

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.65    5.34    5.959  0.20( 0.10) 0.51       2.4     150.00
     1       14.05    5.86    5.649  0.20( 0.10) 0.51       2.6      14.00
     1       16.21    9.84    4.197  0.20( 0.11) 0.54       4.2      10.00
     1       16.38   10.50    4.044  0.20( 0.11) 0.55       4.4     147.00
     1       16.51   11.04    3.931  0.20( 0.11) 0.55       4.6     152.00
     1       16.52   13.97    3.434  0.20( 0.11) 0.56       5.3     144.00
     1       15.54   15.67    3.215  0.20( 0.11) 0.57       5.4     147.00
     2        2.47    6.52    5.314  0.20( 0.03) 0.15       0.5     154.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.92    5.34    5.959  0.20( 0.09) 0.46       2.8     150.00
     2       16.42    5.86    5.649  0.20( 0.09) 0.46       3.1      14.00
     3       16.88    6.52    5.314  0.20( 0.09) 0.46       3.4     154.00
     4       18.16    9.84    4.197  0.20( 0.10) 0.50       4.7      10.00
     5       18.26   10.50    4.044  0.20( 0.10) 0.50       4.9     147.00
     6       18.33   11.04    3.931  0.20( 0.10) 0.51       5.1     152.00
     7       18.12   13.97    3.434  0.20( 0.10) 0.52       5.8     144.00
     8       17.03   15.67    3.215  0.20( 0.11) 0.53       5.9     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      18.33    Tc(MIN.) =    11.04
  EFFECTIVE AREA(ACRES) =       5.09   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.9
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    158.00 =    1375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.33
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.40  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.009
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.415
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.24      0.20     0.600    91    9.01
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.79
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      4.79

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.01
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.24
  TOTAL STREAM AREA(ACRES) =       1.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.79

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    500.50  DOWNSTREAM(FEET) =    495.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.976
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.425
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"        D        0.68      0.20     0.600    91    8.98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.63
  TOTAL AREA(ACRES) =      0.68   PEAK FLOW RATE(CFS) =      2.63

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   4.42
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.68
  TOTAL STREAM AREA(ACRES) =       0.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.63

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.79    9.01    4.415  0.20( 0.12) 0.60       1.2     159.00
      2        2.63    8.98    4.425  0.20( 0.12) 0.60       0.7     160.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.42    8.98    4.425  0.20( 0.12) 0.60       1.9     160.00
      2        7.42    9.01    4.415  0.20( 0.12) 0.60       1.9     159.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.42    Tc(MIN.) =     9.01
  EFFECTIVE AREA(ACRES) =       1.92   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    161.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   495.00  DOWNSTREAM(FEET) =   494.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.42
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.19
  LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.42    9.16    4.374  0.20( 0.12) 0.60       1.9     160.00
     2        7.42    9.19    4.365  0.20( 0.12) 0.60       1.9     159.00
 LONGEST FLOWPATH FROM NODE    159.00 TO NODE    162.00 =     375.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.92    5.41    5.912  0.20( 0.09) 0.46       2.8     150.00
     2       16.42    5.93    5.609  0.20( 0.09) 0.46       3.1      14.00
     3       16.88    6.59    5.280  0.20( 0.09) 0.46       3.4     154.00
     4       18.16    9.92    4.179  0.20( 0.10) 0.50       4.7      10.00
     5       18.26   10.58    4.028  0.20( 0.10) 0.50       4.9     147.00
     6       18.33   11.11    3.916  0.20( 0.10) 0.51       5.1     152.00
     7       18.12   14.04    3.424  0.20( 0.10) 0.52       5.8     144.00
     8       17.03   15.74    3.207  0.20( 0.11) 0.53       5.9     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.90    5.41    5.912  0.20( 0.10) 0.50       4.0     150.00
     2       22.62    5.93    5.609  0.20( 0.10) 0.50       4.4      14.00
     3       23.37    6.59    5.280  0.20( 0.10) 0.50       4.8     154.00
     4       25.29    9.16    4.374  0.20( 0.10) 0.52       6.3     160.00
     5       25.30    9.19    4.365  0.20( 0.11) 0.53       6.3     159.00
     6       25.26    9.92    4.179  0.20( 0.11) 0.53       6.6      10.00
     7       25.09   10.58    4.028  0.20( 0.11) 0.53       6.8     147.00
     8       24.97   11.11    3.916  0.20( 0.11) 0.53       7.0     152.00
     9       23.89   14.04    3.424  0.20( 0.11) 0.54       7.7     144.00
    10       22.43   15.74    3.207  0.20( 0.11) 0.55       7.8     147.00
   TOTAL AREA(ACRES) =         7.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       25.30  Tc(MIN.) =    9.190
 EFFECTIVE AREA(ACRES) =      6.33  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =        7.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    162.00 =    1420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    162.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   494.00  DOWNSTREAM(FEET) =   486.50
 FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.25
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      25.30
 PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    9.40
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
```

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE    163.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    500.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.881
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.452
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.28      0.20     0.600    91    8.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.99
  TOTAL AREA(ACRES) =      1.28   PEAK FLOW RATE(CFS) =      4.99

********************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  31
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.50  DOWNSTREAM(FEET) =   497.50
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

********************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.28
  TOTAL STREAM AREA(ACRES) =       1.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.99

********************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE    164.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.965
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.738
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.21      0.20     0.500    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      5.05
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      5.05

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    164.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   4.74
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.21
  TOTAL STREAM AREA(ACRES) =       1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.05

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.99    9.36    4.321  0.20( 0.12) 0.60       1.3      17.00
      2        5.05    7.97    4.738  0.20( 0.10) 0.50       1.2      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        9.72    7.97    4.738  0.20( 0.11) 0.55       2.3      16.00
      2        9.59    9.36    4.321  0.20( 0.11) 0.55       2.5      17.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.72    Tc(MIN.) =     7.97
  EFFECTIVE AREA(ACRES) =       2.30   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    164.00 =     490.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   486.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.72
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.01
  LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        9.72    8.01    4.723  0.20( 0.11) 0.55       2.3      16.00
    2        9.59    9.40    4.309  0.20( 0.11) 0.55       2.5      17.00
 LONGEST FLOWPATH FROM NODE     17.00 TO NODE    165.00 =     545.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       21.90    5.63    5.781  0.20( 0.10) 0.50       4.0     150.00
    2       22.62    6.15    5.496  0.20( 0.10) 0.50       4.4      14.00
    3       23.37    6.81    5.185  0.20( 0.10) 0.50       4.8     154.00
    4       25.29    9.37    4.318  0.20( 0.10) 0.52       6.3     160.00
    5       25.30    9.40    4.309  0.20( 0.11) 0.53       6.3     159.00
    6       25.26   10.13    4.129  0.20( 0.11) 0.53       6.6      10.00
    7       25.09   10.79    3.983  0.20( 0.11) 0.53       6.8     147.00
    8       24.97   11.32    3.874  0.20( 0.11) 0.53       7.0     152.00
    9       23.89   14.25    3.395  0.20( 0.11) 0.54       7.7     144.00
   10       22.43   15.96    3.182  0.20( 0.11) 0.55       7.8     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       30.30    5.63    5.781  0.20( 0.10) 0.51       5.6     150.00
    2       31.33    6.15    5.496  0.20( 0.10) 0.51       6.1      14.00
    3       32.45    6.81    5.185  0.20( 0.10) 0.52       6.8     154.00
    4       33.99    8.01    4.723  0.20( 0.10) 0.52       7.8      16.00
    5       34.88    9.37    4.318  0.20( 0.11) 0.53       8.8     160.00
    6       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8     159.00
    7       34.89    9.40    4.309  0.20( 0.11) 0.53       8.8      17.00
    8       34.43   10.13    4.129  0.20( 0.11) 0.54       9.1      10.00
    9       33.94   10.79    3.983  0.20( 0.11) 0.54       9.3     147.00
   10       33.56   11.32    3.874  0.20( 0.11) 0.54       9.5     152.00
   11       31.39   14.25    3.395  0.20( 0.11) 0.55      10.2     144.00
   12       29.44   15.96    3.182  0.20( 0.11) 0.55      10.3     147.00
  TOTAL AREA(ACRES) =        10.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       34.89  Tc(MIN.) =    9.400
 EFFECTIVE AREA(ACRES) =      8.82  AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
 TOTAL AREA(ACRES) =       10.3
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    165.00 =    1600.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    167.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   486.50  DOWNSTREAM(FEET) =   484.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.66
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.89
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.45
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.45
  RAINFALL INTENSITY(INCH/HR) =   4.30
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       8.82
  TOTAL STREAM AREA(ACRES) =      10.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.89

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE    166.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    506.30  DOWNSTREAM(FEET) =    498.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.100
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.521
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20     0.100    91    6.10
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.44
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.44

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  498.00  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   335.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    7.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.98
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    7.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.863
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.44      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.44      SUBAREA RUNOFF(CFS) =    1.91
  EFFECTIVE AREA(ACRES) =      0.73    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.17

  END OF SUBAREA STREET FLOW HYDRAULICS:
```

```
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.93
  FLOW VELOCITY(FEET/SEC.) =  3.97   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE    167.00 =     635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.61
  RAINFALL INTENSITY(INCH/HR) =   4.86
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.17

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    167.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.00  DOWNSTREAM(FEET) =    484.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.043
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.157
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    91    5.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      1.71

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    167.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.04
  RAINFALL INTENSITY(INCH/HR) =   6.16
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.31
  TOTAL STREAM AREA(ACRES) =       0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.30    5.68    5.750  0.20( 0.10) 0.51        5.6     150.00
      1       31.33    6.20    5.469  0.20( 0.10) 0.51        6.1      14.00
      1       32.45    6.86    5.162  0.20( 0.10) 0.52        6.8     154.00
      1       33.99    8.06    4.706  0.20( 0.10) 0.52        7.8      16.00
      1       34.88    9.42    4.305  0.20( 0.11) 0.53        8.8     160.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53        8.8     159.00
      1       34.89    9.45    4.296  0.20( 0.11) 0.53        8.8      17.00
      1       34.43   10.18    4.117  0.20( 0.11) 0.54        9.1      10.00
      1       33.94   10.84    3.972  0.20( 0.11) 0.54        9.3     147.00
      1       33.56   11.37    3.864  0.20( 0.11) 0.54        9.5     152.00
```

```
     1       31.39   14.31    3.388  0.20( 0.11) 0.55      10.2     144.00
     1       29.44   16.01    3.176  0.20( 0.11) 0.55      10.3     147.00
     2        3.17    7.61    4.863  0.20( 0.03) 0.16       0.7      19.00
     3        1.71    5.04    6.157  0.20( 0.02) 0.10       0.3     161.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.20    5.04    6.157  0.20( 0.09) 0.46       5.8     161.00
      2       34.70    5.68    5.750  0.20( 0.09) 0.46       6.4     150.00
      3       35.76    6.20    5.469  0.20( 0.09) 0.47       7.0      14.00
      4       36.93    6.86    5.162  0.20( 0.09) 0.47       7.7     154.00
      5       37.94    7.61    4.863  0.20( 0.09) 0.47       8.5      19.00
      6       38.37    8.06    4.706  0.20( 0.10) 0.48       8.9      16.00
      7       38.88    9.42    4.305  0.20( 0.10) 0.49       9.8     160.00
      8       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9     159.00
      9       38.89    9.45    4.296  0.20( 0.10) 0.49       9.9      17.00
     10       38.26   10.18    4.117  0.20( 0.10) 0.50      10.1      10.00
     11       37.63   10.84    3.972  0.20( 0.10) 0.50      10.4     147.00
     12       37.15   11.37    3.864  0.20( 0.10) 0.50      10.5     152.00
     13       34.54   14.31    3.388  0.20( 0.10) 0.51      11.3     144.00
     14       32.39   16.01    3.176  0.20( 0.10) 0.51      11.3     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.89    Tc(MIN.) =     9.45
  EFFECTIVE AREA(ACRES) =       9.86   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       11.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    167.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.01
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.89
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.709
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.85      0.20     0.600    91    8.05
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.51
  TOTAL AREA(ACRES) =      0.85   PEAK FLOW RATE(CFS) =      3.51

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.05
  RAINFALL INTENSITY(INCH/HR) =   4.71
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.85
  TOTAL STREAM AREA(ACRES) =       0.85
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.51

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    483.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.161
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.673
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.99      0.20     0.600    91    8.16
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.99   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.16
  RAINFALL INTENSITY(INCH/HR) =   4.67
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.99
  TOTAL STREAM AREA(ACRES) =       0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.51    8.05    4.709  0.20( 0.12) 0.60       0.9     168.00
      2        4.06    8.16    4.673  0.20( 0.12) 0.60       1.0     169.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        7.54    8.05    4.709  0.20( 0.12) 0.60       1.8     168.00
    2        7.54    8.16    4.673  0.20( 0.12) 0.60       1.8     169.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.54    Tc(MIN.) =     8.05
  EFFECTIVE AREA(ACRES) =       1.83   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    170.00 =     295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.00  DOWNSTREAM(FEET) =   481.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.54
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        7.54    8.19    4.663  0.20( 0.12) 0.60       1.8     168.00
      2        7.54    8.30    4.628  0.20( 0.12) 0.60       1.8     169.00
  LONGEST FLOWPATH FROM NODE    168.00 TO NODE    171.00 =     370.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.20    5.11    6.113  0.20( 0.09) 0.46       5.8     161.00
      2       34.70    5.74    5.715  0.20( 0.09) 0.46       6.4     150.00
      3       35.76    6.26    5.439  0.20( 0.09) 0.47       7.0      14.00
      4       36.93    6.92    5.136  0.20( 0.09) 0.47       7.7     154.00
      5       37.94    7.67    4.842  0.20( 0.09) 0.47       8.5      19.00
      6       38.37    8.12    4.686  0.20( 0.10) 0.48       8.9      16.00
      7       38.88    9.48    4.289  0.20( 0.10) 0.49       9.8     160.00
      8       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9     159.00
      9       38.89    9.51    4.281  0.20( 0.10) 0.49       9.9      17.00
     10       38.26   10.24    4.104  0.20( 0.10) 0.50      10.1      10.00
     11       37.63   10.90    3.960  0.20( 0.10) 0.50      10.4     147.00
     12       37.15   11.43    3.852  0.20( 0.10) 0.50      10.5     152.00
     13       34.54   14.37    3.380  0.20( 0.10) 0.51      11.3     144.00
     14       32.39   16.08    3.169  0.20( 0.10) 0.51      11.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.41    5.11    6.113  0.20( 0.10) 0.48       6.9     161.00
      2       41.21    5.74    5.715  0.20( 0.10) 0.49       7.7     150.00
      3       42.52    6.26    5.439  0.20( 0.10) 0.49       8.4      14.00
      4       43.96    6.92    5.136  0.20( 0.10) 0.49       9.3     154.00
      5       45.28    7.67    4.842  0.20( 0.10) 0.50      10.2      19.00
      6       45.89    8.12    4.686  0.20( 0.10) 0.50      10.7      16.00
      7       45.94    8.19    4.663  0.20( 0.10) 0.50      10.7     168.00
      8       45.98    8.30    4.628  0.20( 0.10) 0.50      10.8     169.00
      9       45.86    9.48    4.289  0.20( 0.10) 0.51      11.7     160.00
```

```
    10       45.85    9.51    4.281  0.20( 0.10) 0.51      11.7     159.00
    11       45.84    9.51    4.281  0.20( 0.10) 0.51      11.7      17.00
    12       44.92   10.24    4.104  0.20( 0.10) 0.51      12.0      10.00
    13       44.05   10.90    3.960  0.20( 0.10) 0.51      12.2     147.00
    14       43.39   11.43    3.852  0.20( 0.10) 0.51      12.4     152.00
    15       39.99   14.37    3.380  0.20( 0.10) 0.52      13.1     144.00
    16       37.49   16.08    3.169  0.20( 0.10) 0.52      13.2     147.00
   TOTAL AREA(ACRES) =        13.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       45.98  Tc(MIN.) =    8.299
  EFFECTIVE AREA(ACRES) =     10.82  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       13.2
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    171.00 =    1710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    171.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   472.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.98
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.98
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    8.50
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.50
  RAINFALL INTENSITY(INCH/HR) =   4.57
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      10.82
  TOTAL STREAM AREA(ACRES) =      13.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.98

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    172.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    472.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.28      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
 SUBAREA RUNOFF(CFS) =      1.55
 TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      1.55

****************************************************************************
 FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.00
 RAINFALL INTENSITY(INCH/HR) =   6.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.28
 TOTAL STREAM AREA(ACRES) =       0.28
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.55

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.41    5.32    5.973  0.20( 0.10) 0.48       6.9     161.00
     1       41.21    5.95    5.599  0.20( 0.10) 0.49       7.7     150.00
     1       42.52    6.47    5.337  0.20( 0.10) 0.49       8.4      14.00
     1       43.96    7.13    5.049  0.20( 0.10) 0.49       9.3     154.00
     1       45.28    7.87    4.770  0.20( 0.10) 0.50      10.2      19.00
     1       45.89    8.32    4.621  0.20( 0.10) 0.50      10.7      16.00
     1       45.94    8.39    4.599  0.20( 0.10) 0.50      10.7     168.00
     1       45.98    8.50    4.565  0.20( 0.10) 0.50      10.8     169.00
     1       45.86    9.68    4.238  0.20( 0.10) 0.51      11.7     160.00
     1       45.85    9.71    4.230  0.20( 0.10) 0.51      11.7     159.00
     1       45.84    9.71    4.230  0.20( 0.10) 0.51      11.7      17.00
     1       44.92   10.45    4.056  0.20( 0.10) 0.51      12.0      10.00
     1       44.05   11.11    3.917  0.20( 0.10) 0.51      12.2     147.00
     1       43.39   11.64    3.812  0.20( 0.10) 0.51      12.4     152.00
     1       39.99   14.58    3.351  0.20( 0.10) 0.52      13.1     144.00
     1       37.49   16.29    3.145  0.20( 0.10) 0.52      13.2     147.00
     2        1.55    5.00    6.187  0.20( 0.02) 0.10       0.3     170.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.96    5.00    6.187  0.20( 0.09) 0.47       6.8     170.00
     2       40.91    5.32    5.973  0.20( 0.09) 0.47       7.2     161.00
     3       42.62    5.95    5.599  0.20( 0.09) 0.47       8.0     150.00
     4       43.86    6.47    5.337  0.20( 0.10) 0.48       8.7      14.00
     5       45.23    7.13    5.049  0.20( 0.10) 0.48       9.5     154.00
     6       46.48    7.87    4.770  0.20( 0.10) 0.48      10.4      19.00
     7       47.05    8.32    4.621  0.20( 0.10) 0.49      10.9      16.00
     8       47.10    8.39    4.599  0.20( 0.10) 0.49      11.0     168.00
     9       47.12    8.50    4.565  0.20( 0.10) 0.49      11.1     169.00
    10       46.92    9.68    4.238  0.20( 0.10) 0.50      12.0     160.00
    11       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0     159.00
    12       46.91    9.71    4.230  0.20( 0.10) 0.50      12.0      17.00
    13       45.94   10.45    4.056  0.20( 0.10) 0.50      12.3      10.00
    14       45.03   11.11    3.917  0.20( 0.10) 0.50      12.5     147.00
    15       44.35   11.64    3.812  0.20( 0.10) 0.50      12.7     152.00
    16       40.83   14.58    3.351  0.20( 0.10) 0.51      13.4     144.00
    17       38.27   16.29    3.145  0.20( 0.10) 0.51      13.4     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      47.12    Tc(MIN.) =     8.50
 EFFECTIVE AREA(ACRES) =      11.10   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
 TOTAL AREA(ACRES) =       13.4
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    172.00 =    1915.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   472.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.12
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.56
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.943
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.81      0.20     0.200    91    5.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      4.06
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      4.06

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.94
  RAINFALL INTENSITY(INCH/HR) =   5.60
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.06

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    175.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    470.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.576
```

```
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.812
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.51      0.20      0.100    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.66
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.66

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.58
  RAINFALL INTENSITY(INCH/HR) =   5.81
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.66

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.06    5.94    5.604  0.20( 0.04) 0.20       0.8     173.00
      2        2.66    5.58    5.812  0.20( 0.02) 0.10       0.5     174.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        6.61    5.58    5.812  0.20( 0.03) 0.16       1.3     174.00
      2        6.62    5.94    5.604  0.20( 0.03) 0.16       1.3     173.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.62    Tc(MIN.) =     5.94
  EFFECTIVE AREA(ACRES) =       1.32   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =        1.3
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    176.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.62
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.09
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.61    5.72    5.728  0.20( 0.03) 0.16       1.3     174.00
     2        6.62    6.09    5.528  0.20( 0.03) 0.16       1.3     173.00
 LONGEST FLOWPATH FROM NODE    173.00 TO NODE    176.00 =     375.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.96    5.06    6.142  0.20( 0.09) 0.47       6.8     170.00
     2       40.91    5.38    5.932  0.20( 0.09) 0.47       7.2     161.00
     3       42.62    6.02    5.564  0.20( 0.09) 0.47       8.0     150.00
     4       43.86    6.54    5.307  0.20( 0.10) 0.48       8.7      14.00
     5       45.23    7.19    5.024  0.20( 0.10) 0.48       9.5     154.00
     6       46.48    7.94    4.748  0.20( 0.10) 0.48      10.4      19.00
     7       47.05    8.38    4.601  0.20( 0.10) 0.49      10.9      16.00
     8       47.10    8.46    4.579  0.20( 0.10) 0.49      11.0     168.00
     9       47.12    8.56    4.546  0.20( 0.10) 0.49      11.1     169.00
    10       46.92    9.74    4.222  0.20( 0.10) 0.50      12.0     160.00
    11       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0     159.00
    12       46.91    9.77    4.214  0.20( 0.10) 0.50      12.0      17.00
    13       45.94   10.51    4.042  0.20( 0.10) 0.50      12.3      10.00
    14       45.03   11.17    3.904  0.20( 0.10) 0.50      12.5     147.00
    15       44.35   11.71    3.800  0.20( 0.10) 0.50      12.7     152.00
    16       40.83   14.64    3.343  0.20( 0.10) 0.51      13.4     144.00
    17       38.27   16.35    3.138  0.20( 0.10) 0.51      13.4     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       46.24    5.06    6.142  0.20( 0.08) 0.42       7.9     170.00
     2       47.35    5.38    5.932  0.20( 0.08) 0.42       8.4     161.00
     3       48.42    5.72    5.728  0.20( 0.09) 0.43       8.9     174.00
     4       49.24    6.02    5.564  0.20( 0.09) 0.43       9.3     150.00
     5       49.40    6.09    5.528  0.20( 0.09) 0.43       9.4     173.00
     6       50.21    6.54    5.307  0.20( 0.09) 0.43      10.0      14.00
     7       51.24    7.19    5.024  0.20( 0.09) 0.44      10.9     154.00
     8       52.16    7.94    4.748  0.20( 0.09) 0.45      11.8      19.00
     9       52.55    8.38    4.601  0.20( 0.09) 0.45      12.3      16.00
    10       52.57    8.46    4.579  0.20( 0.09) 0.45      12.3     168.00
    11       52.56    8.56    4.546  0.20( 0.09) 0.46      12.4     169.00
    12       51.97    9.74    4.222  0.20( 0.09) 0.47      13.3     160.00
    13       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3     159.00
    14       51.94    9.77    4.214  0.20( 0.09) 0.47      13.3      17.00
    15       50.77   10.51    4.042  0.20( 0.09) 0.47      13.6      10.00
    16       49.69   11.17    3.904  0.20( 0.09) 0.47      13.8     147.00
    17       48.89   11.71    3.800  0.20( 0.09) 0.47      14.0     152.00
    18       44.82   14.64    3.343  0.20( 0.10) 0.48      14.7     144.00
    19       42.01   16.35    3.138  0.20( 0.10) 0.48      14.8     147.00
   TOTAL AREA(ACRES) =        14.8

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       52.57  Tc(MIN.) =    8.455
 EFFECTIVE AREA(ACRES) =     12.33  AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =       14.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    176.00 =    1985.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    176.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    176.00 TO NODE    178.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   458.40
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.28
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.57
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    178.00 =    2300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   4.48
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.45
  EFFECTIVE STREAM AREA(ACRES) =      12.33
  TOTAL STREAM AREA(ACRES) =      14.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      52.57

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    458.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.705
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.43      0.20     0.100    91    5.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.21
  TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      2.21

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.70
  RAINFALL INTENSITY(INCH/HR) =   5.74
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.43
  TOTAL STREAM AREA(ACRES) =       0.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.21

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    472.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.580
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.810
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    5.58
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.77
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    178.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  472.40  DOWNSTREAM ELEVATION(FEET) =  458.40
  STREET LENGTH(FEET) =   385.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.79
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.76   Tc(MIN.) =    7.34
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.966
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =      0.80    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.75
  FLOW VELOCITY(FEET/SEC.) =  3.82   DEPTH*VELOCITY(FT*FT/SEC.) =   1.13
  LONGEST FLOWPATH FROM NODE    167.00 TO NODE    178.00 =     645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    178.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   4.97
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
```

EFFECTIVE STREAM AREA(ACRES) = 0.80
TOTAL STREAM AREA(ACRES) = 0.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.55

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	46.24	5.42	5.905	0.20(0.08)	0.42	7.9	170.00
1	47.35	5.74	5.716	0.20(0.08)	0.42	8.4	161.00
1	48.42	6.08	5.533	0.20(0.09)	0.43	8.9	174.00
1	49.24	6.37	5.383	0.20(0.09)	0.43	9.3	150.00
1	49.40	6.44	5.350	0.20(0.09)	0.43	9.4	173.00
1	50.21	6.89	5.148	0.20(0.09)	0.43	10.0	14.00
1	51.24	7.55	4.886	0.20(0.09)	0.44	10.9	154.00
1	52.16	8.28	4.634	0.20(0.09)	0.45	11.8	19.00
1	52.55	8.73	4.496	0.20(0.09)	0.45	12.3	16.00
1	52.57	8.80	4.476	0.20(0.09)	0.45	12.3	168.00
1	52.56	8.91	4.444	0.20(0.09)	0.46	12.4	169.00
1	51.97	10.09	4.139	0.20(0.09)	0.47	13.3	160.00
1	51.94	10.12	4.131	0.20(0.09)	0.47	13.3	159.00
1	51.94	10.12	4.131	0.20(0.09)	0.47	13.3	17.00
1	50.77	10.87	3.966	0.20(0.09)	0.47	13.6	10.00
1	49.69	11.53	3.834	0.20(0.09)	0.47	13.8	147.00
1	48.89	12.06	3.735	0.20(0.09)	0.47	14.0	152.00
1	44.82	15.00	3.297	0.20(0.10)	0.48	14.7	144.00
1	42.01	16.72	3.098	0.20(0.10)	0.48	14.8	147.00
2	2.21	5.70	5.737	0.20(0.02)	0.10	0.4	175.00
3	3.55	7.34	4.966	0.20(0.04)	0.20	0.8	167.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	51.52	5.42	5.905	0.20(0.08)	0.39	8.9	170.00
2	52.62	5.70	5.737	0.20(0.08)	0.39	9.4	175.00
3	52.75	5.74	5.716	0.20(0.08)	0.40	9.4	161.00
4	53.83	6.08	5.533	0.20(0.08)	0.40	10.0	174.00
5	54.65	6.37	5.383	0.20(0.08)	0.40	10.4	150.00
6	54.82	6.44	5.350	0.20(0.08)	0.40	10.6	173.00
7	55.65	6.89	5.148	0.20(0.08)	0.41	11.2	14.00
8	56.37	7.34	4.966	0.20(0.08)	0.41	11.8	167.00
9	56.61	7.55	4.886	0.20(0.08)	0.41	12.1	154.00
10	57.26	8.28	4.634	0.20(0.08)	0.42	13.0	19.00
11	57.49	8.73	4.496	0.20(0.09)	0.43	13.5	16.00
12	57.49	8.80	4.476	0.20(0.09)	0.43	13.6	168.00
13	57.44	8.91	4.444	0.20(0.09)	0.43	13.7	169.00
14	56.51	10.09	4.139	0.20(0.09)	0.44	14.5	160.00
15	56.48	10.12	4.131	0.20(0.09)	0.44	14.5	159.00
16	56.48	10.12	4.131	0.20(0.09)	0.44	14.5	17.00
17	55.13	10.87	3.966	0.20(0.09)	0.44	14.8	10.00
18	53.90	11.53	3.834	0.20(0.09)	0.45	15.0	147.00
19	52.99	12.06	3.735	0.20(0.09)	0.45	15.2	152.00
20	48.43	15.00	3.297	0.20(0.09)	0.46	15.9	144.00
21	45.41	16.72	3.098	0.20(0.09)	0.46	16.0	147.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 57.49 Tc(MIN.) = 8.73
EFFECTIVE AREA(ACRES) = 13.49 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 16.0
LONGEST FLOWPATH FROM NODE 147.00 TO NODE 178.00 = 2300.00 FEET.

****
FLOW PROCESS FROM NODE 178.00 TO NODE 193.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==
ELEVATION DATA: UPSTREAM(FEET) = 458.40 DOWNSTREAM(FEET) = 456.00

```
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.84
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.49
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.79
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    180.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.197
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.661
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.67      0.20     0.500    91    8.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.75
  TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.69
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =    9.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.315
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.50      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.89
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```
  EFFECTIVE AREA(ACRES) =      1.17    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       4.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.50
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE    179.00 TO NODE    183.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.38
  RAINFALL INTENSITY(INCH/HR) =   4.31
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       1.17
  TOTAL STREAM AREA(ACRES) =       1.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.43

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    182.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.00  DOWNSTREAM(FEET) =    463.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.618
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.12      0.20     0.600    91    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.53
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.53

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    183.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  463.50  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   325.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.30
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.88
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.188
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        1.02      0.20     0.600    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.73
 EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       7.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.37
 FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    183.00 TO NODE    183.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.88
 RAINFALL INTENSITY(INCH/HR) =   4.19
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.14
 TOTAL STREAM AREA(ACRES) =       2.14
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        4.43    9.38    4.315  0.20( 0.11) 0.54       1.2     179.00
     2        7.83    9.88    4.188  0.20( 0.12) 0.60       2.1     181.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.10    9.38    4.315  0.20( 0.12) 0.58       3.2     179.00
     2       12.13    9.88    4.188  0.20( 0.12) 0.58       3.3     181.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.13    Tc(MIN.) =     9.88
 EFFECTIVE AREA(ACRES) =       3.31   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
 TOTAL AREA(ACRES) =        3.3
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    183.00 =     605.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    183.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.13
```

```
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   10.02
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.10    9.52    4.279  0.20( 0.12) 0.58       3.2     179.00
     2       12.13   10.02    4.155  0.20( 0.12) 0.58       3.3     181.00
 LONGEST FLOWPATH FROM NODE    181.00 TO NODE    193.00 =     670.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       51.52    5.48    5.868  0.20( 0.08) 0.39       8.9     170.00
     2       52.62    5.76    5.703  0.20( 0.08) 0.39       9.4     175.00
     3       52.75    5.80    5.683  0.20( 0.08) 0.40       9.4     161.00
     4       53.83    6.14    5.502  0.20( 0.08) 0.40      10.0     174.00
     5       54.65    6.43    5.355  0.20( 0.08) 0.40      10.4     150.00
     6       54.82    6.50    5.322  0.20( 0.08) 0.40      10.6     173.00
     7       55.65    6.95    5.123  0.20( 0.08) 0.41      11.2      14.00
     8       56.37    7.40    4.943  0.20( 0.08) 0.41      11.8     167.00
     9       56.61    7.61    4.864  0.20( 0.08) 0.41      12.1     154.00
    10       57.26    8.34    4.615  0.20( 0.08) 0.42      13.0      19.00
    11       57.49    8.79    4.479  0.20( 0.09) 0.43      13.5      16.00
    12       57.49    8.86    4.458  0.20( 0.09) 0.43      13.6     168.00
    13       57.44    8.97    4.428  0.20( 0.09) 0.43      13.7     169.00
    14       56.51   10.14    4.125  0.20( 0.09) 0.44      14.5     160.00
    15       56.48   10.18    4.117  0.20( 0.09) 0.44      14.5     159.00
    16       56.48   10.18    4.117  0.20( 0.09) 0.44      14.5      17.00
    17       55.13   10.93    3.953  0.20( 0.09) 0.44      14.8      10.00
    18       53.90   11.59    3.823  0.20( 0.09) 0.45      15.0     147.00
    19       52.99   12.12    3.725  0.20( 0.09) 0.45      15.2     152.00
    20       48.43   15.06    3.289  0.20( 0.09) 0.46      15.9     144.00
    21       45.41   16.78    3.092  0.20( 0.09) 0.46      16.0     147.00
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       61.16    5.48    5.868  0.20( 0.09) 0.43      10.7     170.00
     2       62.46    5.76    5.703  0.20( 0.09) 0.43      11.3     175.00
     3       62.61    5.80    5.683  0.20( 0.09) 0.43      11.4     161.00
     4       63.93    6.14    5.502  0.20( 0.09) 0.43      12.0     174.00
     5       64.95    6.43    5.355  0.20( 0.09) 0.43      12.6     150.00
     6       65.16    6.50    5.322  0.20( 0.09) 0.43      12.7     173.00
     7       66.28    6.95    5.123  0.20( 0.09) 0.44      13.5      14.00
     8       67.28    7.40    4.943  0.20( 0.09) 0.44      14.3     167.00
     9       67.65    7.61    4.864  0.20( 0.09) 0.44      14.7     154.00
    10       68.71    8.34    4.615  0.20( 0.09) 0.45      15.8      19.00
    11       69.20    8.79    4.479  0.20( 0.09) 0.45      16.5      16.00
    12       69.24    8.86    4.458  0.20( 0.09) 0.46      16.5     168.00
    13       69.25    8.97    4.428  0.20( 0.09) 0.46      16.7     169.00
    14       69.11    9.52    4.279  0.20( 0.09) 0.46      17.3     179.00
    15       68.74   10.02    4.155  0.20( 0.09) 0.46      17.7     181.00
    16       68.55   10.14    4.125  0.20( 0.09) 0.47      17.8     160.00
    17       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8     159.00
    18       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8      17.00
    19       66.65   10.93    3.953  0.20( 0.09) 0.47      18.1      10.00
    20       65.03   11.59    3.823  0.20( 0.09) 0.47      18.3     147.00
    21       63.82   12.12    3.725  0.20( 0.09) 0.47      18.5     152.00
    22       57.96   15.06    3.289  0.20( 0.10) 0.48      19.2     144.00
    23       54.34   16.78    3.092  0.20( 0.10) 0.48      19.3     147.00
  TOTAL AREA(ACRES) =        19.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       69.25  Tc(MIN.) =    8.966
  EFFECTIVE AREA(ACRES) =     16.67  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =       19.3
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.50  DOWNSTREAM(FEET) =    480.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.788
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.210
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.31      0.20     0.600    91    9.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      4.82
  TOTAL AREA(ACRES) =      1.31   PEAK FLOW RATE(CFS) =      4.82

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    186.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   14.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.43
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   1.22   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.937
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
  "3-4 DWELLINGS/ACRE"       D        1.14      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.14      SUBAREA RUNOFF(CFS) =    3.92
  EFFECTIVE AREA(ACRES) =      2.45    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.42

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  16.07
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    186.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    186.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   476.00  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.54
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.42
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   3.91
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.45
  TOTAL STREAM AREA(ACRES) =       2.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.42

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.50  DOWNSTREAM(FEET) =    479.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.299
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.336
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.62      0.20     0.600    91    9.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.35
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.35

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    189.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  479.50  DOWNSTREAM ELEVATION(FEET) =  470.00
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.22
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   10.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.129
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.73      SUBAREA RUNOFF(CFS) =    2.65
  EFFECTIVE AREA(ACRES) =      1.35    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       4.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.68
  FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE    187.00 TO NODE    189.00 =     470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.13
  RAINFALL INTENSITY(INCH/HR) =   4.13
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.35
  TOTAL STREAM AREA(ACRES) =       1.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.42   11.14    3.910  0.20( 0.12) 0.60       2.4     184.00
      2        4.88   10.13    4.129  0.20( 0.11) 0.55       1.4     187.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.98   10.13    4.129  0.20( 0.12) 0.58       3.6     187.00
      2       13.04   11.14    3.910  0.20( 0.12) 0.58       3.8     184.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.04    Tc(MIN.) =    11.14
  EFFECTIVE AREA(ACRES) =       3.80   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.8
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    189.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    192.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   457.00
  FLOW LENGTH(FEET) =   320.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.04
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   3.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.80
  TOTAL STREAM AREA(ACRES) =       3.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.04

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    470.50  DOWNSTREAM(FEET) =    461.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.038
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.086
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.54      0.20     0.600    91    7.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.41
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      2.41

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  461.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00
```

```
  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   0.89   Tc(MIN.) =    7.93
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.752
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    3.21
  EFFECTIVE AREA(ACRES) =      1.31    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       5.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  12.91
  FLOW VELOCITY(FEET/SEC.) =  3.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.93
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.31
  TOTAL STREAM AREA(ACRES) =       1.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.46

****************************************************************************
  FLOW PROCESS FROM NODE    191.10 TO NODE    191.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.884
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.152
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.57      0.20     0.600    91    6.88
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.58
  TOTAL AREA(ACRES) =      0.57   PEAK FLOW RATE(CFS) =      2.58
```

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****************************************************************************
  FLOW PROCESS FROM NODE    191.20 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  464.00  DOWNSTREAM ELEVATION(FEET) =  457.00
  STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    9.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   0.73   Tc(MIN.) =    7.61
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.864
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.43      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    0.43      SUBAREA RUNOFF(CFS) =    1.84
  EFFECTIVE AREA(ACRES) =      1.00    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       4.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =  10.33
  FLOW VELOCITY(FEET/SEC.) =  4.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    191.10 TO NODE    192.00 =     425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    192.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.61
  RAINFALL INTENSITY(INCH/HR) =   4.86
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       1.00
  TOTAL STREAM AREA(ACRES) =       1.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.27

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.98   10.57    4.029  0.20( 0.12) 0.58       3.6     187.00
      1       13.04   11.58    3.824  0.20( 0.12) 0.58       3.8     184.00
      2        5.46    7.93    4.752  0.20( 0.12) 0.60       1.3     190.00
      3        4.27    7.61    4.864  0.20( 0.12) 0.60       1.0     191.10

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
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  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.98    7.61    4.864  0.20( 0.12) 0.59       4.8     191.10
      2       21.16    7.93    4.752  0.20( 0.12) 0.59       5.0     190.00
      3       21.11   10.57    4.029  0.20( 0.12) 0.59       5.9     187.00
      4       20.74   11.58    3.824  0.20( 0.12) 0.59       6.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.16    Tc(MIN.) =     7.93
  EFFECTIVE AREA(ACRES) =       4.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    192.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   457.00  DOWNSTREAM(FEET) =   456.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.82
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.98    7.66    4.846  0.20( 0.12) 0.59       4.8     191.10
      2       21.16    7.98    4.735  0.20( 0.12) 0.59       5.0     190.00
      3       21.11   10.62    4.018  0.20( 0.12) 0.59       5.9     187.00
      4       20.74   11.63    3.815  0.20( 0.12) 0.59       6.1     184.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    193.00 =     985.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       61.16    5.48    5.868  0.20( 0.09) 0.43      10.7     170.00
      2       62.46    5.76    5.703  0.20( 0.09) 0.43      11.3     175.00
      3       62.61    5.80    5.683  0.20( 0.09) 0.43      11.4     161.00
      4       63.93    6.14    5.502  0.20( 0.09) 0.43      12.0     174.00
      5       64.95    6.43    5.355  0.20( 0.09) 0.43      12.6     150.00
      6       65.16    6.50    5.322  0.20( 0.09) 0.43      12.7     173.00
      7       66.28    6.95    5.123  0.20( 0.09) 0.44      13.5      14.00
      8       67.28    7.40    4.943  0.20( 0.09) 0.44      14.3     167.00
      9       67.65    7.61    4.864  0.20( 0.09) 0.44      14.7     154.00
     10       68.71    8.34    4.615  0.20( 0.09) 0.45      15.8      19.00
     11       69.20    8.79    4.479  0.20( 0.09) 0.45      16.5      16.00
     12       69.24    8.86    4.458  0.20( 0.09) 0.46      16.5     168.00
     13       69.25    8.97    4.428  0.20( 0.09) 0.46      16.7     169.00
     14       69.11    9.52    4.279  0.20( 0.09) 0.46      17.3     179.00
     15       68.74   10.02    4.155  0.20( 0.09) 0.46      17.7     181.00
     16       68.55   10.14    4.125  0.20( 0.09) 0.47      17.8     160.00
     17       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8     159.00
     18       68.50   10.18    4.117  0.20( 0.09) 0.47      17.8      17.00
     19       66.65   10.93    3.953  0.20( 0.09) 0.47      18.1      10.00
     20       65.03   11.59    3.823  0.20( 0.09) 0.47      18.3     147.00
     21       63.82   12.12    3.725  0.20( 0.09) 0.47      18.5     152.00
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    22       57.96   15.06    3.289  0.20( 0.10) 0.48      19.2     144.00
    23       54.34   16.78    3.092  0.20( 0.10) 0.48      19.3     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       79.42    5.48    5.868  0.20( 0.09) 0.47      14.2     170.00
      2       81.11    5.76    5.703  0.20( 0.09) 0.47      14.9     175.00
      3       81.31    5.80    5.683  0.20( 0.09) 0.47      15.0     161.00
      4       83.07    6.14    5.502  0.20( 0.09) 0.47      15.9     174.00
      5       84.47    6.43    5.355  0.20( 0.09) 0.47      16.7     150.00
      6       84.77    6.50    5.322  0.20( 0.09) 0.47      16.8     173.00
      7       86.43    6.95    5.123  0.20( 0.09) 0.47      17.9      14.00
      8       87.96    7.40    4.943  0.20( 0.10) 0.48      19.0     167.00
      9       88.57    7.61    4.864  0.20( 0.10) 0.48      19.5     154.00
     10       88.70    7.66    4.846  0.20( 0.10) 0.48      19.6     191.10
     11       89.34    7.98    4.735  0.20( 0.10) 0.48      20.2     190.00
     12       89.87    8.34    4.615  0.20( 0.10) 0.48      20.9      19.00
     13       90.34    8.79    4.479  0.20( 0.10) 0.49      21.7      16.00
     14       90.38    8.86    4.458  0.20( 0.10) 0.49      21.8     168.00
     15       90.39    8.97    4.428  0.20( 0.10) 0.49      22.0     169.00
     16       90.23    9.52    4.279  0.20( 0.10) 0.49      22.8     179.00
     17       89.86   10.02    4.155  0.20( 0.10) 0.49      23.4     181.00
     18       89.67   10.14    4.125  0.20( 0.10) 0.50      23.5     160.00
     19       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6     159.00
     20       89.61   10.18    4.117  0.20( 0.10) 0.50      23.6      17.00
     21       88.51   10.62    4.018  0.20( 0.10) 0.50      23.9     187.00
     22       87.64   10.93    3.953  0.20( 0.10) 0.50      24.1      10.00
     23       85.78   11.59    3.823  0.20( 0.10) 0.50      24.4     147.00
     24       85.67   11.63    3.815  0.20( 0.10) 0.50      24.5     184.00
     25       84.06   12.12    3.725  0.20( 0.10) 0.50      24.6     152.00
     26       75.75   15.06    3.289  0.20( 0.10) 0.50      25.3     144.00
     27       71.02   16.78    3.092  0.20( 0.10) 0.51      25.4     147.00
    TOTAL AREA(ACRES) =        25.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       90.39  Tc(MIN.) =    8.966
  EFFECTIVE AREA(ACRES) =     22.00  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       25.4
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    193.00 =    2360.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    194.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   456.00  DOWNSTREAM(FEET) =   452.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.87
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      90.39
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    194.00 =    2440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    194.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =    9.00   RAINFALL INTENSITY(INCH/HR) =  4.42
```

```
  EFFECTIVE AREA(ACRES) =     4.87
  TOTAL AREA(ACRES) =     5.60        PEAK FLOW RATE(CFS) =     20.00
  AREA-AVERAGED Fm(INCH/HR) =   0.10  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.49
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   452.50  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.00
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.03
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.03
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.49
  EFFECTIVE STREAM AREA(ACRES) =       4.87
  TOTAL STREAM AREA(ACRES) =       5.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.00

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    37.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        1.21      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      6.54
  TOTAL AREA(ACRES) =      1.21   PEAK FLOW RATE(CFS) =      6.54

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    197.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   440.00  DOWNSTREAM(FEET) =   439.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.54
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
```

```
 LONGEST FLOWPATH FROM NODE    195.00 TO NODE    197.00 =     137.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    197.00 TO NODE    197.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.28
 RAINFALL INTENSITY(INCH/HR) =   6.00
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       1.21
 TOTAL STREAM AREA(ACRES) =       1.21
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.54

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       20.00    9.03    4.411  0.20( 0.10) 0.49       4.9     147.00
     2        6.54    5.28    5.999  0.20( 0.18) 0.90       1.2     195.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.54    5.28    5.999  0.20( 0.12) 0.61       4.1     195.00
     2       24.76    9.03    4.411  0.20( 0.11) 0.57       6.1     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      24.76    Tc(MIN.) =     9.03
 EFFECTIVE AREA(ACRES) =       6.08   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =        6.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    197.00 =    2485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   439.00  DOWNSTREAM(FEET) =   438.20
 FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      24.76
 PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    9.45
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.45
 RAINFALL INTENSITY(INCH/HR) =   4.30
 AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.57
 EFFECTIVE STREAM AREA(ACRES) =       6.08
 TOTAL STREAM AREA(ACRES) =       6.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      24.76
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    444.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.334
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.962
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20     0.100    91    5.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.76
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    198.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.33
  RAINFALL INTENSITY(INCH/HR) =   5.96
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.33
  TOTAL STREAM AREA(ACRES) =       0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       22.54    5.70    5.738  0.20( 0.12) 0.61       4.1     195.00
      1       24.76    9.45    4.297  0.20( 0.11) 0.57       6.1     147.00
      2        1.76    5.33    5.962  0.20( 0.02) 0.10       0.3     183.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.69    5.33    5.962  0.20( 0.11) 0.57       4.1     183.00
      2       24.24    5.70    5.738  0.20( 0.11) 0.57       4.4     195.00
      3       26.03    9.45    4.297  0.20( 0.11) 0.55       6.4     147.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.03    Tc(MIN.) =     9.45
  EFFECTIVE AREA(ACRES) =       6.41   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        7.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    198.00 =    2645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.20  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.03
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.57
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.80  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.760
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.12      0.20     0.500    91    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      4.70
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      4.70

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   4.76
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.12
  TOTAL STREAM AREA(ACRES) =       1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.70

****************************************************************************
  FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    450.10  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.529
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.556
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    91    8.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.19
```

```
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.19

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.53
  RAINFALL INTENSITY(INCH/HR) =   4.56
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.70    7.90    4.760  0.20( 0.10) 0.50       1.1     199.00
      2        3.19    8.53    4.556  0.20( 0.12) 0.60       0.8     200.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.79    7.90    4.760  0.20( 0.11) 0.54       1.9     199.00
      2        7.69    8.53    4.556  0.20( 0.11) 0.54       1.9     200.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.79    Tc(MIN.) =     7.90
  EFFECTIVE AREA(ACRES) =       1.86   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =        1.9
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    201.00 =     300.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   443.00  DOWNSTREAM(FEET) =   438.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.98
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        7.79    7.98    4.732  0.20( 0.11) 0.54       1.9     199.00
      2        7.69    8.61    4.532  0.20( 0.11) 0.54       1.9     200.00
  LONGEST FLOWPATH FROM NODE    199.00 TO NODE    202.00 =     365.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
```

```
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       23.69    5.46    5.883  0.20( 0.11) 0.57       4.1     183.00
      2       24.24    5.83    5.667  0.20( 0.11) 0.57       4.4     195.00
      3       26.03    9.57    4.266  0.20( 0.11) 0.55       6.4     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.34    5.46    5.883  0.20( 0.11) 0.56       5.4     183.00
      2       31.08    5.83    5.667  0.20( 0.11) 0.57       5.7     195.00
      3       33.06    7.98    4.732  0.20( 0.11) 0.55       7.4     199.00
      4       33.25    8.61    4.532  0.20( 0.11) 0.55       7.8     200.00
      5       33.25    9.57    4.266  0.20( 0.11) 0.55       8.3     147.00
    TOTAL AREA(ACRES) =          9.1

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       33.25  Tc(MIN.) =    8.610
  EFFECTIVE AREA(ACRES) =      7.81  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        9.1
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    202.00 =    2690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   438.00  DOWNSTREAM(FEET) =   432.00
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.77
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.25
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.02
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       7.81
  TOTAL STREAM AREA(ACRES) =       9.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      33.25

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    457.00  DOWNSTREAM(FEET) =    443.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.856
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.652
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.39      0.20     0.200    91    5.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.97
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.97

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  443.00  DOWNSTREAM ELEVATION(FEET) =  432.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    8.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =    7.28
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.991
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.42      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.87
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.86
  FLOW VELOCITY(FEET/SEC.) =  3.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    204.00 =     610.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.28
  RAINFALL INTENSITY(INCH/HR) =   4.99
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
```

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.61

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       30.34    5.89    5.632  0.20( 0.11) 0.56       5.4     183.00
     1       31.08    6.24    5.448  0.20( 0.11) 0.57       5.7     195.00
     1       33.06    8.39    4.598  0.20( 0.11) 0.55       7.4     199.00
     1       33.25    9.02    4.412  0.20( 0.11) 0.55       7.8     200.00
     1       33.25    9.98    4.165  0.20( 0.11) 0.55       8.3     147.00
     2        3.61    7.28    4.991  0.20( 0.04) 0.20       0.8     192.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.65    5.89    5.632  0.20( 0.10) 0.52       6.1     183.00
     2       34.46    6.24    5.448  0.20( 0.11) 0.53       6.4     195.00
     3       35.64    7.28    4.991  0.20( 0.10) 0.52       7.4     192.00
     4       36.38    8.39    4.598  0.20( 0.10) 0.52       8.2     199.00
     5       36.44    9.02    4.412  0.20( 0.10) 0.52       8.6     200.00
     6       36.26    9.98    4.165  0.20( 0.10) 0.52       9.1     147.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      36.44    Tc(MIN.) =     9.02
 EFFECTIVE AREA(ACRES) =       8.62   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =        9.9
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    204.00 =    2980.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   432.00  DOWNSTREAM(FEET) =   430.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.58
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      36.44
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.07
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    184.00 TO NODE    205.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
 ELEVATION DATA: UPSTREAM(FEET) =    484.20  DOWNSTREAM(FEET) =    480.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.273
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.343
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.80      0.20     0.600    91    9.27
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.04
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      3.04

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.60  DOWNSTREAM ELEVATION(FEET) =  474.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =   10.48
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.049
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.10      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    7.43
  EFFECTIVE AREA(ACRES) =      2.90    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.9        PEAK FLOW RATE(CFS) =      10.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.54
  FLOW VELOCITY(FEET/SEC.) =  4.19   DEPTH*VELOCITY(FT*FT/SEC.) =   1.73
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.48
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.90
  TOTAL STREAM AREA(ACRES) =       2.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.25

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    474.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.526
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.842
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.17      0.20     0.100    91    5.53
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.89
  TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.89

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.53
  RAINFALL INTENSITY(INCH/HR) =   5.84
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.17
  TOTAL STREAM AREA(ACRES) =       0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.89

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.25   10.48    4.049  0.20( 0.12) 0.60       2.9     184.00
      2        0.89    5.53    5.842  0.20( 0.02) 0.10       0.2      59.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.77    5.53    5.842  0.20( 0.11) 0.55       1.7      59.00
      2       10.87   10.48    4.049  0.20( 0.11) 0.57       3.1     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.87    Tc(MIN.) =    10.48
  EFFECTIVE AREA(ACRES) =       3.07   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    206.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   464.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.87
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =   10.82
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       3.07
  TOTAL STREAM AREA(ACRES) =       3.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.87

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE    207.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    475.70  DOWNSTREAM(FEET) =    464.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.81      0.20     0.600    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.43
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.77    5.89    5.634  0.20( 0.11) 0.55       1.7      59.00
      1       10.87   10.82    3.975  0.20( 0.11) 0.57       3.1     184.00
      2        3.43    7.72    4.825  0.20( 0.12) 0.60       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.83    5.89    5.634  0.20( 0.11) 0.56       2.3      59.00
      2       12.98    7.72    4.825  0.20( 0.11) 0.57       3.0      64.00
      3       13.68   10.82    3.975  0.20( 0.12) 0.58       3.9     184.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      13.68    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =       3.88   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    207.00 =     790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   464.00  DOWNSTREAM(FEET) =   462.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.78
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.68
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.86
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.86
  RAINFALL INTENSITY(INCH/HR) =   3.97
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       3.88
  TOTAL STREAM AREA(ACRES) =       3.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.68

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    482.20  DOWNSTREAM(FEET) =    479.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.659
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.243
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"         D        0.48      0.20     0.600    91    9.66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      1.78
  TOTAL AREA(ACRES) =      0.48   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  479.10  DOWNSTREAM ELEVATION(FEET) =  462.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   1.34   Tc(MIN.) =   11.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.938
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.88      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.88      SUBAREA RUNOFF(CFS) =    6.46
  EFFECTIVE AREA(ACRES) =      2.36    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       8.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  13.14
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   1.81
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    210.00 =     650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   3.94
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.36
  TOTAL STREAM AREA(ACRES) =       2.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.83    5.92    5.615  0.20( 0.11) 0.56       2.3      59.00
      1       12.98    7.75    4.812  0.20( 0.11) 0.57       3.0      64.00
      1       13.68   10.86    3.968  0.20( 0.12) 0.58       3.9     184.00
      2        8.11   11.00    3.938  0.20( 0.12) 0.60       2.4     208.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    5.92    5.615  0.20( 0.12) 0.58       3.6      59.00
      2       20.00    7.75    4.812  0.20( 0.12) 0.58       4.7      64.00
      3       21.75   10.86    3.968  0.20( 0.12) 0.59       6.2     184.00
      4       21.68   11.00    3.938  0.20( 0.12) 0.59       6.2     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.75    Tc(MIN.) =    10.86
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```
  EFFECTIVE AREA(ACRES) =       6.21   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        6.2
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    210.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    215.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   462.00  DOWNSTREAM(FEET) =   434.80
  FLOW LENGTH(FEET) =   660.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.75
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   11.65
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.65
  RAINFALL INTENSITY(INCH/HR) =   3.81
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       6.21
  TOTAL STREAM AREA(ACRES) =       6.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.75

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    463.50  DOWNSTREAM(FEET) =    460.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.505
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.282
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.73      0.20     0.500    91    9.50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.75
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.75

****************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    215.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  460.40  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   420.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

```
  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.29
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   11.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =   10.82
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.976
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        2.04      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.04      SUBAREA RUNOFF(CFS) =    7.08
  EFFECTIVE AREA(ACRES) =      2.77    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        2.8        PEAK FLOW RATE(CFS) =       9.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.26
  FLOW VELOCITY(FEET/SEC.) =  5.96   DEPTH*VELOCITY(FT*FT/SEC.) =   2.12
  LONGEST FLOWPATH FROM NODE    211.00 TO NODE    215.00 =     720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       2.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.63

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    462.10  DOWNSTREAM(FEET) =    456.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.301
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.627
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.45      0.20     0.500    91    8.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    215.00 IS CODE =  62
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  456.00  DOWNSTREAM ELEVATION(FEET) =  434.80
  STREET LENGTH(FEET) =   285.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CS) =       3.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.11
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.40
  STREET FLOW TRAVEL TIME(MIN.) =   0.93   Tc(MIN.) =    9.23
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.354
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.99      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.99      SUBAREA RUNOFF(CFS) =    3.79
  EFFECTIVE AREA(ACRES) =      1.44    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =       5.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.10
  FLOW VELOCITY(FEET/SEC.) =  5.58   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    215.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.23
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.44
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.51

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.12    6.77    5.200  0.20( 0.12) 0.58       3.6      59.00
      1       20.00    8.60    4.536  0.20( 0.12) 0.58       4.7      64.00
      1       21.75   11.65    3.810  0.20( 0.12) 0.59       6.2     184.00
      1       21.68   11.80    3.783  0.20( 0.12) 0.59       6.2     208.00
      2        9.63   10.82    3.976  0.20( 0.11) 0.57       2.8     211.00
      3        5.51    9.23    4.354  0.20( 0.10) 0.50       1.4     213.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.
```

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  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.90    6.77    5.200  0.20( 0.11) 0.56       6.4      59.00
      2       34.11    8.60    4.536  0.20( 0.11) 0.57       8.2      64.00
      3       34.88    9.23    4.354  0.20( 0.11) 0.57       8.8     213.00
      4       35.92   10.82    3.976  0.20( 0.11) 0.57      10.0     211.00
      5       35.77   11.65    3.810  0.20( 0.11) 0.57      10.4     184.00
      6       35.60   11.80    3.783  0.20( 0.11) 0.57      10.5     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      35.92    Tc(MIN.) =    10.82
  EFFECTIVE AREA(ACRES) =      10.00   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       10.5
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    215.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.80  DOWNSTREAM(FEET) =   431.00
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.32
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.92
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.05
  RAINFALL INTENSITY(INCH/HR) =   3.93
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      10.00
  TOTAL STREAM AREA(ACRES) =      10.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.92

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   140.00
  ELEVATION DATA: UPSTREAM(FEET) =    434.80  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.18      0.20     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.00
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    216.00 TO NODE    216.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.00

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       30.90    7.02    5.096  0.20( 0.11) 0.56       6.4      59.00
      1       34.11    8.83    4.467  0.20( 0.11) 0.57       8.2      64.00
      1       34.88    9.46    4.293  0.20( 0.11) 0.57       8.8     213.00
      1       35.92   11.05    3.929  0.20( 0.11) 0.57      10.0     211.00
      1       35.77   11.88    3.767  0.20( 0.11) 0.57      10.4     184.00
      1       35.60   12.03    3.741  0.20( 0.11) 0.57      10.5     208.00
      2        1.00    5.00    6.187  0.20( 0.02) 0.10       0.2     215.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       27.85    5.00    6.187  0.20( 0.11) 0.55       4.7     215.00
      2       31.72    7.02    5.096  0.20( 0.11) 0.55       6.6      59.00
      3       34.83    8.83    4.467  0.20( 0.11) 0.56       8.4      64.00
      4       35.58    9.46    4.293  0.20( 0.11) 0.56       9.0     213.00
      5       36.55   11.05    3.929  0.20( 0.11) 0.56      10.2     211.00
      6       36.37   11.88    3.767  0.20( 0.11) 0.56      10.6     184.00
      7       36.20   12.03    3.741  0.20( 0.11) 0.56      10.6     208.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.55    Tc(MIN.) =    11.05
  EFFECTIVE AREA(ACRES) =      10.18   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.56
  TOTAL AREA(ACRES) =       10.6
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    216.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   431.00  DOWNSTREAM(FEET) =   430.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.55
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   11.10
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       27.85    5.06    6.147  0.20( 0.11) 0.55       4.7     215.00
    2       31.72    7.07    5.074  0.20( 0.11) 0.55       6.6      59.00
    3       34.83    8.88    4.452  0.20( 0.11) 0.56       8.4      64.00
    4       35.58    9.51    4.279  0.20( 0.11) 0.56       9.0     213.00
    5       36.55   11.10    3.918  0.20( 0.11) 0.56      10.2     211.00
    6       36.37   11.94    3.758  0.20( 0.11) 0.56      10.6     184.00
    7       36.20   12.08    3.732  0.20( 0.11) 0.56      10.6     208.00
  LONGEST FLOWPATH FROM NODE    184.00 TO NODE    217.00 =    1685.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       33.65    5.94    5.604  0.20( 0.10) 0.52       6.1     183.00
    2       34.46    6.30    5.422  0.20( 0.11) 0.53       6.4     195.00
    3       35.64    7.33    4.971  0.20( 0.10) 0.52       7.4     192.00
    4       36.38    8.45    4.582  0.20( 0.10) 0.52       8.2     199.00
    5       36.44    9.07    4.398  0.20( 0.10) 0.52       8.6     200.00
    6       36.26   10.03    4.152  0.20( 0.10) 0.52       9.1     147.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       59.30    5.06    6.147  0.20( 0.11) 0.53       9.9     215.00
    2       63.20    5.94    5.604  0.20( 0.11) 0.54      11.6     183.00
    3       64.70    6.30    5.422  0.20( 0.11) 0.54      12.3     195.00
    4       67.07    7.07    5.074  0.20( 0.11) 0.54      13.7      59.00
    5       67.80    7.33    4.971  0.20( 0.11) 0.54      14.2     192.00
    6       70.47    8.45    4.582  0.20( 0.11) 0.54      16.2     199.00
    7       71.26    8.88    4.452  0.20( 0.11) 0.54      16.9      64.00
    8       71.50    9.07    4.398  0.20( 0.11) 0.54      17.2     200.00
    9       71.93    9.51    4.279  0.20( 0.11) 0.54      17.8     213.00
   10       72.15   10.03    4.152  0.20( 0.11) 0.54      18.5     147.00
   11       70.71   11.10    3.918  0.20( 0.11) 0.54      19.3     211.00
   12       69.10   11.94    3.758  0.20( 0.11) 0.54      19.7     184.00
   13       68.70   12.08    3.732  0.20( 0.11) 0.54      19.8     208.00
   TOTAL AREA(ACRES) =        20.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       72.15  Tc(MIN.) =   10.029
  EFFECTIVE AREA(ACRES) =     18.51  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       20.5
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    217.00 =    3025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    217.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    219.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   430.40  DOWNSTREAM(FEET) =   418.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.94
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.15
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.40
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      18.51
  TOTAL STREAM AREA(ACRES) =      20.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      72.15

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    218.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    443.00  DOWNSTREAM(FEET) =    431.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.680
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.839
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.91      0.20     0.600    91    7.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      3.86
  TOTAL AREA(ACRES) =      0.91   PEAK FLOW RATE(CFS) =      3.86

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    219.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  431.00  DOWNSTREAM ELEVATION(FEET) =  418.00
  STREET LENGTH(FEET) =   375.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   12.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    9.13
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.383
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.39      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.39      SUBAREA RUNOFF(CFS) =    5.33
  EFFECTIVE AREA(ACRES) =      2.30    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
```

```
 TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       8.82

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.43
 FLOW VELOCITY(FEET/SEC.) =  4.66   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    219.00 =     675.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.13
 RAINFALL INTENSITY(INCH/HR) =   4.38
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.60
 EFFECTIVE STREAM AREA(ACRES) =       2.30
 TOTAL STREAM AREA(ACRES) =       2.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.82

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       59.30    5.45    5.888  0.20( 0.11) 0.53       9.9     215.00
     1       63.20    6.33    5.403  0.20( 0.11) 0.54      11.6     183.00
     1       64.70    6.69    5.238  0.20( 0.11) 0.54      12.3     195.00
     1       67.07    7.46    4.920  0.20( 0.11) 0.54      13.7      59.00
     1       67.80    7.72    4.826  0.20( 0.11) 0.54      14.2     192.00
     1       70.47    8.82    4.469  0.20( 0.11) 0.54      16.2     199.00
     1       71.26    9.26    4.348  0.20( 0.11) 0.54      16.9      64.00
     1       71.50    9.45    4.297  0.20( 0.11) 0.54      17.2     200.00
     1       71.93    9.89    4.186  0.20( 0.11) 0.54      17.8     213.00
     1       72.15   10.40    4.066  0.20( 0.11) 0.54      18.5     147.00
     1       70.71   11.47    3.844  0.20( 0.11) 0.54      19.3     211.00
     1       69.10   12.33    3.690  0.20( 0.11) 0.54      19.7     184.00
     1       68.70   12.47    3.665  0.20( 0.11) 0.54      19.8     208.00
     2        8.82    9.13    4.383  0.20( 0.12) 0.60       2.3     201.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       66.44    5.45    5.888  0.20( 0.11) 0.54      11.3     215.00
     2       70.79    6.33    5.403  0.20( 0.11) 0.54      13.2     183.00
     3       72.46    6.69    5.238  0.20( 0.11) 0.54      14.0     195.00
     4       75.19    7.46    4.920  0.20( 0.11) 0.54      15.6      59.00
     5       76.04    7.72    4.826  0.20( 0.11) 0.54      16.1     192.00
     6       79.17    8.82    4.469  0.20( 0.11) 0.54      18.4     199.00
     7       79.85    9.13    4.383  0.20( 0.11) 0.54      19.0     201.00
     8       80.01    9.26    4.348  0.20( 0.11) 0.54      19.2      64.00
     9       80.15    9.45    4.297  0.20( 0.11) 0.54      19.5     200.00
    10       80.35    9.89    4.186  0.20( 0.11) 0.54      20.1     213.00
    11       80.32   10.40    4.066  0.20( 0.11) 0.54      20.8     147.00
    12       78.42   11.47    3.844  0.20( 0.11) 0.55      21.6     211.00
    13       76.49   12.33    3.690  0.20( 0.11) 0.55      22.0     184.00
    14       76.03   12.47    3.665  0.20( 0.11) 0.55      22.1     208.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      80.35    Tc(MIN.) =     9.89
 EFFECTIVE AREA(ACRES) =      20.14   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
 TOTAL AREA(ACRES) =       22.8
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    219.00 =    3405.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    219.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   418.00  DOWNSTREAM(FEET) =   417.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.39
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      80.35
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.92
 LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    220.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    436.00  DOWNSTREAM(FEET) =    428.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.328
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       D        0.77      0.20     0.600    91    8.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA RUNOFF(CFS) =      3.12
 TOTAL AREA(ACRES) =      0.77   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
 FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.80
 STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.63
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   12.56
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.85
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.33
 STREET FLOW TRAVEL TIME(MIN.) =   0.67   Tc(MIN.) =    9.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.418
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        1.30      0.20     0.600    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    5.03
  EFFECTIVE AREA(ACRES) =      2.07    AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.55
  FLOW VELOCITY(FEET/SEC.) =  4.17   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    222.00 =     455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.80  DOWNSTREAM(FEET) =   423.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.01
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.08
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.08
  RAINFALL INTENSITY(INCH/HR) =   4.40
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       2.07
  TOTAL STREAM AREA(ACRES) =       2.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.01

****************************************************************************
  FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    432.70  DOWNSTREAM(FEET) =    428.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.554
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.884
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.47      0.20     0.500    91    7.55
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.02
  TOTAL AREA(ACRES) =      0.47   PEAK FLOW RATE(CFS) =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    224.00 TO NODE    225.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  428.00  DOWNSTREAM ELEVATION(FEET) =  423.00
  STREET LENGTH(FEET) =   165.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CS) =       4.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =    8.26
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.640
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.42      0.20     0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.42      SUBAREA RUNOFF(CFS) =    5.80
  EFFECTIVE AREA(ACRES) =      1.89    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       7.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  14.08
  FLOW VELOCITY(FEET/SEC.) =  4.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.26
  RAINFALL INTENSITY(INCH/HR) =   4.64
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.89
  TOTAL STREAM AREA(ACRES) =       1.89
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.01    9.08    4.396  0.20( 0.12) 0.60       2.1     220.00
      2        7.72    8.26    4.640  0.20( 0.10) 0.50       1.9     223.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1       15.43    8.26    4.640  0.20( 0.11) 0.55       3.8     223.00
     2       15.31    9.08    4.396  0.20( 0.11) 0.55       4.0     220.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.43    Tc(MIN.) =     8.26
  EFFECTIVE AREA(ACRES) =       3.77   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        4.0
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    225.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    226.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   423.00  DOWNSTREAM(FEET) =   417.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.43
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    8.58
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.43    8.58    4.542  0.20( 0.11) 0.55       3.8     223.00
      2       15.31    9.39    4.311  0.20( 0.11) 0.55       4.0     220.00
  LONGEST FLOWPATH FROM NODE    220.00 TO NODE    226.00 =     700.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       66.44    5.48    5.869  0.20( 0.11) 0.54      11.3     215.00
      2       70.79    6.36    5.388  0.20( 0.11) 0.54      13.2     183.00
      3       72.46    6.72    5.225  0.20( 0.11) 0.54      14.0     195.00
      4       75.19    7.49    4.909  0.20( 0.11) 0.54      15.6      59.00
      5       76.04    7.74    4.815  0.20( 0.11) 0.54      16.1     192.00
      6       79.17    8.85    4.461  0.20( 0.11) 0.54      18.4     199.00
      7       79.85    9.16    4.375  0.20( 0.11) 0.54      19.0     201.00
      8       80.01    9.28    4.340  0.20( 0.11) 0.54      19.2      64.00
      9       80.15    9.48    4.290  0.20( 0.11) 0.54      19.5     200.00
     10       80.35    9.92    4.179  0.20( 0.11) 0.54      20.1     213.00
     11       80.32   10.43    4.060  0.20( 0.11) 0.54      20.8     147.00
     12       78.42   11.50    3.838  0.20( 0.11) 0.55      21.6     211.00
     13       76.49   12.35    3.685  0.20( 0.11) 0.55      22.0     184.00
     14       76.03   12.50    3.660  0.20( 0.11) 0.55      22.1     208.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       79.25    5.48    5.869  0.20( 0.11) 0.54      13.7     215.00
      2       84.42    6.36    5.388  0.20( 0.11) 0.54      16.0     183.00
      3       86.40    6.72    5.225  0.20( 0.11) 0.55      16.9     195.00
      4       89.77    7.49    4.909  0.20( 0.11) 0.54      18.9      59.00
      5       90.83    7.74    4.815  0.20( 0.11) 0.54      19.5     192.00
      6       93.82    8.58    4.542  0.20( 0.11) 0.54      21.6     223.00
      7       94.56    8.85    4.461  0.20( 0.11) 0.55      22.2     199.00
      8       95.19    9.16    4.375  0.20( 0.11) 0.55      22.9     201.00
      9       95.34    9.28    4.340  0.20( 0.11) 0.55      23.1      64.00
     10       95.40    9.39    4.311  0.20( 0.11) 0.55      23.3     220.00
     11       95.38    9.48    4.290  0.20( 0.11) 0.55      23.5     200.00
```

```
    12       95.18    9.92    4.179  0.20( 0.11) 0.55      24.1     213.00
    13       94.72   10.43    4.060  0.20( 0.11) 0.55      24.8     147.00
    14       92.01   11.50    3.838  0.20( 0.11) 0.55      25.6     211.00
    15       89.52   12.35    3.685  0.20( 0.11) 0.55      26.0     184.00
    16       88.97   12.50    3.660  0.20( 0.11) 0.55      26.0     208.00
   TOTAL AREA(ACRES) =        26.8

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       95.40  Tc(MIN.) =    9.393
  EFFECTIVE AREA(ACRES) =     23.33  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       26.8
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    226.00 =    3435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    226.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   417.00  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  52.67
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.40
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.40
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       79.25    5.49    5.865  0.20( 0.11) 0.54      13.7     215.00
      2       84.42    6.37    5.385  0.20( 0.11) 0.54      16.0     183.00
      3       86.40    6.72    5.222  0.20( 0.11) 0.55      16.9     195.00
      4       89.77    7.49    4.907  0.20( 0.11) 0.54      18.9      59.00
      5       90.83    7.75    4.813  0.20( 0.11) 0.54      19.5     192.00
      6       93.82    8.58    4.540  0.20( 0.11) 0.54      21.6     223.00
      7       94.56    8.86    4.459  0.20( 0.11) 0.55      22.2     199.00
      8       95.19    9.16    4.373  0.20( 0.11) 0.55      22.9     201.00
      9       95.34    9.29    4.338  0.20( 0.11) 0.55      23.1      64.00
     10       95.40    9.40    4.310  0.20( 0.11) 0.55      23.3     220.00
     11       95.38    9.48    4.288  0.20( 0.11) 0.55      23.5     200.00
     12       95.18    9.92    4.177  0.20( 0.11) 0.55      24.1     213.00
     13       94.72   10.44    4.058  0.20( 0.11) 0.55      24.8     147.00
     14       92.01   11.51    3.837  0.20( 0.11) 0.55      25.6     211.00
     15       89.52   12.36    3.684  0.20( 0.11) 0.55      26.0     184.00
     16       88.97   12.51    3.659  0.20( 0.11) 0.55      26.0     208.00
  LONGEST FLOWPATH FROM NODE    147.00 TO NODE    230.00 =    3455.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      174.53    5.07    6.141  0.20( 0.12) 0.58      27.8     140.00
      2      184.95    5.82    5.672  0.20( 0.12) 0.58      32.0     104.00
      3      191.51    6.30    5.420  0.20( 0.12) 0.58      34.8      88.00
      4      202.28    7.23    5.010  0.20( 0.12) 0.58      40.4      95.00
      5      204.09    7.39    4.945  0.20( 0.12) 0.58      41.4     118.00
      6      206.83    7.64    4.852  0.20( 0.12) 0.58      43.0     138.00
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      7      211.67    8.09    4.695  0.20( 0.12) 0.58      45.7     141.00
      8      217.82    8.71    4.503  0.20( 0.12) 0.59      49.3      85.00
      9      218.83    8.81    4.472  0.20( 0.12) 0.59      50.0     136.00
     10      219.05    8.84    4.465  0.20( 0.12) 0.59      50.1      97.00
     11      222.25    9.38    4.315  0.20( 0.12) 0.59      52.8      92.00
     12      223.83    9.66    4.241  0.20( 0.12) 0.59      54.1     129.00
     13      226.27   10.17    4.118  0.20( 0.12) 0.58      56.4     134.00
     14      226.59   10.25    4.101  0.20( 0.12) 0.58      56.8     116.00
     15      230.11   11.28    3.882  0.20( 0.12) 0.58      61.1       1.00
     16      227.55   11.59    3.822  0.20( 0.12) 0.58      61.4     114.00
     17      226.67   11.69    3.803  0.20( 0.12) 0.58      61.5     100.00
     18      222.35   12.18    3.714  0.20( 0.12) 0.58      61.9     127.00
     19      221.47   12.28    3.697  0.20( 0.12) 0.58      62.0     123.00
     20      220.56   12.38    3.681  0.20( 0.12) 0.58      62.0      97.00
     21      216.80   12.76    3.618  0.20( 0.12) 0.58      62.1     120.00
     22      215.57   12.88    3.598  0.20( 0.12) 0.58      62.1     111.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      251.18    5.07    6.141  0.20( 0.11) 0.57      40.4     140.00
      2      259.62    5.49    5.865  0.20( 0.11) 0.57      43.8     215.00
      3      266.15    5.82    5.672  0.20( 0.11) 0.57      46.5     104.00
      4      275.52    6.30    5.420  0.20( 0.11) 0.57      50.6      88.00
      5      276.76    6.37    5.385  0.20( 0.11) 0.57      51.3     183.00
      6      282.80    6.72    5.222  0.20( 0.11) 0.57      54.3     195.00
      7      290.89    7.23    5.010  0.20( 0.11) 0.57      58.6      95.00
      8      293.43    7.39    4.945  0.20( 0.11) 0.57      60.0     118.00
      9      294.97    7.49    4.907  0.20( 0.11) 0.57      60.9      59.00
     10      297.21    7.64    4.852  0.20( 0.11) 0.57      62.2     138.00
     11      298.82    7.75    4.813  0.20( 0.11) 0.57      63.1     192.00
     12      303.73    8.09    4.695  0.20( 0.11) 0.57      66.1     141.00
     13      310.40    8.58    4.540  0.20( 0.11) 0.57      70.2     223.00
     14      311.97    8.71    4.503  0.20( 0.11) 0.57      71.2      85.00
     15      313.26    8.81    4.472  0.20( 0.11) 0.57      72.1     136.00
     16      313.55    8.84    4.465  0.20( 0.11) 0.57      72.3      97.00
     17      313.73    8.86    4.459  0.20( 0.11) 0.57      72.4     199.00
     18      316.16    9.16    4.373  0.20( 0.11) 0.57      74.6     201.00
     19      317.07    9.29    4.338  0.20( 0.11) 0.57      75.5      64.00
     20      317.64    9.38    4.315  0.20( 0.11) 0.57      76.1      92.00
     21      317.76    9.40    4.310  0.20( 0.11) 0.57      76.2     220.00
     22      318.20    9.48    4.288  0.20( 0.11) 0.57      76.7     200.00
     23      319.12    9.66    4.241  0.20( 0.11) 0.57      77.8     129.00
     24      320.25    9.92    4.177  0.20( 0.11) 0.57      79.4     213.00
     25      321.23   10.17    4.118  0.20( 0.11) 0.57      80.9     134.00
     26      321.48   10.25    4.101  0.20( 0.11) 0.57      81.3     116.00
     27      321.95   10.44    4.058  0.20( 0.11) 0.57      82.3     147.00
     28      322.70   11.28    3.882  0.20( 0.11) 0.57      86.5       1.00
     29      320.21   11.51    3.837  0.20( 0.11) 0.57      86.9     211.00
     30      319.33   11.59    3.822  0.20( 0.11) 0.57      87.1     114.00
     31      318.15   11.69    3.803  0.20( 0.11) 0.57      87.2     100.00
     32      312.39   12.18    3.714  0.20( 0.11) 0.57      87.9     127.00
     33      311.22   12.28    3.697  0.20( 0.11) 0.57      88.0     123.00
     34      310.25   12.36    3.684  0.20( 0.11) 0.57      88.0     184.00
     35      310.02   12.38    3.681  0.20( 0.11) 0.57      88.0      97.00
     36      308.25   12.51    3.659  0.20( 0.11) 0.57      88.1     208.00
     37      304.74   12.76    3.618  0.20( 0.11) 0.57      88.2     120.00
     38      303.02   12.88    3.598  0.20( 0.11) 0.57      88.2     111.00
    TOTAL AREA(ACRES) =        92.5

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      322.70  Tc(MIN.) =   11.280
  EFFECTIVE AREA(ACRES) =     86.48  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =       92.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    230.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  12
----------------------------------------------------------------------------
```

>>>>>CLEAR MEMORY BANK # 1 <<<<<

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 92.5 TC(MIN.) = 11.28
EFFECTIVE AREA(ACRES) = 86.48 AREA-AVERAGED Fm(INCH/HR)= 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.572
PEAK FLOW RATE(CFS) = 322.70

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	251.18	5.07	6.141	0.20(0.11)	0.57	40.4	140.00
2	259.62	5.49	5.865	0.20(0.11)	0.57	43.8	215.00
3	266.15	5.82	5.672	0.20(0.11)	0.57	46.5	104.00
4	275.52	6.30	5.420	0.20(0.11)	0.57	50.6	88.00
5	276.76	6.37	5.385	0.20(0.11)	0.57	51.3	183.00
6	282.80	6.72	5.222	0.20(0.11)	0.57	54.3	195.00
7	290.89	7.23	5.010	0.20(0.11)	0.57	58.6	95.00
8	293.43	7.39	4.945	0.20(0.11)	0.57	60.0	118.00
9	294.97	7.49	4.907	0.20(0.11)	0.57	60.9	59.00
10	297.21	7.64	4.852	0.20(0.11)	0.57	62.2	138.00
11	298.82	7.75	4.813	0.20(0.11)	0.57	63.1	192.00
12	303.73	8.09	4.695	0.20(0.11)	0.57	66.1	141.00
13	310.40	8.58	4.540	0.20(0.11)	0.57	70.2	223.00
14	311.97	8.71	4.503	0.20(0.11)	0.57	71.2	85.00
15	313.26	8.81	4.472	0.20(0.11)	0.57	72.1	136.00
16	313.55	8.84	4.465	0.20(0.11)	0.57	72.3	97.00
17	313.73	8.86	4.459	0.20(0.11)	0.57	72.4	199.00
18	316.16	9.16	4.373	0.20(0.11)	0.57	74.6	201.00
19	317.07	9.29	4.338	0.20(0.11)	0.57	75.5	64.00
20	317.64	9.38	4.315	0.20(0.11)	0.57	76.1	92.00
21	317.76	9.40	4.310	0.20(0.11)	0.57	76.2	220.00
22	318.20	9.48	4.288	0.20(0.11)	0.57	76.7	200.00
23	319.12	9.66	4.241	0.20(0.11)	0.57	77.8	129.00
24	320.25	9.92	4.177	0.20(0.11)	0.57	79.4	213.00
25	321.23	10.17	4.118	0.20(0.11)	0.57	80.9	134.00
26	321.48	10.25	4.101	0.20(0.11)	0.57	81.3	116.00
27	321.95	10.44	4.058	0.20(0.11)	0.57	82.3	147.00
28	322.70	11.28	3.882	0.20(0.11)	0.57	86.5	1.00
29	320.21	11.51	3.837	0.20(0.11)	0.57	86.9	211.00
30	319.33	11.59	3.822	0.20(0.11)	0.57	87.1	114.00
31	318.15	11.69	3.803	0.20(0.11)	0.57	87.2	100.00
32	312.39	12.18	3.714	0.20(0.11)	0.57	87.9	127.00
33	311.22	12.28	3.697	0.20(0.11)	0.57	88.0	123.00
34	310.25	12.36	3.684	0.20(0.11)	0.57	88.0	184.00
35	310.02	12.38	3.681	0.20(0.11)	0.57	88.0	97.00
36	308.25	12.51	3.659	0.20(0.11)	0.57	88.1	208.00
37	304.74	12.76	3.618	0.20(0.11)	0.57	88.2	120.00
38	303.02	12.88	3.598	0.20(0.11)	0.57	88.2	111.00

END OF RATIONAL METHOD ANALYSIS

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                           Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - EAST - AREA 'A' (CONTINUE) - WITH 2 FLOW-BY DETENTION BASINS  *
 ************************************************************************

  FILE NAME: EAST-B2.DAT
  TIME/DATE OF STUDY: 14:25 11/01/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150
  2   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0312 0.125 0.0150
  3   24.0     19.0    0.010/0.010/0.020   0.33    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =   7
------------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
==============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   11.28   RAINFALL INTENSITY(INCH/HR) =  3.88
  EFFECTIVE AREA(ACRES) =    86.48
  TOTAL AREA(ACRES) =    92.50        PEAK FLOW RATE(CFS) =    322.70
  AREA-AVERAGED Fm(INCH/HR) =   0.11  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.57
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

******************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    240.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   404.80
```

```
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  78.0 INCH PIPE IS  59.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.87
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     322.70
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   11.54
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    232.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    465.00  DOWNSTREAM(FEET) =    442.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.970
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.60      0.20     0.900    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    233.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    442.00  DOWNSTREAM(FEET) =    434.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   235.00   CHANNEL SLOPE =  0.0340
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.448
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.92      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.23
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.93
  Tc(MIN.) =    8.90
  SUBAREA AREA(ACRES) =     0.92       SUBAREA RUNOFF(CFS) =    3.53
  EFFECTIVE AREA(ACRES) =      1.52     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.5         PEAK FLOW RATE(CFS) =       5.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   4.60
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    233.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    233.00 TO NODE    236.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   434.00  DOWNSTREAM(FEET) =   420.00
  FLOW LENGTH(FEET) =   615.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.84
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   10.18
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       1.52
  TOTAL STREAM AREA(ACRES) =       1.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.84

****************************************************************************
  FLOW PROCESS FROM NODE    234.00 TO NODE    235.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    440.00  DOWNSTREAM(FEET) =    437.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.250
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.349
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.25      0.20     0.900    91    9.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    236.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  437.00  DOWNSTREAM ELEVATION(FEET) =  420.00
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =   10.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.041
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.72      0.20     0.400    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.72      SUBAREA RUNOFF(CFS) =    2.57
  EFFECTIVE AREA(ACRES) =      0.97    AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.44

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   8.69
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    234.00 TO NODE    236.00 =     505.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    236.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.53
  EFFECTIVE STREAM AREA(ACRES) =       0.97
  TOTAL STREAM AREA(ACRES) =       0.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.84   10.18    4.117  0.20( 0.18) 0.90       1.5     231.00
      2        3.44   10.51    4.041  0.20( 0.11) 0.53       1.0     234.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.18    4.117  0.20( 0.15) 0.76       2.5     231.00
      2        9.16   10.51    4.041  0.20( 0.15) 0.76       2.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.23    Tc(MIN.) =    10.18
  EFFECTIVE AREA(ACRES) =       2.46   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.76
  TOTAL AREA(ACRES) =        2.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    236.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    236.00 TO NODE    238.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   420.00  DOWNSTREAM(FEET) =   408.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
```

```
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.23
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.45
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.76
  EFFECTIVE STREAM AREA(ACRES) =       2.46
  TOTAL STREAM AREA(ACRES) =       2.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.23

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    238.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    430.00  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.803
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "3-4 DWELLINGS/ACRE"       D        0.56      0.20     0.600    91    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA RUNOFF(CFS) =      2.55
  TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.55

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    238.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =       0.56
  TOTAL STREAM AREA(ACRES) =       0.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.55

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        9.23   10.45    4.056  0.20( 0.15) 0.76       2.5     231.00
      1        9.16   10.78    3.983  0.20( 0.15) 0.76       2.5     234.00
      2        2.55    6.80    5.187  0.20( 0.12) 0.60       0.6     237.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.80    5.187  0.20( 0.14) 0.72       2.2     237.00
      2       11.21   10.45    4.056  0.20( 0.15) 0.73       3.0     231.00
      3       11.11   10.78    3.983  0.20( 0.15) 0.73       3.0     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.21    Tc(MIN.) =    10.45
  EFFECTIVE AREA(ACRES) =       3.02   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =        3.0
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    238.00 =    1355.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    238.00 TO NODE    239.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.06
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.21
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.47
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.47
  RAINFALL INTENSITY(INCH/HR) =   4.05
  AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =       3.02
  TOTAL STREAM AREA(ACRES) =       3.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.21

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    239.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    418.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.49      0.20     0.200    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    239.00 IS CODE =   1
```

```
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   6.19
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.49
  TOTAL STREAM AREA(ACRES) =       0.49
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       10.30    6.82    5.179  0.20( 0.14) 0.72       2.2     237.00
      1       11.21   10.47    4.052  0.20( 0.15) 0.73       3.0     231.00
      1       11.11   10.80    3.979  0.20( 0.15) 0.73       3.0     234.00
      2        2.71    5.00    6.187  0.20( 0.04) 0.20       0.5     219.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.00    6.187  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.82    5.179  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.47    4.052  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.80    3.979  0.20( 0.13) 0.65       3.5     234.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      12.98    Tc(MIN.) =    10.47
  EFFECTIVE AREA(ACRES) =       3.51   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.66
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    239.00 =    1370.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    239.00 TO NODE    240.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   404.80
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.27
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.98
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.78    5.04    6.158  0.20( 0.12) 0.60       2.1     219.00
      2       12.57    6.86    5.161  0.20( 0.12) 0.62       2.7     237.00
      3       12.98   10.51    4.043  0.20( 0.13) 0.66       3.5     231.00
      4       12.85   10.84    3.971  0.20( 0.13) 0.65       3.5     234.00
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.
```

```
  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      322.70   11.54    3.832  0.20( 0.11) 0.57      86.5     230.00
  LONGEST FLOWPATH FROM NODE    230.00 TO NODE    240.00 =     185.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM        Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      241.00    5.04    6.158  0.20( 0.11) 0.57      39.9     219.00
      2      273.09    6.86    5.161  0.20( 0.11) 0.57      54.1     237.00
      3      323.53   10.51    4.043  0.20( 0.12) 0.58      82.3     231.00
      4      327.41   10.84    3.971  0.20( 0.12) 0.58      84.8     234.00
      5      335.08   11.54    3.832  0.20( 0.12) 0.58      90.0     230.00
    TOTAL AREA(ACRES) =        96.0

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      335.08  Tc(MIN.) =   11.540
  EFFECTIVE AREA(ACRES) =     90.02  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =       96.0
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    240.00 =    1405.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    240.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    242.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.80  DOWNSTREAM(FEET) =   404.70
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  78.0 INCH PIPE IS  60.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.06
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     335.08
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.57
  RAINFALL INTENSITY(INCH/HR) =   3.83
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =      90.02
  TOTAL STREAM AREA(ACRES) =      96.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     335.08

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    242.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    419.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.249
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.445
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        0.51      0.20      0.400    91    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA RUNOFF(CFS) =      2.46
 TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
 FLOW PROCESS FROM NODE    242.00 TO NODE    242.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.25
 RAINFALL INTENSITY(INCH/HR) =   5.45
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.40
 EFFECTIVE STREAM AREA(ACRES) =       0.51
 TOTAL STREAM AREA(ACRES) =       0.51
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      241.00    5.07    6.137  0.20( 0.11) 0.57      39.9     219.00
     1      273.09    6.89    5.148  0.20( 0.11) 0.57      54.1     237.00
     1      323.53   10.54    4.037  0.20( 0.12) 0.58      82.3     231.00
     1      327.41   10.87    3.965  0.20( 0.12) 0.58      84.8     234.00
     1      335.08   11.57    3.826  0.20( 0.12) 0.58      90.0     230.00
     2        2.46    6.25    5.445  0.20( 0.08) 0.40       0.5     241.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      243.26    5.07    6.137  0.20( 0.11) 0.57      40.3     219.00
     2      264.22    6.25    5.445  0.20( 0.11) 0.57      49.6     241.00
     3      275.41    6.89    5.148  0.20( 0.11) 0.57      54.6     237.00
     4      325.35   10.54    4.037  0.20( 0.11) 0.57      82.8     231.00
     5      329.19   10.87    3.965  0.20( 0.11) 0.57      85.3     234.00
     6      336.80   11.57    3.826  0.20( 0.11) 0.57      90.5     230.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     336.80    Tc(MIN.) =    11.57
 EFFECTIVE AREA(ACRES) =      90.53   AREA-AVERAGED Fm(INCH/HR) =  0.11
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
 TOTAL AREA(ACRES) =       96.6
 LONGEST FLOWPATH FROM NODE    231.00 TO NODE    242.00 =    1425.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    250.00 TO NODE    251.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.599
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.868
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.39      0.20      0.200    91    7.60
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.69
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.69

****************************************************************************
  FLOW PROCESS FROM NODE    251.00 TO NODE    252.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  410.00  DOWNSTREAM ELEVATION(FEET) =  402.50
  STREET LENGTH(FEET) =  1120.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.76
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.09
  STREET FLOW TRAVEL TIME(MIN.) =   7.91   Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.25      0.20      0.500    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.25      SUBAREA RUNOFF(CFS) =    9.17
  EFFECTIVE AREA(ACRES) =      3.64    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        3.6        PEAK FLOW RATE(CFS) =      10.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.35
  FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE    250.00 TO NODE    252.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    252.00 TO NODE    252.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.235
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.19      0.20      0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.52
  EFFECTIVE AREA(ACRES) =      3.83   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
```

```
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.81
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        3.8  TC(MIN.) =     15.51
  EFFECTIVE AREA(ACRES) =      3.83  AREA-AVERAGED Fm(INCH/HR)=  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.489
  PEAK FLOW RATE(CFS)   =      10.81
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

SOUTHEAST – AREA 'B'

100-YR STUDY

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
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          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY                                                          *
* PROPOSED - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: S-EAST.DAT
  TIME/DATE OF STUDY: 19:29 11/08/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.83

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.267
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =    6.62
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =   12.82
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   8.18
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.38

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.401
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    91    9.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.32
 TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
 STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   14.05
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.91
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.957
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    4.19
 EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.27

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.16
 FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.91
 RAINFALL INTENSITY(INCH/HR) =   3.96
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.43
 EFFECTIVE STREAM AREA(ACRES) =       1.80
 TOTAL STREAM AREA(ACRES) =       1.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.27
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.38    6.98    5.110  0.20( 0.16) 0.82       3.1       1.00
      2        6.27   10.91    3.957  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.59    6.98    5.110  0.20( 0.14) 0.71       4.3       1.00
      2       17.30   10.91    3.957  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.59    Tc(MIN.) =     6.98
  EFFECTIVE AREA(ACRES) =       4.28   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.367
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    91    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =   10.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.115
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.71
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.95
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.36
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.95

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.547
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    91    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      3.88
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.88

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   5.55
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.88

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.95   10.36    4.075  0.20( 0.07) 0.36       0.8       7.00
     2        3.88    6.05    5.547  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.23    6.05    5.547  0.20( 0.04) 0.20       1.3      10.00
     2        5.79   10.36    4.075  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.23    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.23
```

```
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.20
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.20
  RAINFALL INTENSITY(INCH/HR) =   5.47
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.23

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.378
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20      0.100    91    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.23
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      7.23

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.23    6.20    5.470  0.20( 0.04) 0.20       1.3      10.00
      1        5.79   10.51    4.042  0.20( 0.05) 0.23       1.6       7.00
      2        7.23    6.39    5.378  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.38    6.20    5.470  0.20( 0.03) 0.14       2.7      10.00
```

```
      2       13.45    6.39    5.378  0.20( 0.03) 0.15       2.8      12.00
      3       11.22   10.51    4.042  0.20( 0.03) 0.17       3.1       7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.45    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.45
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   5.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.45

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.726
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    91    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      2.11

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.72
```

```
 RAINFALL INTENSITY(INCH/HR) =   5.73
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.41
 TOTAL STREAM AREA(ACRES) =       0.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.11

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.38    6.26    5.440  0.20( 0.03) 0.14       2.7      10.00
     1       13.45    6.45    5.349  0.20( 0.03) 0.15       2.8      12.00
     1       11.22   10.57    4.028  0.20( 0.03) 0.17       3.1       7.00
     2        2.11    5.72    5.726  0.20( 0.02) 0.10       0.4      14.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    5.72    5.726  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.26    5.440  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.45    5.349  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   10.57    4.028  0.20( 0.03) 0.16       3.5       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.41    Tc(MIN.) =     6.45
 EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
 TOTAL AREA(ACRES) =        3.5
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.41
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    6.89
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    6.16    5.488  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.70    5.232  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.89    5.150  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   11.02    3.933  0.20( 0.03) 0.16       3.5       7.00
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.59    7.95    4.743  0.20( 0.14) 0.71       4.3       1.00
     2       17.30   11.90    3.765  0.20( 0.14) 0.68       4.9       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.16    5.488  0.20( 0.09) 0.45       6.2      14.00
      2       33.63    6.70    5.232  0.20( 0.09) 0.45       6.7      10.00
      3       33.88    6.89    5.150  0.20( 0.09) 0.45       6.9      12.00
      4       34.30    7.95    4.743  0.20( 0.09) 0.47       7.5       1.00
      5       30.51   11.02    3.933  0.20( 0.09) 0.46       8.3       7.00
      6       29.45   11.90    3.765  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.30  Tc(MIN.) =    7.951
  EFFECTIVE AREA(ACRES) =      7.54  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.30
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   4.59
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.30

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.545
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.28
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      2.28

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   5.54
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.62    5.266  0.20( 0.09) 0.45       6.2      14.00
      1       33.63    7.16    5.037  0.20( 0.09) 0.45       6.7      10.00
      1       33.88    7.35    4.963  0.20( 0.09) 0.45       6.9      12.00
      1       34.30    8.41    4.593  0.20( 0.09) 0.47       7.5       1.00
      1       30.51   11.49    3.841  0.20( 0.09) 0.46       8.3       7.00
      1       29.45   12.36    3.683  0.20( 0.09) 0.46       8.4       4.00
      2        2.28    6.05    5.545  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    6.05    5.545  0.20( 0.09) 0.43       6.1      16.00
      2       34.79    6.62    5.266  0.20( 0.09) 0.43       6.7      14.00
      3       35.70    7.16    5.037  0.20( 0.09) 0.43       7.2      10.00
      4       35.92    7.35    4.963  0.20( 0.09) 0.43       7.3      12.00
      5       36.19    8.41    4.593  0.20( 0.09) 0.45       8.0       1.00
      6       32.08   11.49    3.841  0.20( 0.09) 0.45       8.7       7.00
      7       30.96   12.36    3.683  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.19    Tc(MIN.) =     8.41
  EFFECTIVE AREA(ACRES) =       8.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.19
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.443
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    6.25
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.65
 TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
 FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
 FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.48
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.65
 PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    7.52
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.52
 RAINFALL INTENSITY(INCH/HR) =   4.90
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.34
 TOTAL STREAM AREA(ACRES) =       0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20      0.900    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65    7.52    4.896  0.20( 0.04) 0.20       0.3      18.00
      2        1.21    7.72    4.825  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    7.52    4.896  0.20( 0.10) 0.52       0.6      18.00
      2        2.84    7.72    4.825  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.85    Tc(MIN.) =     7.52
  EFFECTIVE AREA(ACRES) =       0.62   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.85
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =    8.91
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    91    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    9.75
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =      11.36

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    6.20
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      17.56

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.38
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       4.35
  TOTAL STREAM AREA(ACRES) =       4.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    8.91    4.443  0.20( 0.10) 0.52       0.6      18.00
      1        2.84    9.11    4.388  0.20( 0.10) 0.52       0.6      18.00
      2       17.56    8.38    4.604  0.20( 0.12) 0.59       4.4      21.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.38    4.604  0.20( 0.12) 0.58       4.9      21.00
      2       19.79    8.91    4.443  0.20( 0.12) 0.58       5.0      18.00
      3       19.56    9.11    4.388  0.20( 0.12) 0.58       5.0      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.35    Tc(MIN.) =     8.38
  EFFECTIVE AREA(ACRES) =       4.94   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.35
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    9.24
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.94
  TOTAL STREAM AREA(ACRES) =       4.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.35

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.190
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20     0.100    91    6.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.72
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.80
  RAINFALL INTENSITY(INCH/HR) =   5.19
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.37
  TOTAL STREAM AREA(ACRES) =       0.37
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.72

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.092
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.40      0.20     0.100    91    7.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.02
  RAINFALL INTENSITY(INCH/HR) =   5.09
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.40
```

```
 TOTAL STREAM AREA(ACRES) =       0.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.83

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       20.35    9.24    4.352  0.20( 0.12) 0.58       4.9      21.00
     1       19.79    9.78    4.213  0.20( 0.12) 0.58       5.0      18.00
     1       19.56    9.98    4.165  0.20( 0.12) 0.58       5.0      18.00
     2        1.72    6.80    5.190  0.20( 0.02) 0.10       0.4      26.00
     3        1.83    7.02    5.092  0.20( 0.02) 0.10       0.4      27.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.44    6.80    5.190  0.20( 0.10) 0.49       4.4      26.00
     2       21.67    7.02    5.092  0.20( 0.10) 0.50       4.5      27.00
     3       23.35    9.24    4.352  0.20( 0.10) 0.51       5.7      21.00
     4       22.69    9.78    4.213  0.20( 0.10) 0.51       5.7      18.00
     5       22.43    9.98    4.165  0.20( 0.10) 0.51       5.8      18.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      23.35    Tc(MIN.) =     9.24
 EFFECTIVE AREA(ACRES) =       5.71   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
 TOTAL AREA(ACRES) =        5.8
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.15
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.35
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.31
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       21.44    6.87    5.157  0.20( 0.10) 0.49       4.4      26.00
     2       21.67    7.10    5.061  0.20( 0.10) 0.50       4.5      27.00
     3       23.35    9.31    4.332  0.20( 0.10) 0.51       5.7      21.00
     4       22.69    9.85    4.194  0.20( 0.10) 0.51       5.7      18.00
     5       22.43   10.05    4.147  0.20( 0.10) 0.51       5.8      18.00
 LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       33.70    6.14    5.503  0.20( 0.09) 0.43       6.1      16.00
     2       34.79    6.70    5.230  0.20( 0.09) 0.43       6.7      14.00
     3       35.70    7.24    5.005  0.20( 0.09) 0.43       7.2      10.00
     4       35.92    7.43    4.932  0.20( 0.09) 0.43       7.3      12.00
     5       36.19    8.49    4.568  0.20( 0.09) 0.45       8.0       1.00
     6       32.08   11.57    3.826  0.20( 0.09) 0.45       8.7       7.00
```

```
     7       30.96   12.44    3.669  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.14    5.503  0.20( 0.09) 0.45      10.0      16.00
      2       56.02    6.70    5.230  0.20( 0.09) 0.45      10.9      14.00
      3       56.52    6.87    5.157  0.20( 0.09) 0.46      11.2      26.00
      4       57.13    7.10    5.061  0.20( 0.09) 0.46      11.6      27.00
      5       57.48    7.24    5.005  0.20( 0.09) 0.46      11.8      10.00
      6       57.84    7.43    4.932  0.20( 0.09) 0.46      12.0      12.00
      7       58.91    8.49    4.568  0.20( 0.09) 0.47      13.3       1.00
      8       58.44    9.31    4.332  0.20( 0.10) 0.48      13.9      21.00
      9       57.06    9.85    4.194  0.20( 0.10) 0.48      14.1      18.00
     10       56.54   10.05    4.147  0.20( 0.10) 0.48      14.1      18.00
     11       52.73   11.57    3.826  0.20( 0.09) 0.47      14.5       7.00
     12       50.75   12.44    3.669  0.20( 0.09) 0.47      14.6       4.00
    TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.91  Tc(MIN.) =    8.490
  EFFECTIVE AREA(ACRES) =     13.27  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.74
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.25
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.02
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.27
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.91

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.14
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      3.14

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.14
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
  RAINFALL INTENSITY(INCH/HR) =   6.01
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.67    5.245  0.20( 0.09) 0.45      10.0      16.00
      1       56.02    7.24    5.006  0.20( 0.09) 0.45      10.9      14.00
      1       56.52    7.40    4.941  0.20( 0.09) 0.46      11.2      26.00
      1       57.13    7.63    4.856  0.20( 0.09) 0.46      11.6      27.00
      1       57.48    7.77    4.806  0.20( 0.09) 0.46      11.8      10.00
      1       57.84    7.96    4.741  0.20( 0.09) 0.46      12.0      12.00
      1       58.91    9.02    4.413  0.20( 0.09) 0.47      13.3       1.00
      1       58.44    9.84    4.197  0.20( 0.10) 0.48      13.9      21.00
```

```
     1       57.06   10.39    4.070  0.20( 0.10) 0.48      14.1      18.00
     1       56.54   10.58    4.026  0.20( 0.10) 0.48      14.1      18.00
     1       52.73   12.12    3.725  0.20( 0.09) 0.47      14.5       7.00
     1       50.75   13.00    3.579  0.20( 0.09) 0.47      14.6       4.00
     2        3.14    5.26    6.010  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.18    5.26    6.010  0.20( 0.10) 0.48       8.5      31.00
      2       56.88    6.67    5.245  0.20( 0.10) 0.48      10.6      16.00
      3       58.61    7.24    5.006  0.20( 0.10) 0.48      11.5      14.00
      4       59.08    7.40    4.941  0.20( 0.10) 0.48      11.8      26.00
      5       59.65    7.63    4.856  0.20( 0.10) 0.48      12.2      27.00
      6       59.97    7.77    4.806  0.20( 0.10) 0.48      12.4      10.00
      7       60.29    7.96    4.741  0.20( 0.10) 0.48      12.6      12.00
      8       61.19    9.02    4.413  0.20( 0.10) 0.49      13.8       1.00
      9       60.60    9.84    4.197  0.20( 0.10) 0.49      14.5      21.00
     10       59.16   10.39    4.070  0.20( 0.10) 0.49      14.7      18.00
     11       58.61   10.58    4.026  0.20( 0.10) 0.49      14.7      18.00
     12       54.64   12.12    3.725  0.20( 0.10) 0.49      15.1       7.00
     13       52.58   13.00    3.579  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.19    Tc(MIN.) =     9.02
  EFFECTIVE AREA(ACRES) =      13.85   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.656
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        2.01      0.20     1.000    98   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.25
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      6.25

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.042
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.51      0.20     1.000    98
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   4.75
  Tc(MIN.) =   17.27
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    8.98
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =      14.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.12
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   18.44
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.44
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.12

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.23      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        3.15      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =   13.83
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =      14.87

******************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      16.69

******************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   5.08
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.12   18.44    2.929  0.20( 0.20) 1.00       5.5      37.00
      2       16.69    7.06    5.077  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.06    5.077  0.20( 0.18) 0.90       5.9      40.00
      2       23.50   18.44    2.929  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.35    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.89   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.35
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    7.56
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.56
  RAINFALL INTENSITY(INCH/HR) =   4.88
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       5.89
  TOTAL STREAM AREA(ACRES) =       9.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.35

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.820
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.63      0.20     1.000    98    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.375
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.00      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.15
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =    9.15
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   18.79
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      21.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   6.17
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.62
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.56    4.881  0.20( 0.18) 0.90       5.9      40.00
      1       23.50   18.97    2.882  0.20( 0.19) 0.94       9.3      37.00
      2       21.16    9.36    4.321  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.78    7.56    4.881  0.20( 0.19) 0.95      10.4      40.00
      2       47.06    9.36    4.321  0.20( 0.19) 0.95      12.1      42.00
      3       37.27   18.97    2.882  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.06    Tc(MIN.) =     9.36
  EFFECTIVE AREA(ACRES) =      12.06   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
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```
 FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
 FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.06
 PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   10.15
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   4.12
 AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.95
 EFFECTIVE STREAM AREA(ACRES) =      12.06
 TOTAL STREAM AREA(ACRES) =      14.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.06

****************************************************************************
 FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
 ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.957
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    91    7.36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.68
 TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
 STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.56
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       7.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.28
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.67
  RAINFALL INTENSITY(INCH/HR) =   4.51
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.08

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.719
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    91    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
```

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 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.90
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   16.75
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
 STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.58
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.264
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        1.99      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    7.56
 EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =      10.38

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  19.68
 FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.58
 RAINFALL INTENSITY(INCH/HR) =   4.26
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       2.73
 TOTAL STREAM AREA(ACRES) =       2.73
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.38

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       45.78    8.36    4.608  0.20( 0.19) 0.95      10.4      40.00
     1       47.06   10.15    4.123  0.20( 0.19) 0.95      12.1      42.00
     1       37.27   19.81    2.811  0.20( 0.19) 0.96      14.9      37.00
     2        7.08    8.67    4.513  0.20( 0.04) 0.20       1.8      46.00
     3       10.38    9.58    4.264  0.20( 0.04) 0.20       2.7      48.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       62.56    8.36    4.608  0.20( 0.15) 0.74      14.5      40.00
     2       63.04    8.67    4.513  0.20( 0.15) 0.74      15.0      46.00
     3       63.73    9.58    4.264  0.20( 0.15) 0.74      16.0      48.00
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     4       63.56   10.15    4.123  0.20( 0.15) 0.75      16.5      42.00
     5       48.47   19.81    2.811  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.73    Tc(MIN.) =     9.58
  EFFECTIVE AREA(ACRES) =      16.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.73
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.63
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.64      0.20     0.200    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =    8.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.426
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.76
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.68
  FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.97
  RAINFALL INTENSITY(INCH/HR) =   4.43
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.29

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.013
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    91    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.95
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.874
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.87
  AVERAGE FLOW DEPTH(FEET) =   0.82   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    7.58
  SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    6.53
  EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
  TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =      12.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =   7.42
  LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.58
  RAINFALL INTENSITY(INCH/HR) =   4.87
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.83
  TOTAL STREAM AREA(ACRES) =       2.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        8.29    8.97    4.426  0.20( 0.04) 0.20       2.1      14.00
      2       12.31    7.58    4.874  0.20( 0.04) 0.20       2.8      52.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       20.03    7.58    4.874  0.20( 0.04) 0.20       4.6      52.00
      2       19.46    8.97    4.426  0.20( 0.04) 0.20       4.9      14.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.03    Tc(MIN.) =     7.58
  EFFECTIVE AREA(ACRES) =       4.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.03
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.03    8.39    4.600  0.20( 0.04) 0.20       4.6      52.00
      2       19.46    9.78    4.213  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.56    8.42    4.589  0.20( 0.15) 0.74      14.5      40.00
      2       63.04    8.73    4.495  0.20( 0.15) 0.74      15.0      46.00
      3       63.73    9.63    4.249  0.20( 0.15) 0.74      16.0      48.00
      4       63.56   10.21    4.109  0.20( 0.15) 0.75      16.5      42.00
      5       48.47   19.88    2.806  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.39    4.600  0.20( 0.12) 0.61      19.1      52.00
      2       82.58    8.42    4.589  0.20( 0.12) 0.61      19.1      40.00
      3       82.93    8.73    4.495  0.20( 0.12) 0.61      19.6      46.00
      4       83.25    9.63    4.249  0.20( 0.12) 0.61      20.9      48.00
      5       83.15    9.78    4.213  0.20( 0.12) 0.61      21.1      14.00
      6       82.54   10.21    4.109  0.20( 0.12) 0.62      21.5      42.00
      7       61.37   19.88    2.806  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.25  Tc(MIN.) =    9.635
  EFFECTIVE AREA(ACRES) =     20.92  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.25
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.00
 RAINFALL INTENSITY(INCH/HR) =   4.16
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.61
 EFFECTIVE STREAM AREA(ACRES) =      20.92
 TOTAL STREAM AREA(ACRES) =      24.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.25

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.382
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        0.88      0.20     0.900    91    9.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      3.33
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      3.33

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.235
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.25      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.77
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   0.56
 Tc(MIN.) =    9.69
 SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.93
 EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
 TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       4.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   4.88
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.75    4.490  0.20( 0.12) 0.61      19.1      52.00
      1       82.58    8.78    4.480  0.20( 0.12) 0.61      19.1      40.00
      1       82.93    9.09    4.392  0.20( 0.12) 0.61      19.6      46.00
      1       83.25   10.00    4.160  0.20( 0.12) 0.61      20.9      48.00
      1       83.15   10.14    4.126  0.20( 0.12) 0.61      21.1      14.00
      1       82.54   10.57    4.028  0.20( 0.12) 0.62      21.5      42.00
      1       61.37   20.27    2.775  0.20( 0.13) 0.67      24.4      37.00
      2        4.14   10.51    4.043  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       86.33    8.75    4.490  0.20( 0.12) 0.62      20.0      52.00
      2       86.43    8.78    4.480  0.20( 0.12) 0.62      20.1      40.00
      3       86.84    9.09    4.392  0.20( 0.12) 0.62      20.6      46.00
      4       87.31   10.00    4.160  0.20( 0.12) 0.62      22.0      48.00
      5       87.24   10.14    4.126  0.20( 0.12) 0.62      22.2      14.00
      6       86.78   10.51    4.043  0.20( 0.13) 0.63      22.5      56.00
      7       86.66   10.57    4.028  0.20( 0.13) 0.63      22.6      42.00
      8       64.16   20.27    2.775  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.31    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =      22.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
```

```
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.31
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      22.00
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      87.31

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.382
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.51      0.20      0.100    91    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.717
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    9.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.230
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  2.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.71
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.82
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       86.33    9.13    4.381  0.20( 0.12) 0.62      20.0      52.00
     1       86.43    9.17    4.371  0.20( 0.12) 0.62      20.1      40.00
     1       86.84    9.48    4.289  0.20( 0.12) 0.62      20.6      46.00
     1       87.31   10.38    4.071  0.20( 0.12) 0.62      22.0      48.00
     1       87.24   10.52    4.039  0.20( 0.12) 0.62      22.2      14.00
     1       86.78   10.89    3.961  0.20( 0.13) 0.63      22.5      56.00
     1       86.66   10.96    3.947  0.20( 0.13) 0.63      22.6      42.00
     1       64.16   20.69    2.742  0.20( 0.13) 0.67      25.5      37.00
     2        2.46    6.38    5.382  0.20( 0.02) 0.10       0.5      60.00
     3        1.82    9.71    4.230  0.20( 0.02) 0.10       0.5      58.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       78.44    6.38    5.382  0.20( 0.12) 0.59      14.8      60.00
     2       90.11    9.13    4.381  0.20( 0.12) 0.59      21.0      52.00
     3       90.20    9.17    4.371  0.20( 0.12) 0.59      21.0      40.00
     4       90.60    9.48    4.289  0.20( 0.12) 0.59      21.6      46.00
     5       90.71    9.71    4.230  0.20( 0.12) 0.60      22.0      58.00
     6       90.92   10.38    4.071  0.20( 0.12) 0.60      23.0      48.00
     7       90.82   10.52    4.039  0.20( 0.12) 0.60      23.2      14.00
     8       90.29   10.89    3.961  0.20( 0.12) 0.61      23.5      56.00
     9       90.16   10.96    3.947  0.20( 0.12) 0.61      23.6      42.00
    10       66.58   20.69    2.742  0.20( 0.13) 0.65      26.5      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      90.92    Tc(MIN.) =    10.38
 EFFECTIVE AREA(ACRES) =      22.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       26.5
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.07
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.92
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.58
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
 FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  31.79
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.92
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.60
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.60
  RAINFALL INTENSITY(INCH/HR) =   4.02
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      22.99
  TOTAL STREAM AREA(ACRES) =      26.47
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      90.92

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.33
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      4.33

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.33
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
  RAINFALL INTENSITY(INCH/HR) =   6.01
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.80
  TOTAL STREAM AREA(ACRES) =       0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
      1       78.44    6.61    5.272  0.20( 0.12) 0.59      14.8       60.00
      1       90.11    9.36    4.321  0.20( 0.12) 0.59      21.0       52.00
      1       90.20    9.39    4.311  0.20( 0.12) 0.59      21.0       40.00
```

```
     1       90.60    9.70    4.232  0.20( 0.12) 0.59      21.6      46.00
     1       90.71    9.93    4.175  0.20( 0.12) 0.60      22.0      58.00
     1       90.92   10.60    4.022  0.20( 0.12) 0.60      23.0      48.00
     1       90.82   10.75    3.991  0.20( 0.12) 0.60      23.2      14.00
     1       90.29   11.11    3.915  0.20( 0.12) 0.61      23.5      56.00
     1       90.16   11.18    3.901  0.20( 0.12) 0.61      23.6      42.00
     1       66.58   20.93    2.724  0.20( 0.13) 0.65      26.5      37.00
     2        4.33    5.26    6.012  0.20( 0.18) 0.90       0.8      64.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       75.66    5.26    6.012  0.20( 0.12) 0.61      12.6      64.00
      2       82.22    6.61    5.272  0.20( 0.12) 0.60      15.6      60.00
      3       93.18    9.36    4.321  0.20( 0.12) 0.60      21.8      52.00
      4       93.27    9.39    4.311  0.20( 0.12) 0.60      21.8      40.00
      5       93.60    9.70    4.232  0.20( 0.12) 0.60      22.4      46.00
      6       93.68    9.93    4.175  0.20( 0.12) 0.61      22.8      58.00
      7       93.77   10.60    4.022  0.20( 0.12) 0.61      23.8      48.00
      8       93.64   10.75    3.991  0.20( 0.12) 0.61      24.0      14.00
      9       93.06   11.11    3.915  0.20( 0.12) 0.62      24.3      56.00
     10       92.92   11.18    3.901  0.20( 0.12) 0.62      24.4      42.00
     11       68.47   20.93    2.724  0.20( 0.13) 0.66      27.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.77    Tc(MIN.) =    10.60
  EFFECTIVE AREA(ACRES) =      23.79   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       27.3
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.00  DOWNSTREAM(FEET) =    400.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.319
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.55      0.20     0.100    91    6.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    445.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.244
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.003
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
```

```
  "BARREN"                    D        0.62      0.20     1.000    98    7.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.68
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.68

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.417
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.57
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   1.76
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   20.72
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1         PEAK FLOW RATE(CFS) =      23.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   9.34
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.00
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      23.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY WITH A FLOW-BY DETENTION BASIN                           *
* PROPOSED - SOUTHEAST - AREA 'B'                                       *
 ************************************************************************

  FILE NAME: S-EAST-B.DAT
  TIME/DATE OF STUDY: 19:18 11/08/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    501.00  DOWNSTREAM(FEET) =    468.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.33      0.20      0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.83
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      1.83

******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    468.00  DOWNSTREAM(FEET) =    407.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   690.00   CHANNEL SLOPE =  0.0884
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.267
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =    6.62
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =   12.82
  EFFECTIVE AREA(ACRES) =      3.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.82
  TOTAL AREA(ACRES) =        3.1         PEAK FLOW RATE(CFS) =      14.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   8.18
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.78
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =    6.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.98
  RAINFALL INTENSITY(INCH/HR) =   5.11
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =       3.13
  TOTAL STREAM AREA(ACRES) =       3.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.38

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    417.20  DOWNSTREAM(FEET) =    414.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.062
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.401
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.60      0.20     0.500    91    9.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA RUNOFF(CFS) =      2.32
 TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  414.00  DOWNSTREAM ELEVATION(FEET) =  411.80
 STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.42
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   14.05
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
 STREET FLOW TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =   10.91
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.957
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"      D        1.20      0.20     0.400    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    4.19
 EFFECTIVE AREA(ACRES) =      1.80    AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
 TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.27

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.16
 FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.07
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE      6.00 =     540.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.91
 RAINFALL INTENSITY(INCH/HR) =   3.96
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.43
 EFFECTIVE STREAM AREA(ACRES) =       1.80
 TOTAL STREAM AREA(ACRES) =       1.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.27
```

```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.38    6.98    5.110  0.20( 0.16) 0.82       3.1       1.00
      2        6.27   10.91    3.957  0.20( 0.09) 0.43       1.8       4.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       19.59    6.98    5.110  0.20( 0.14) 0.71       4.3       1.00
      2       17.30   10.91    3.957  0.20( 0.14) 0.68       4.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.59    Tc(MIN.) =     6.98
  EFFECTIVE AREA(ACRES) =       4.28   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =        4.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.50
  FLOW LENGTH(FEET) =   350.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.02
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.59
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =    7.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.50  DOWNSTREAM(FEET) =    408.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.184
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.367
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        0.52      0.20     0.500    91    9.18
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      2.00
  TOTAL AREA(ACRES) =      0.52   PEAK FLOW RATE(CFS) =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
```

```
==========================================================================
  UPSTREAM ELEVATION(FEET) =  408.00  DOWNSTREAM ELEVATION(FEET) =  405.90
  STREET LENGTH(FEET) =   150.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =   10.19
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.115
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.29      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =      0.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       2.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  10.71
  FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.90  DOWNSTREAM(FEET) =   405.70
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.95
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.36
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.36
  RAINFALL INTENSITY(INCH/HR) =   4.08
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.36
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.95

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
 ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.051
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.547
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.78      0.20     0.100    91    6.05
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      3.88
 TOTAL AREA(ACRES) =      0.78   PEAK FLOW RATE(CFS) =      3.88

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   5.55
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.78
 TOTAL STREAM AREA(ACRES) =       0.78
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.88

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.95   10.36    4.075  0.20( 0.07) 0.36       0.8       7.00
     2        3.88    6.05    5.547  0.20( 0.02) 0.10       0.8      10.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.23    6.05    5.547  0.20( 0.04) 0.20       1.3      10.00
     2        5.79   10.36    4.075  0.20( 0.05) 0.23       1.6       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.23    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.25   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     11.00 =     485.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.70  DOWNSTREAM(FEET) =   405.40
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.23
```

```
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.20
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.20
  RAINFALL INTENSITY(INCH/HR) =   5.47
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.25
  TOTAL STREAM AREA(ACRES) =       1.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.23

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    405.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.386
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.378
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        1.50      0.20      0.100    91    6.39
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      7.23
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      7.23

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.50
  TOTAL STREAM AREA(ACRES) =       1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.23    6.20    5.470  0.20( 0.04) 0.20       1.3      10.00
      1        5.79   10.51    4.042  0.20( 0.05) 0.23       1.6       7.00
      2        7.23    6.39    5.378  0.20( 0.02) 0.10       1.5      12.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.38    6.20    5.470  0.20( 0.03) 0.14       2.7      10.00
```

```
      2       13.45    6.39    5.378  0.20( 0.03) 0.15       2.8      12.00
      3       11.22   10.51    4.042  0.20( 0.03) 0.17       3.1       7.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.45    Tc(MIN.) =     6.39
  EFFECTIVE AREA(ACRES) =       2.77   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     13.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.40  DOWNSTREAM(FEET) =   405.30
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.45
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.45
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.45
  RAINFALL INTENSITY(INCH/HR) =   5.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.15
  EFFECTIVE STREAM AREA(ACRES) =       2.77
  TOTAL STREAM AREA(ACRES) =       3.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.45

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   190.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.723
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.726
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.41      0.20     0.100    91    5.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      0.41   PEAK FLOW RATE(CFS) =      2.11

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.72
```

```
 RAINFALL INTENSITY(INCH/HR) =   5.73
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.41
 TOTAL STREAM AREA(ACRES) =       0.41
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.11

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.38    6.26    5.440  0.20( 0.03) 0.14       2.7      10.00
     1       13.45    6.45    5.349  0.20( 0.03) 0.15       2.8      12.00
     1       11.22   10.57    4.028  0.20( 0.03) 0.17       3.1       7.00
     2        2.11    5.72    5.726  0.20( 0.02) 0.10       0.4      14.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    5.72    5.726  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.26    5.440  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.45    5.349  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   10.57    4.028  0.20( 0.03) 0.16       3.5       7.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.41    Tc(MIN.) =     6.45
 EFFECTIVE AREA(ACRES) =       3.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.14
 TOTAL AREA(ACRES) =        3.5
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.00 =     550.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   405.30  DOWNSTREAM(FEET) =   404.50
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.41
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    6.89
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.98    6.16    5.488  0.20( 0.03) 0.14       2.9      14.00
     2       15.38    6.70    5.232  0.20( 0.03) 0.14       3.1      10.00
     3       15.41    6.89    5.150  0.20( 0.03) 0.14       3.2      12.00
     4       12.70   11.02    3.933  0.20( 0.03) 0.16       3.5       7.00
 LONGEST FLOWPATH FROM NODE      7.00 TO NODE     15.10 =     700.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.59    7.95    4.743  0.20( 0.14) 0.71       4.3       1.00
     2       17.30   11.90    3.765  0.20( 0.14) 0.68       4.9       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.16    5.488  0.20( 0.09) 0.45       6.2      14.00
      2       33.63    6.70    5.232  0.20( 0.09) 0.45       6.7      10.00
      3       33.88    6.89    5.150  0.20( 0.09) 0.45       6.9      12.00
      4       34.30    7.95    4.743  0.20( 0.09) 0.47       7.5       1.00
      5       30.51   11.02    3.933  0.20( 0.09) 0.46       8.3       7.00
      6       29.45   11.90    3.765  0.20( 0.09) 0.46       8.4       4.00
    TOTAL AREA(ACRES) =         8.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       34.30  Tc(MIN.) =    7.951
  EFFECTIVE AREA(ACRES) =      7.54  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
  TOTAL AREA(ACRES) =        8.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     15.10 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     15.10 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.10 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.50  DOWNSTREAM(FEET) =   403.60
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.30
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    8.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.41
  RAINFALL INTENSITY(INCH/HR) =   4.59
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       7.54
  TOTAL STREAM AREA(ACRES) =       8.43
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.30

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.054
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.545
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
```

```
  "11+ DWELLINGS/ACRE"       D        0.46      0.20     0.200    91    6.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.28
  TOTAL AREA(ACRES) =      0.46   PEAK FLOW RATE(CFS) =      2.28

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.05
  RAINFALL INTENSITY(INCH/HR) =   5.54
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.46
  TOTAL STREAM AREA(ACRES) =       0.46
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.28

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       32.63    6.62    5.266  0.20( 0.09) 0.45       6.2      14.00
      1       33.63    7.16    5.037  0.20( 0.09) 0.45       6.7      10.00
      1       33.88    7.35    4.963  0.20( 0.09) 0.45       6.9      12.00
      1       34.30    8.41    4.593  0.20( 0.09) 0.47       7.5       1.00
      1       30.51   11.49    3.841  0.20( 0.09) 0.46       8.3       7.00
      1       29.45   12.36    3.683  0.20( 0.09) 0.46       8.4       4.00
      2        2.28    6.05    5.545  0.20( 0.04) 0.20       0.5      16.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    6.05    5.545  0.20( 0.09) 0.43       6.1      16.00
      2       34.79    6.62    5.266  0.20( 0.09) 0.43       6.7      14.00
      3       35.70    7.16    5.037  0.20( 0.09) 0.43       7.2      10.00
      4       35.92    7.35    4.963  0.20( 0.09) 0.43       7.3      12.00
      5       36.19    8.41    4.593  0.20( 0.09) 0.45       8.0       1.00
      6       32.08   11.49    3.841  0.20( 0.09) 0.45       8.7       7.00
      7       30.96   12.36    3.683  0.20( 0.09) 0.45       8.9       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.19    Tc(MIN.) =     8.41
  EFFECTIVE AREA(ACRES) =       8.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.60  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.27
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.19
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

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```

```
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    410.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.254
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.443
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.34      0.20     0.200    91    6.25
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.65
  TOTAL AREA(ACRES) =      0.34   PEAK FLOW RATE(CFS) =      1.65

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   408.40
  FLOW LENGTH(FEET) =   265.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    7.52
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.52
  RAINFALL INTENSITY(INCH/HR) =   4.90
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       0.34
  TOTAL STREAM AREA(ACRES) =       0.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  ELEVATION DATA: UPSTREAM(FEET) =    412.00  DOWNSTREAM(FEET) =    411.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.718
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.825
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.29      0.20      0.900    91    7.72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.21
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      1.21

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.72
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.29
  TOTAL STREAM AREA(ACRES) =       0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.21

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.65    7.52    4.896  0.20( 0.04) 0.20       0.3      18.00
      2        1.21    7.72    4.825  0.20( 0.18) 0.90       0.3      18.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    7.52    4.896  0.20( 0.10) 0.52       0.6      18.00
      2        2.84    7.72    4.825  0.20( 0.10) 0.52       0.6      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.85    Tc(MIN.) =     7.52
  EFFECTIVE AREA(ACRES) =       0.62   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.6
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     20.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     22.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.40  DOWNSTREAM(FEET) =   406.30
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.85
  PIPE TRAVEL TIME(MIN.) =   1.39    Tc(MIN.) =    8.91
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.44
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       0.62
  TOTAL STREAM AREA(ACRES) =       0.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.85

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.10  DOWNSTREAM(FEET) =    409.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.376
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.39      0.20     0.100    91    8.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.39   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        2.45      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    9.75
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =      11.36

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.38
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.604
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.51      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.51      SUBAREA RUNOFF(CFS) =    6.20
  EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =        4.4       PEAK FLOW RATE(CFS) =      17.56

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =   1
```

```
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.38
  RAINFALL INTENSITY(INCH/HR) =   4.60
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.59
  EFFECTIVE STREAM AREA(ACRES) =       4.35
  TOTAL STREAM AREA(ACRES) =       4.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.56

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.85    8.91    4.443  0.20( 0.10) 0.52       0.6      18.00
      1        2.84    9.11    4.388  0.20( 0.10) 0.52       0.6      18.00
      2       17.56    8.38    4.604  0.20( 0.12) 0.59       4.4      21.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    8.38    4.604  0.20( 0.12) 0.58       4.9      21.00
      2       19.79    8.91    4.443  0.20( 0.12) 0.58       5.0      18.00
      3       19.56    9.11    4.388  0.20( 0.12) 0.58       5.0      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.35    Tc(MIN.) =     8.38
  EFFECTIVE AREA(ACRES) =       4.94   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        5.0
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     22.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   406.30  DOWNSTREAM(FEET) =   404.20
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.35
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    9.24
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.24
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.58
  EFFECTIVE STREAM AREA(ACRES) =       4.94
  TOTAL STREAM AREA(ACRES) =       4.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.35

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     26.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
 ELEVATION DATA: UPSTREAM(FEET) =    410.30  DOWNSTREAM(FEET) =    407.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.795
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.190
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.37      0.20      0.100    91    6.80
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.72
 TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.72

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.80
 RAINFALL INTENSITY(INCH/HR) =   5.19
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.37
 TOTAL STREAM AREA(ACRES) =       0.37
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.72

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    407.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.024
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.092
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.40      0.20      0.100    91    7.02
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.83
 TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.83

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.02
 RAINFALL INTENSITY(INCH/HR) =   5.09
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.40
```

```
  TOTAL STREAM AREA(ACRES) =       0.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.35    9.24    4.352  0.20( 0.12) 0.58       4.9      21.00
      1       19.79    9.78    4.213  0.20( 0.12) 0.58       5.0      18.00
      1       19.56    9.98    4.165  0.20( 0.12) 0.58       5.0      18.00
      2        1.72    6.80    5.190  0.20( 0.02) 0.10       0.4      26.00
      3        1.83    7.02    5.092  0.20( 0.02) 0.10       0.4      27.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    6.80    5.190  0.20( 0.10) 0.49       4.4      26.00
      2       21.67    7.02    5.092  0.20( 0.10) 0.50       4.5      27.00
      3       23.35    9.24    4.352  0.20( 0.10) 0.51       5.7      21.00
      4       22.69    9.78    4.213  0.20( 0.10) 0.51       5.7      18.00
      5       22.43    9.98    4.165  0.20( 0.10) 0.51       5.8      18.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      23.35    Tc(MIN.) =     9.24
  EFFECTIVE AREA(ACRES) =       5.71   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =        5.8
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     28.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   403.40
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.15
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.35
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       21.44    6.87    5.157  0.20( 0.10) 0.49       4.4      26.00
      2       21.67    7.10    5.061  0.20( 0.10) 0.50       4.5      27.00
      3       23.35    9.31    4.332  0.20( 0.10) 0.51       5.7      21.00
      4       22.69    9.85    4.194  0.20( 0.10) 0.51       5.7      18.00
      5       22.43   10.05    4.147  0.20( 0.10) 0.51       5.8      18.00
  LONGEST FLOWPATH FROM NODE     18.00 TO NODE     29.00 =    1165.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.70    6.14    5.503  0.20( 0.09) 0.43       6.1      16.00
      2       34.79    6.70    5.230  0.20( 0.09) 0.43       6.7      14.00
      3       35.70    7.24    5.005  0.20( 0.09) 0.43       7.2      10.00
      4       35.92    7.43    4.932  0.20( 0.09) 0.43       7.3      12.00
      5       36.19    8.49    4.568  0.20( 0.09) 0.45       8.0       1.00
      6       32.08   11.57    3.826  0.20( 0.09) 0.45       8.7       7.00
```

```
     7       30.96   12.44    3.669  0.20( 0.09) 0.45       8.9       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.14    5.503  0.20( 0.09) 0.45      10.0      16.00
      2       56.02    6.70    5.230  0.20( 0.09) 0.45      10.9      14.00
      3       56.52    6.87    5.157  0.20( 0.09) 0.46      11.2      26.00
      4       57.13    7.10    5.061  0.20( 0.09) 0.46      11.6      27.00
      5       57.48    7.24    5.005  0.20( 0.09) 0.46      11.8      10.00
      6       57.84    7.43    4.932  0.20( 0.09) 0.46      12.0      12.00
      7       58.91    8.49    4.568  0.20( 0.09) 0.47      13.3       1.00
      8       58.44    9.31    4.332  0.20( 0.10) 0.48      13.9      21.00
      9       57.06    9.85    4.194  0.20( 0.10) 0.48      14.1      18.00
     10       56.54   10.05    4.147  0.20( 0.10) 0.48      14.1      18.00
     11       52.73   11.57    3.826  0.20( 0.09) 0.47      14.5       7.00
     12       50.75   12.44    3.669  0.20( 0.09) 0.47      14.6       4.00
    TOTAL AREA(ACRES) =        14.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       58.91  Tc(MIN.) =    8.490
  EFFECTIVE AREA(ACRES) =     13.27  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =       14.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     29.00 =    1685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   403.40  DOWNSTREAM(FEET) =   400.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.74
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =    8.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    1985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.25
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.91
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.02
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.02
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.41
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      13.27
  TOTAL STREAM AREA(ACRES) =      14.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.91

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"         D        0.58      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      3.14
  TOTAL AREA(ACRES) =      0.58   PEAK FLOW RATE(CFS) =      3.14

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   390.00  DOWNSTREAM(FEET) =   388.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.14
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =     200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
  RAINFALL INTENSITY(INCH/HR) =   6.01
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.58
  TOTAL STREAM AREA(ACRES) =       0.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.16    6.67    5.245  0.20( 0.09) 0.45      10.0      16.00
      1       56.02    7.24    5.006  0.20( 0.09) 0.45      10.9      14.00
      1       56.52    7.40    4.941  0.20( 0.09) 0.46      11.2      26.00
      1       57.13    7.63    4.856  0.20( 0.09) 0.46      11.6      27.00
      1       57.48    7.77    4.806  0.20( 0.09) 0.46      11.8      10.00
      1       57.84    7.96    4.741  0.20( 0.09) 0.46      12.0      12.00
      1       58.91    9.02    4.413  0.20( 0.09) 0.47      13.3       1.00
      1       58.44    9.84    4.197  0.20( 0.10) 0.48      13.9      21.00
```

```
     1       57.06   10.39    4.070  0.20( 0.10) 0.48      14.1      18.00
     1       56.54   10.58    4.026  0.20( 0.10) 0.48      14.1      18.00
     1       52.73   12.12    3.725  0.20( 0.09) 0.47      14.5       7.00
     1       50.75   13.00    3.579  0.20( 0.09) 0.47      14.6       4.00
     2        3.14    5.26    6.010  0.20( 0.18) 0.90       0.6      31.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       52.18    5.26    6.010  0.20( 0.10) 0.48       8.5      31.00
      2       56.88    6.67    5.245  0.20( 0.10) 0.48      10.6      16.00
      3       58.61    7.24    5.006  0.20( 0.10) 0.48      11.5      14.00
      4       59.08    7.40    4.941  0.20( 0.10) 0.48      11.8      26.00
      5       59.65    7.63    4.856  0.20( 0.10) 0.48      12.2      27.00
      6       59.97    7.77    4.806  0.20( 0.10) 0.48      12.4      10.00
      7       60.29    7.96    4.741  0.20( 0.10) 0.48      12.6      12.00
      8       61.19    9.02    4.413  0.20( 0.10) 0.49      13.8       1.00
      9       60.60    9.84    4.197  0.20( 0.10) 0.49      14.5      21.00
     10       59.16   10.39    4.070  0.20( 0.10) 0.49      14.7      18.00
     11       58.61   10.58    4.026  0.20( 0.10) 0.49      14.7      18.00
     12       54.64   12.12    3.725  0.20( 0.10) 0.49      15.1       7.00
     13       52.58   13.00    3.579  0.20( 0.10) 0.49      15.2       4.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      61.19    Tc(MIN.) =     9.02
  EFFECTIVE AREA(ACRES) =      13.85   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =       15.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    2085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    416.00  DOWNSTREAM(FEET) =    413.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.656
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        2.01      0.20     1.000    98   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      6.25
  TOTAL AREA(ACRES) =      2.01   PEAK FLOW RATE(CFS) =      6.25

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    410.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0059
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.042
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.51      0.20     1.000    98
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.79
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   4.75
  Tc(MIN.) =   17.27
  SUBAREA AREA(ACRES) =     3.51       SUBAREA RUNOFF(CFS) =    8.98
  EFFECTIVE AREA(ACRES) =      5.52     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =      14.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   410.00  DOWNSTREAM(FEET) =   409.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.12
  PIPE TRAVEL TIME(MIN.) =   1.17    Tc(MIN.) =   18.44
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   18.44
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.52
  TOTAL STREAM AREA(ACRES) =       5.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.12

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.60  DOWNSTREAM(FEET) =    409.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.061
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.23      0.20     0.100    91    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.05
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.05

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        3.15      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    3.15      SUBAREA RUNOFF(CFS) =   13.83
  EFFECTIVE AREA(ACRES) =      3.38   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =        3.4       PEAK FLOW RATE(CFS) =      14.87

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    7.06
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.077
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.40      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    1.82
  EFFECTIVE AREA(ACRES) =      3.78   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      16.69

********************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   5.08
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       3.78
  TOTAL STREAM AREA(ACRES) =       3.78
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.69

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.12   18.44    2.929  0.20( 0.20) 1.00       5.5      37.00
      2       16.69    7.06    5.077  0.20( 0.17) 0.85       3.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.06    5.077  0.20( 0.18) 0.90       5.9      40.00
      2       23.50   18.44    2.929  0.20( 0.19) 0.94       9.3      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.35    Tc(MIN.) =     7.06
  EFFECTIVE AREA(ACRES) =       5.89   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     41.00 =    1120.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   409.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.30
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.35
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    7.56
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.56
  RAINFALL INTENSITY(INCH/HR) =   4.88
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       5.89
  TOTAL STREAM AREA(ACRES) =       9.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.35

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    460.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.731
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.820
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                    D        0.63      0.20     1.000    98    7.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.62
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    460.00  DOWNSTREAM(FEET) =    408.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.1182
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.375
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.00      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.15
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =    9.15
  SUBAREA AREA(ACRES) =     5.00       SUBAREA RUNOFF(CFS) =   18.79
  EFFECTIVE AREA(ACRES) =      5.63     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        5.6         PEAK FLOW RATE(CFS) =      21.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   6.17
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     44.00 =     740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   408.00  DOWNSTREAM(FEET) =   407.50
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.62
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.16
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    9.36
  LONGEST FLOWPATH FROM NODE     42.00 TO NODE     45.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.36
  RAINFALL INTENSITY(INCH/HR) =   4.32
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.63
  TOTAL STREAM AREA(ACRES) =       5.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.16

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.35    7.56    4.881  0.20( 0.18) 0.90       5.9      40.00
      1       23.50   18.97    2.882  0.20( 0.19) 0.94       9.3      37.00
      2       21.16    9.36    4.321  0.20( 0.20) 1.00       5.6      42.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.78    7.56    4.881  0.20( 0.19) 0.95      10.4      40.00
      2       47.06    9.36    4.321  0.20( 0.19) 0.95      12.1      42.00
      3       37.27   18.97    2.882  0.20( 0.19) 0.96      14.9      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.06    Tc(MIN.) =     9.36
  EFFECTIVE AREA(ACRES) =      12.06   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       14.9
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     45.00 =    1340.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     45.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   407.50  DOWNSTREAM(FEET) =   405.00
 FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  27.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.14
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.06
 PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   10.15
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   4.12
 AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.95
 EFFECTIVE STREAM AREA(ACRES) =      12.06
 TOTAL STREAM AREA(ACRES) =      14.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.06

****************************************************************************
 FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
 ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.363
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.957
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        0.38      0.20     0.200    91    7.36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.68
 TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.68

****************************************************************************
 FLOW PROCESS FROM NODE     47.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
 STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 20.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.018
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.46
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   13.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.94
  STREET FLOW TRAVEL TIME(MIN.) =   1.31   Tc(MIN.) =    8.67
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.513
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.38      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.38      SUBAREA RUNOFF(CFS) =    5.56
  EFFECTIVE AREA(ACRES) =      1.76    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       7.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  16.28
  FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  LONGEST FLOWPATH FROM NODE     46.00 TO NODE     50.00 =     460.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.67
  RAINFALL INTENSITY(INCH/HR) =   4.51
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       1.76
  TOTAL STREAM AREA(ACRES) =       1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.08

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    410.00  DOWNSTREAM(FEET) =    407.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.023
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.719
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.74      0.20     0.200    91    8.02
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.12
  TOTAL AREA(ACRES) =      0.74   PEAK FLOW RATE(CFS) =      3.12

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  407.10  DOWNSTREAM ELEVATION(FEET) =  405.00
  STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.90
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   16.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    9.58
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.264
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.99      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.99      SUBAREA RUNOFF(CFS) =    7.56
  EFFECTIVE AREA(ACRES) =      2.73    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.7        PEAK FLOW RATE(CFS) =      10.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  19.68
  FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.58
  RAINFALL INTENSITY(INCH/HR) =   4.26
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       2.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.78    8.36    4.608  0.20( 0.19) 0.95      10.4      40.00
      1       47.06   10.15    4.123  0.20( 0.19) 0.95      12.1      42.00
      1       37.27   19.81    2.811  0.20( 0.19) 0.96      14.9      37.00
      2        7.08    8.67    4.513  0.20( 0.04) 0.20       1.8      46.00
      3       10.38    9.58    4.264  0.20( 0.04) 0.20       2.7      48.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.56    8.36    4.608  0.20( 0.15) 0.74      14.5      40.00
      2       63.04    8.67    4.513  0.20( 0.15) 0.74      15.0      46.00
      3       63.73    9.58    4.264  0.20( 0.15) 0.74      16.0      48.00
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     4       63.56   10.15    4.123  0.20( 0.15) 0.75      16.5      42.00
     5       48.47   19.81    2.811  0.20( 0.16) 0.79      19.4      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      63.73    Tc(MIN.) =     9.58
  EFFECTIVE AREA(ACRES) =      16.03   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       19.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     50.00 =    1730.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   405.00  DOWNSTREAM(FEET) =   402.80
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.73
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.63
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    408.20  DOWNSTREAM(FEET) =    405.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.969
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.737
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.64      0.20     0.200    91    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.71
  TOTAL AREA(ACRES) =      0.64   PEAK FLOW RATE(CFS) =      2.71

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     54.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.20  DOWNSTREAM ELEVATION(FEET) =  404.20
  STREET LENGTH(FEET) =   140.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200
```

```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   15.99
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   1.00   Tc(MIN.) =    8.97
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.426
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.46      0.20     0.200    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    5.76
  EFFECTIVE AREA(ACRES) =      2.10    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       8.29

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  18.68
  FLOW VELOCITY(FEET/SEC.) =  2.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.97
  RAINFALL INTENSITY(INCH/HR) =   4.43
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.10
  TOTAL STREAM AREA(ACRES) =       2.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.29

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    411.00  DOWNSTREAM(FEET) =    407.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.218
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.013
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.33      0.20     0.200    91    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.95
  TOTAL AREA(ACRES) =      1.33   PEAK FLOW RATE(CFS) =      5.95

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    404.20
```

```
 CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0187
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.874
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        1.50      0.20     0.200    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.22
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.87
 AVERAGE FLOW DEPTH(FEET) =   0.82   TRAVEL TIME(MIN.) =   0.36
 Tc(MIN.) =    7.58
 SUBAREA AREA(ACRES) =     1.50       SUBAREA RUNOFF(CFS) =    6.53
 EFFECTIVE AREA(ACRES) =      2.83     AREA-AVERAGED Fm(INCH/HR) =   0.04
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.20
 TOTAL AREA(ACRES) =        2.8         PEAK FLOW RATE(CFS) =      12.31

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =   7.42
 LONGEST FLOWPATH FROM NODE     52.00 TO NODE     54.00 =     430.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.58
 RAINFALL INTENSITY(INCH/HR) =   4.87
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       2.83
 TOTAL STREAM AREA(ACRES) =       2.83
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        8.29    8.97    4.426  0.20( 0.04) 0.20       2.1      14.00
     2       12.31    7.58    4.874  0.20( 0.04) 0.20       2.8      52.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       20.03    7.58    4.874  0.20( 0.04) 0.20       4.6      52.00
     2       19.46    8.97    4.426  0.20( 0.04) 0.20       4.9      14.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.03    Tc(MIN.) =     7.58
 EFFECTIVE AREA(ACRES) =       4.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        4.9
 LONGEST FLOWPATH FROM NODE     14.00 TO NODE     54.00 =     440.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   404.20  DOWNSTREAM(FEET) =   402.80
 FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.03
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =    8.39
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.03    8.39    4.600  0.20( 0.04) 0.20       4.6      52.00
      2       19.46    9.78    4.213  0.20( 0.04) 0.20       4.9      14.00
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     55.00 =     725.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       62.56    8.42    4.589  0.20( 0.15) 0.74      14.5      40.00
      2       63.04    8.73    4.495  0.20( 0.15) 0.74      15.0      46.00
      3       63.73    9.63    4.249  0.20( 0.15) 0.74      16.0      48.00
      4       63.56   10.21    4.109  0.20( 0.15) 0.75      16.5      42.00
      5       48.47   19.88    2.806  0.20( 0.16) 0.79      19.4      37.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.39    4.600  0.20( 0.12) 0.61      19.1      52.00
      2       82.58    8.42    4.589  0.20( 0.12) 0.61      19.1      40.00
      3       82.93    8.73    4.495  0.20( 0.12) 0.61      19.6      46.00
      4       83.25    9.63    4.249  0.20( 0.12) 0.61      20.9      48.00
      5       83.15    9.78    4.213  0.20( 0.12) 0.61      21.1      14.00
      6       82.54   10.21    4.109  0.20( 0.12) 0.62      21.5      42.00
      7       61.37   19.88    2.806  0.20( 0.13) 0.67      24.4      37.00
    TOTAL AREA(ACRES) =        24.4

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       83.25  Tc(MIN.) =    9.635
  EFFECTIVE AREA(ACRES) =     20.92  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.61
  TOTAL AREA(ACRES) =       24.4
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     55.00 =    1790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   402.80  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  34.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      83.25
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   10.00
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.00
 RAINFALL INTENSITY(INCH/HR) =   4.16
 AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.61
 EFFECTIVE STREAM AREA(ACRES) =      20.92
 TOTAL STREAM AREA(ACRES) =      24.35
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      83.25

****************************************************************************
 FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
 ELEVATION DATA: UPSTREAM(FEET) =    413.00  DOWNSTREAM(FEET) =    409.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.382
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        0.88      0.20     0.900    91    9.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      3.33
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      3.33

****************************************************************************
 FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    409.00  DOWNSTREAM(FEET) =    407.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0125
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.235
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"       D        0.25      0.20     0.500    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.77
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   0.56
 Tc(MIN.) =    9.69
 SUBAREA AREA(ACRES) =     0.25       SUBAREA RUNOFF(CFS) =    0.93
 EFFECTIVE AREA(ACRES) =      1.13     AREA-AVERAGED Fm(INCH/HR) =   0.16
 AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.81
 TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       4.14

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   4.88
 LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     370.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   407.00  DOWNSTREAM(FEET) =   401.90
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.14
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   10.51
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     59.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.51
  RAINFALL INTENSITY(INCH/HR) =   4.04
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       82.48    8.75    4.490  0.20( 0.12) 0.61      19.1      52.00
      1       82.58    8.78    4.480  0.20( 0.12) 0.61      19.1      40.00
      1       82.93    9.09    4.392  0.20( 0.12) 0.61      19.6      46.00
      1       83.25   10.00    4.160  0.20( 0.12) 0.61      20.9      48.00
      1       83.15   10.14    4.126  0.20( 0.12) 0.61      21.1      14.00
      1       82.54   10.57    4.028  0.20( 0.12) 0.62      21.5      42.00
      1       61.37   20.27    2.775  0.20( 0.13) 0.67      24.4      37.00
      2        4.14   10.51    4.043  0.20( 0.16) 0.81       1.1      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       86.33    8.75    4.490  0.20( 0.12) 0.62      20.0      52.00
      2       86.43    8.78    4.480  0.20( 0.12) 0.62      20.1      40.00
      3       86.84    9.09    4.392  0.20( 0.12) 0.62      20.6      46.00
      4       87.31   10.00    4.160  0.20( 0.12) 0.62      22.0      48.00
      5       87.24   10.14    4.126  0.20( 0.12) 0.62      22.2      14.00
      6       86.78   10.51    4.043  0.20( 0.13) 0.63      22.5      56.00
      7       86.66   10.57    4.028  0.20( 0.13) 0.63      22.6      42.00
      8       64.16   20.27    2.775  0.20( 0.13) 0.67      25.5      37.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.31    Tc(MIN.) =    10.00
  EFFECTIVE AREA(ACRES) =      22.00   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     59.00 =    1975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   401.90  DOWNSTREAM(FEET) =   400.90
```

```
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.31
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.62
  EFFECTIVE STREAM AREA(ACRES) =      22.00
  TOTAL STREAM AREA(ACRES) =      25.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      87.31

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
  ELEVATION DATA: UPSTREAM(FEET) =    406.40  DOWNSTREAM(FEET) =    403.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.378
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.382
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.51      0.20      0.100    91    6.38
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.46
  TOTAL AREA(ACRES) =      0.51   PEAK FLOW RATE(CFS) =      2.46

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.38
  RAINFALL INTENSITY(INCH/HR) =   5.38
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.51
  TOTAL STREAM AREA(ACRES) =       0.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.46

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    407.00  DOWNSTREAM(FEET) =    405.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.027
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.717
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20     0.100    91    8.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.35
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  405.00  DOWNSTREAM ELEVATION(FEET) =  403.00
  STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.66
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.98
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.57
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    9.71
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.230
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.16      0.20     0.100    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.61
  EFFECTIVE AREA(ACRES) =      0.48    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       1.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  2.03   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  LONGEST FLOWPATH FROM NODE     58.00 TO NODE     62.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.71
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.48
  TOTAL STREAM AREA(ACRES) =       0.48
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.82
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       86.33    9.13    4.381  0.20( 0.12) 0.62      20.0      52.00
     1       86.43    9.17    4.371  0.20( 0.12) 0.62      20.1      40.00
     1       86.84    9.48    4.289  0.20( 0.12) 0.62      20.6      46.00
     1       87.31   10.38    4.071  0.20( 0.12) 0.62      22.0      48.00
     1       87.24   10.52    4.039  0.20( 0.12) 0.62      22.2      14.00
     1       86.78   10.89    3.961  0.20( 0.13) 0.63      22.5      56.00
     1       86.66   10.96    3.947  0.20( 0.13) 0.63      22.6      42.00
     1       64.16   20.69    2.742  0.20( 0.13) 0.67      25.5      37.00
     2        2.46    6.38    5.382  0.20( 0.02) 0.10       0.5      60.00
     3        1.82    9.71    4.230  0.20( 0.02) 0.10       0.5      58.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       78.44    6.38    5.382  0.20( 0.12) 0.59      14.8      60.00
     2       90.11    9.13    4.381  0.20( 0.12) 0.59      21.0      52.00
     3       90.20    9.17    4.371  0.20( 0.12) 0.59      21.0      40.00
     4       90.60    9.48    4.289  0.20( 0.12) 0.59      21.6      46.00
     5       90.71    9.71    4.230  0.20( 0.12) 0.60      22.0      58.00
     6       90.92   10.38    4.071  0.20( 0.12) 0.60      23.0      48.00
     7       90.82   10.52    4.039  0.20( 0.12) 0.60      23.2      14.00
     8       90.29   10.89    3.961  0.20( 0.12) 0.61      23.5      56.00
     9       90.16   10.96    3.947  0.20( 0.12) 0.61      23.6      42.00
    10       66.58   20.69    2.742  0.20( 0.13) 0.65      26.5      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      90.92    Tc(MIN.) =    10.38
 EFFECTIVE AREA(ACRES) =      22.99   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.60
 TOTAL AREA(ACRES) =       26.5
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     62.00 =    2175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   400.90  DOWNSTREAM(FEET) =   400.30
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  48.0 INCH PIPE IS  35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.07
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      90.92
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.58
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     63.00 =    2285.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN.) =   10.37   RAINFALL INTENSITY(INCH/HR) =  4.07
 EFFECTIVE AREA(ACRES) =    13.89
 TOTAL AREA(ACRES) =    16.02        PEAK FLOW RATE(CFS) =     55.00
 AREA-AVERAGED Fm(INCH/HR) =   0.12  AREA-AVERAGED Fp(INCH/HR) =   0.20
 AREA-AVERAGED Ap =  0.60
 NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
       CONFLUENCE ANALYSES.

****************************************************************************
 FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   400.30  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.53
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.00
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.39
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.39
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.60
  EFFECTIVE STREAM AREA(ACRES) =      13.89
  TOTAL STREAM AREA(ACRES) =      16.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      55.00

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  USER SPECIFIED Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      4.33
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      4.33

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   395.00  DOWNSTREAM(FEET) =   394.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.33
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    5.26
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =     120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.26
```

```
 RAINFALL INTENSITY(INCH/HR) =   6.01
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       0.80
 TOTAL STREAM AREA(ACRES) =       0.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.33

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       55.00   10.39    4.068  0.20( 0.12) 0.60      13.9      37.00
     2        4.33    5.26    6.012  0.20( 0.18) 0.90       0.8      64.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       45.84    5.26    6.012  0.20( 0.13) 0.63       7.8      64.00
     2       57.88   10.39    4.068  0.20( 0.12) 0.62      14.7      37.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      57.88    Tc(MIN.) =    10.39
 EFFECTIVE AREA(ACRES) =      14.69   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =       16.8
 LONGEST FLOWPATH FROM NODE     37.00 TO NODE     66.00 =    2325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    406.00  DOWNSTREAM(FEET) =    400.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.319
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.55      0.20      0.100    91    6.51
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.62
 TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      2.62

****************************************************************************
 FLOW PROCESS FROM NODE     81.00 TO NODE     82.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    499.00  DOWNSTREAM(FEET) =    445.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.244
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.003
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 NATURAL POOR COVER
 "BARREN"                   D        0.62      0.20      1.000    98    7.24
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      2.68
```

```
  TOTAL AREA(ACRES) =      0.62   PEAK FLOW RATE(CFS) =      2.68

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     83.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    445.00  DOWNSTREAM(FEET) =    396.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0606
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   0.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.417
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        5.46      0.20     1.000    98
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.07
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.57
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   1.76
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     5.46       SUBAREA RUNOFF(CFS) =   20.72
  EFFECTIVE AREA(ACRES) =      6.08     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        6.1          PEAK FLOW RATE(CFS) =      23.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   9.34
  LONGEST FLOWPATH FROM NODE     81.00 TO NODE     83.00 =    1100.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.1  TC(MIN.) =      9.00
  EFFECTIVE AREA(ACRES) =      6.08  AREA-AVERAGED Fm(INCH/HR)=  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      23.08
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 7

DETENTION BASIN CALCULATIONS

WEST

AREA “A”

100-YEAR STUDY

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  WEST - AREA 'A' - NODE 33
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         35.80       18.00       75.(AMC II)     0.200       0.932

    TOTAL AREA (Acres) =     35.80

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.036

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.068
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             F L O O D    R O U T I N G    A N A L Y S I S
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 33, WEST AREA                                                    *
 ************************************************************************

  FILE NAME: WEST-33.DAT
  TIME/DATE OF STUDY: 18:41 11/07/2021


************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      35.800 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.123 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.036
         LOW LOSS FRACTION = 0.068
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  67.751


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


========================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	8.138	35.233
2	50.316	182.615
3	87.801	162.292
4	97.582	42.348
5	99.235	7.158
6	99.694	1.987
7	99.924	0.993
8	100.000	0.331

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.9474
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 15.8394

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	5.7767	12.11	. Q . V . . .
14.083	5.8619	12.37	. Q . V . . .
14.167	5.9492	12.68	. Q . V . . .
14.250	6.0387	13.00	. Q . V . . .
14.333	6.1304	13.32	. Q . V . . .
14.417	6.2243	13.64	. Q . V . . .
14.500	6.3207	14.00	. Q . V . . .
14.583	6.4197	14.37	. Q . V . . .
14.667	6.5215	14.78	. Q . V . . .
14.750	6.6263	15.22	. Q . V . . .
14.833	6.7346	15.72	. Q . V . . .
14.917	6.8464	16.24	. Q . V . . .
15.000	6.9624	16.84	. Q . V . . .
15.083	7.0828	17.49	. Q . V . . .
15.167	7.2087	18.28	. Q . V . . .
15.250	7.3406	19.15	. Q . V . . .
15.333	7.4797	20.20	. Q . V . . .
15.417	7.6251	21.11	. Q . V . . .
15.500	7.7714	21.24	. Q . V . . .
15.583	7.9210	21.72	. Q . V . . .
15.667	8.0832	23.56	. Q . V . . .
15.750	8.2633	26.15	. Q . V . . .
15.833	8.4701	30.02	. Q . V . . .
15.917	8.7151	35.57	. Q . V . . .
16.000	9.0333	46.20	. Q . V . . .
16.083	9.5390	73.43	. Q . V . . .
16.167	10.4433	131.31	. Q . V . . .
16.250	11.2199	112.76	. Q . V . . .
16.333	11.5920	54.04	. Q . V . . .
16.417	11.8070	31.21	. Q . V . . .
16.500	11.9783	24.86	. Q . V . . .
16.583	12.1304	22.10	. Q . V . . .
16.667	12.2659	19.68	. Q . V . . .
16.750	12.3885	17.80	. Q . V . . .
16.833	12.5019	16.46	. Q . V . . .
16.917	12.6079	15.39	. Q . V . . .
17.000	12.7078	14.50	. Q . V . . .
17.083	12.8024	13.74	. Q . V . . .
17.167	12.8923	13.06	. Q . V . . .
17.250	12.9781	12.45	. Q . V . . .
17.333	13.0604	11.94	. Q . V . . .
17.417	13.1395	11.50	. Q . V . . .
17.500	13.2159	11.09	. Q . V . . .
17.583	13.2898	10.73	. Q . V . . .
17.667	13.3615	10.40	. Q . V . . .
17.750	13.4310	10.10	. Q . V . . .
17.833	13.4986	9.82	. Q . V . . .
17.917	13.5645	9.56	. Q . V . . .
18.000	13.6287	9.32	. Q . V . . .

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

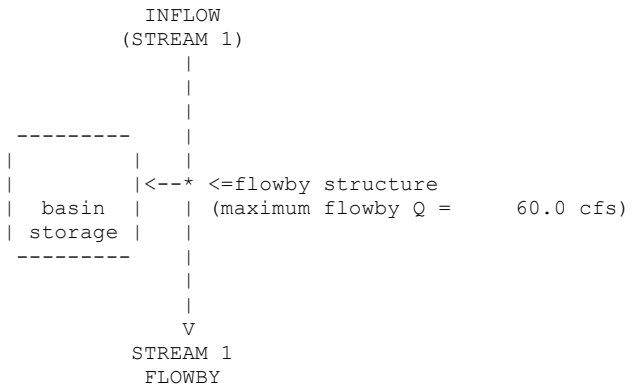
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	170.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

****
FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 2

>>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
60.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.24	0.24	0.000
0.167	1.48	1.48	0.000
0.250	2.59	2.59	0.000
0.333	2.88	2.88	0.000
0.417	2.94	2.94	0.000
0.500	2.96	2.96	0.000
0.583	2.98	2.98	0.000
0.667	2.99	2.99	0.000
0.750	3.00	3.00	0.000
0.833	3.01	3.01	0.000
0.917	3.02	3.02	0.000
1.000	3.03	3.03	0.000
1.083	3.04	3.04	0.000
1.167	3.05	3.05	0.000
1.250	3.06	3.06	0.000
1.333	3.08	3.08	0.000
1.417	3.09	3.09	0.000
1.500	3.10	3.10	0.000
1.583	3.11	3.11	0.000
1.667	3.12	3.12	0.000
1.750	3.13	3.13	0.000

1.833	3.14	3.14	0.000
1.917	3.15	3.15	0.000
2.000	3.17	3.17	0.000
2.083	3.18	3.18	0.000
2.167	3.19	3.19	0.000
2.250	3.20	3.20	0.000
2.333	3.21	3.21	0.000
2.417	3.23	3.23	0.000
2.500	3.24	3.24	0.000
2.583	3.25	3.25	0.000
2.667	3.26	3.26	0.000
2.750	3.28	3.28	0.000
2.833	3.29	3.29	0.000
2.917	3.30	3.30	0.000
3.000	3.31	3.31	0.000
3.083	3.33	3.33	0.000
3.167	3.34	3.34	0.000
3.250	3.35	3.35	0.000
3.333	3.37	3.37	0.000
3.417	3.38	3.38	0.000
3.500	3.40	3.40	0.000
3.583	3.41	3.41	0.000
3.667	3.42	3.42	0.000
3.750	3.44	3.44	0.000
3.833	3.45	3.45	0.000
3.917	3.47	3.47	0.000
4.000	3.48	3.48	0.000
4.083	3.50	3.50	0.000
4.167	3.51	3.51	0.000
4.250	3.53	3.53	0.000
4.333	3.54	3.54	0.000
4.417	3.56	3.56	0.000
4.500	3.57	3.57	0.000
4.583	3.59	3.59	0.000
4.667	3.61	3.61	0.000
4.750	3.62	3.62	0.000
4.833	3.64	3.64	0.000
4.917	3.66	3.66	0.000
5.000	3.67	3.67	0.000
5.083	3.69	3.69	0.000
5.167	3.71	3.71	0.000
5.250	3.73	3.73	0.000
5.333	3.74	3.74	0.000
5.417	3.76	3.76	0.000
5.500	3.78	3.78	0.000
5.583	3.80	3.80	0.000
5.667	3.82	3.82	0.000
5.750	3.84	3.84	0.000
5.833	3.86	3.86	0.000
5.917	3.88	3.88	0.000
6.000	3.90	3.90	0.000
6.083	3.92	3.92	0.000
6.167	3.94	3.94	0.000
6.250	3.96	3.96	0.000
6.333	3.98	3.98	0.000
6.417	4.00	4.00	0.000
6.500	4.02	4.02	0.000
6.583	4.04	4.04	0.000
6.667	4.07	4.07	0.000
6.750	4.09	4.09	0.000
6.833	4.11	4.11	0.000
6.917	4.13	4.13	0.000
7.000	4.16	4.16	0.000
7.083	4.18	4.18	0.000
7.167	4.21	4.21	0.000
7.250	4.23	4.23	0.000
7.333	4.25	4.25	0.000
7.417	4.28	4.28	0.000
7.500	4.31	4.31	0.000
7.583	4.33	4.33	0.000
7.667	4.36	4.36	0.000

7.750	4.38	4.38	0.000
7.833	4.41	4.41	0.000
7.917	4.44	4.44	0.000
8.000	4.47	4.47	0.000
8.083	4.50	4.50	0.000
8.167	4.53	4.53	0.000
8.250	4.56	4.56	0.000
8.333	4.59	4.59	0.000
8.417	4.62	4.62	0.000
8.500	4.65	4.65	0.000
8.583	4.68	4.68	0.000
8.667	4.71	4.71	0.000
8.750	4.75	4.75	0.000
8.833	4.78	4.78	0.000
8.917	4.81	4.81	0.000
9.000	4.85	4.85	0.000
9.083	4.88	4.88	0.000
9.167	4.92	4.92	0.000
9.250	4.96	4.96	0.000
9.333	4.99	4.99	0.000
9.417	5.03	5.03	0.000
9.500	5.07	5.07	0.000
9.583	5.11	5.11	0.000
9.667	5.15	5.15	0.000
9.750	5.19	5.19	0.000
9.833	5.24	5.24	0.000
9.917	5.28	5.28	0.000
10.000	5.33	5.33	0.000
10.083	5.37	5.37	0.000
10.167	5.42	5.42	0.000
10.250	5.46	5.46	0.000
10.333	5.51	5.51	0.000
10.417	5.56	5.56	0.000
10.500	5.61	5.61	0.000
10.583	5.67	5.67	0.000
10.667	5.72	5.72	0.000
10.750	5.77	5.77	0.000
10.833	5.83	5.83	0.000
10.917	5.89	5.89	0.000
11.000	5.95	5.95	0.000
11.083	6.01	6.01	0.000
11.167	6.07	6.07	0.000
11.250	6.13	6.13	0.000
11.333	6.20	6.20	0.000
11.417	6.27	6.27	0.000
11.500	6.34	6.34	0.000
11.583	6.41	6.41	0.000
11.667	6.48	6.48	0.000
11.750	6.56	6.56	0.000
11.833	6.64	6.64	0.000
11.917	6.72	6.72	0.000
12.000	6.80	6.80	0.000
12.083	7.03	7.03	0.000
12.167	7.88	7.88	0.000
12.250	8.65	8.65	0.000
12.333	8.92	8.92	0.000
12.417	9.06	9.06	0.000
12.500	9.18	9.18	0.000
12.583	9.29	9.29	0.000
12.667	9.41	9.41	0.000
12.750	9.53	9.53	0.000
12.833	9.65	9.65	0.000
12.917	9.78	9.78	0.000
13.000	9.92	9.92	0.000
13.083	10.06	10.06	0.000
13.167	10.21	10.21	0.000
13.250	10.36	10.36	0.000
13.333	10.52	10.52	0.000
13.417	10.68	10.68	0.000
13.500	10.86	10.86	0.000
13.583	11.04	11.04	0.000

13.667	11.23	11.23	0.000
13.750	11.43	11.43	0.000
13.833	11.65	11.65	0.000
13.917	11.87	11.87	0.000
14.000	12.11	12.11	0.000
14.083	12.37	12.37	0.000
14.167	12.68	12.68	0.000
14.250	13.00	13.00	0.000
14.333	13.32	13.32	0.000
14.417	13.64	13.64	0.000
14.500	14.00	14.00	0.000
14.583	14.37	14.37	0.000
14.667	14.78	14.78	0.000
14.750	15.22	15.22	0.000
14.833	15.72	15.72	0.000
14.917	16.24	16.24	0.000
15.000	16.84	16.84	0.000
15.083	17.49	17.49	0.000
15.167	18.28	18.28	0.000
15.250	19.15	19.15	0.000
15.333	20.20	20.20	0.000
15.417	21.11	21.11	0.000
15.500	21.24	21.24	0.000
15.583	21.72	21.72	0.000
15.667	23.56	23.56	0.000
15.750	26.15	26.15	0.000
15.833	30.02	30.02	0.000
15.917	35.57	35.57	0.000
16.000	46.20	46.20	0.000
16.083	73.43	60.00	0.092
16.167	131.31	60.00	0.584
16.250	112.76	60.00	0.947
16.333	54.04	54.04	0.947
16.417	31.21	31.21	0.947
16.500	24.86	24.86	0.947
16.583	22.10	22.10	0.947
16.667	19.68	19.68	0.947
16.750	17.80	17.80	0.947
16.833	16.46	16.46	0.947
16.917	15.39	15.39	0.947
17.000	14.50	14.50	0.947
17.083	13.74	13.74	0.947
17.167	13.06	13.06	0.947
17.250	12.45	12.45	0.947
17.333	11.94	11.94	0.947
17.417	11.50	11.50	0.947
17.500	11.09	11.09	0.947
17.583	10.73	10.73	0.947
17.667	10.40	10.40	0.947
17.750	10.10	10.10	0.947
17.833	9.82	9.82	0.947
17.917	9.56	9.56	0.947
18.000	9.32	9.32	0.947
18.083	8.95	8.95	0.947
18.167	7.99	7.99	0.947
18.250	7.13	7.13	0.947
18.333	6.78	6.78	0.947
18.417	6.59	6.59	0.947
18.500	6.43	6.43	0.947
18.583	6.29	6.29	0.947
18.667	6.15	6.15	0.947
18.750	6.02	6.02	0.947
18.833	5.90	5.90	0.947
18.917	5.79	5.79	0.947
19.000	5.68	5.68	0.947
19.083	5.58	5.58	0.947
19.167	5.48	5.48	0.947
19.250	5.38	5.38	0.947
19.333	5.29	5.29	0.947
19.417	5.21	5.21	0.947
19.500	5.12	5.12	0.947

19.583	5.04	5.04	0.947
19.667	4.97	4.97	0.947
19.750	4.89	4.89	0.947
19.833	4.82	4.82	0.947
19.917	4.75	4.75	0.947
20.000	4.69	4.69	0.947
20.083	4.62	4.62	0.947
20.167	4.56	4.56	0.947
20.250	4.50	4.50	0.947
20.333	4.45	4.45	0.947
20.417	4.39	4.39	0.947
20.500	4.34	4.34	0.947
20.583	4.29	4.29	0.947
20.667	4.24	4.24	0.947
20.750	4.19	4.19	0.947
20.833	4.14	4.14	0.947
20.917	4.09	4.09	0.947
21.000	4.05	4.05	0.947
21.083	4.00	4.00	0.947
21.167	3.96	3.96	0.947
21.250	3.92	3.92	0.947
21.333	3.88	3.88	0.947
21.417	3.84	3.84	0.947
21.500	3.80	3.80	0.947
21.583	3.77	3.77	0.947
21.667	3.73	3.73	0.947
21.750	3.70	3.70	0.947
21.833	3.66	3.66	0.947
21.917	3.63	3.63	0.947
22.000	3.59	3.59	0.947
22.083	3.56	3.56	0.947
22.167	3.53	3.53	0.947
22.250	3.50	3.50	0.947
22.333	3.47	3.47	0.947
22.417	3.44	3.44	0.947
22.500	3.41	3.41	0.947
22.583	3.38	3.38	0.947
22.667	3.36	3.36	0.947
22.750	3.33	3.33	0.947
22.833	3.30	3.30	0.947
22.917	3.28	3.28	0.947
23.000	3.25	3.25	0.947
23.083	3.23	3.23	0.947
23.167	3.20	3.20	0.947
23.250	3.18	3.18	0.947
23.333	3.16	3.16	0.947
23.417	3.13	3.13	0.947
23.500	3.11	3.11	0.947
23.583	3.09	3.09	0.947
23.667	3.07	3.07	0.947
23.750	3.05	3.05	0.947
23.833	3.03	3.03	0.947
23.917	3.00	3.00	0.947
24.000	2.98	2.98	0.947

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END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

EAST – AREA 'A'

100-YR STUDY

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

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--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  NODE 86 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         51.30       55.00       75.(AMC II)     0.200       0.880

    TOTAL AREA (Acres) =     51.30

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.110

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.120
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 86, EAST AREA                                                    *
 ************************************************************************

  FILE NAME: EAST-86.DAT
  TIME/DATE OF STUDY: 13:38 11/01/2021


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  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
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  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
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      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      51.300 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.128 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.110
         LOW LOSS FRACTION = 0.120
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.998
          30-MINUTE FACTOR = 0.998
           1-HOUR FACTOR = 0.998
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  65.257


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
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INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.555	46.871
2	47.443	247.468
3	85.986	239.129
4	97.102	68.964
5	99.082	12.283
6	99.633	3.416
7	99.908	1.708
8	100.000	0.569

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.5651
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 21.4895

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 50.0 100.0 150.0 200.0
14.000	7.8093	16.37	. Q . V . . .
14.083	7.9245	16.71	. Q . V . . .
14.167	8.0425	17.14	. Q . V . . .
14.250	8.1635	17.58	. Q . V . . .
14.333	8.2876	18.01	. Q . V . . .
14.417	8.4146	18.44	. Q . V . . .
14.500	8.5449	18.92	. Q . V . . .
14.583	8.6787	19.43	. Q . V . . .
14.667	8.8164	19.99	. Q . V . . .
14.750	8.9581	20.58	. Q . V . . .
14.833	9.1044	21.24	. Q . V . . .
14.917	9.2555	21.95	. Q . V . . .
15.000	9.4122	22.75	. Q . V . . .
15.083	9.5749	23.62	. Q . V . . .
15.167	9.7446	24.63	. Q . V . . .
15.250	9.9218	25.73	. Q . V . . .
15.333	10.1080	27.04	. Q . V . . .
15.417	10.3023	28.21	. Q . V. . .
15.500	10.4980	28.42	. Q . V. . .
15.583	10.6975	28.96	. Q . V. . .
15.667	10.9122	31.17	. Q . V . .
15.750	11.1492	34.41	. Q . V . .
15.833	11.4199	39.31	. Q . .V . .
15.917	11.7419	46.75	. Q. .V . .
16.000	12.1646	61.37	. Q . V . .
16.083	12.8449	98.79	. . Q. V . .
16.167	14.0768	178.88	. . . V . Q .
16.250	15.1865	161.12	. . . V . Q .
16.333	15.7239	78.02	. . Q . V. .
16.417	16.0215	43.22	. Q . V. .
16.500	16.2538	33.72	. Q . . V .
16.583	16.4598	29.91	. Q . . V .
16.667	16.6436	26.69	. Q . . V .
16.750	16.8102	24.18	. Q . . .V .
16.833	16.9643	22.38	. Q . . .V .
16.917	17.1084	20.92	. Q . . .V .
17.000	17.2441	19.71	. Q . . . V .
17.083	17.3727	18.67	. Q . . . V .
17.167	17.4948	17.73	. Q . . . V .
17.250	17.6112	16.90	. Q . . . V .
17.333	17.7228	16.20	. Q . . . V .
17.417	17.8302	15.59	. Q . . . V .
17.500	17.9338	15.04	. Q . . . V .
17.583	18.0340	14.55	. Q . . . V .
17.667	18.1311	14.10	. Q . . . V .
17.750	18.2254	13.69	. Q . . . V .
17.833	18.3170	13.31	. Q . . . V .
17.917	18.4063	12.96	. Q . . . V .
18.000	18.4933	12.63	. Q . . . V .

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	170.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

****
FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 2

>>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
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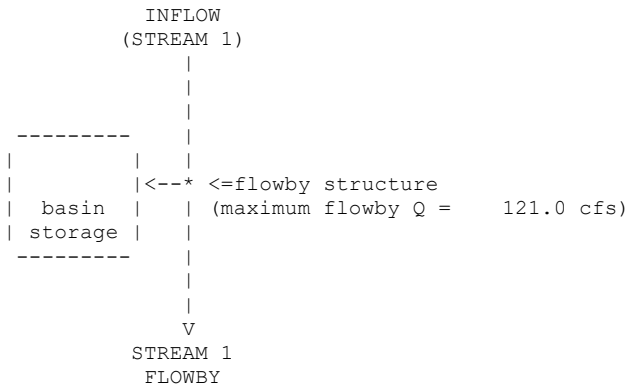
MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
121.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.30	0.30	0.000
0.167	1.89	1.89	0.000
0.250	3.43	3.43	0.000
0.333	3.88	3.88	0.000
0.417	3.97	3.97	0.000
0.500	4.01	4.01	0.000
0.583	4.03	4.03	0.000
0.667	4.05	4.05	0.000
0.750	4.06	4.06	0.000
0.833	4.08	4.08	0.000
0.917	4.09	4.09	0.000
1.000	4.10	4.10	0.000
1.083	4.12	4.12	0.000
1.167	4.13	4.13	0.000
1.250	4.15	4.15	0.000
1.333	4.16	4.16	0.000
1.417	4.18	4.18	0.000
1.500	4.19	4.19	0.000
1.583	4.20	4.20	0.000
1.667	4.22	4.22	0.000
1.750	4.24	4.24	0.000

1.833	4.25	4.25	0.000
1.917	4.27	4.27	0.000
2.000	4.28	4.28	0.000
2.083	4.30	4.30	0.000
2.167	4.31	4.31	0.000
2.250	4.33	4.33	0.000
2.333	4.35	4.35	0.000
2.417	4.36	4.36	0.000
2.500	4.38	4.38	0.000
2.583	4.40	4.40	0.000
2.667	4.41	4.41	0.000
2.750	4.43	4.43	0.000
2.833	4.45	4.45	0.000
2.917	4.47	4.47	0.000
3.000	4.48	4.48	0.000
3.083	4.50	4.50	0.000
3.167	4.52	4.52	0.000
3.250	4.54	4.54	0.000
3.333	4.56	4.56	0.000
3.417	4.57	4.57	0.000
3.500	4.59	4.59	0.000
3.583	4.61	4.61	0.000
3.667	4.63	4.63	0.000
3.750	4.65	4.65	0.000
3.833	4.67	4.67	0.000
3.917	4.69	4.69	0.000
4.000	4.71	4.71	0.000
4.083	4.73	4.73	0.000
4.167	4.75	4.75	0.000
4.250	4.77	4.77	0.000
4.333	4.79	4.79	0.000
4.417	4.81	4.81	0.000
4.500	4.84	4.84	0.000
4.583	4.86	4.86	0.000
4.667	4.88	4.88	0.000
4.750	4.90	4.90	0.000
4.833	4.92	4.92	0.000
4.917	4.95	4.95	0.000
5.000	4.97	4.97	0.000
5.083	4.99	4.99	0.000
5.167	5.02	5.02	0.000
5.250	5.04	5.04	0.000
5.333	5.06	5.06	0.000
5.417	5.09	5.09	0.000
5.500	5.11	5.11	0.000
5.583	5.14	5.14	0.000
5.667	5.16	5.16	0.000
5.750	5.19	5.19	0.000
5.833	5.22	5.22	0.000
5.917	5.24	5.24	0.000
6.000	5.27	5.27	0.000
6.083	5.30	5.30	0.000
6.167	5.32	5.32	0.000
6.250	5.35	5.35	0.000
6.333	5.38	5.38	0.000
6.417	5.41	5.41	0.000
6.500	5.44	5.44	0.000
6.583	5.47	5.47	0.000
6.667	5.50	5.50	0.000
6.750	5.53	5.53	0.000
6.833	5.56	5.56	0.000
6.917	5.59	5.59	0.000
7.000	5.62	5.62	0.000
7.083	5.65	5.65	0.000
7.167	5.69	5.69	0.000
7.250	5.72	5.72	0.000
7.333	5.75	5.75	0.000
7.417	5.79	5.79	0.000
7.500	5.82	5.82	0.000
7.583	5.86	5.86	0.000
7.667	5.89	5.89	0.000

7.750	5.93	5.93	0.000
7.833	5.97	5.97	0.000
7.917	6.00	6.00	0.000
8.000	6.04	6.04	0.000
8.083	6.08	6.08	0.000
8.167	6.12	6.12	0.000
8.250	6.16	6.16	0.000
8.333	6.20	6.20	0.000
8.417	6.24	6.24	0.000
8.500	6.29	6.29	0.000
8.583	6.33	6.33	0.000
8.667	6.37	6.37	0.000
8.750	6.42	6.42	0.000
8.833	6.46	6.46	0.000
8.917	6.51	6.51	0.000
9.000	6.56	6.56	0.000
9.083	6.60	6.60	0.000
9.167	6.65	6.65	0.000
9.250	6.70	6.70	0.000
9.333	6.75	6.75	0.000
9.417	6.81	6.81	0.000
9.500	6.86	6.86	0.000
9.583	6.91	6.91	0.000
9.667	6.97	6.97	0.000
9.750	7.02	7.02	0.000
9.833	7.08	7.08	0.000
9.917	7.14	7.14	0.000
10.000	7.20	7.20	0.000
10.083	7.26	7.26	0.000
10.167	7.33	7.33	0.000
10.250	7.39	7.39	0.000
10.333	7.46	7.46	0.000
10.417	7.52	7.52	0.000
10.500	7.59	7.59	0.000
10.583	7.66	7.66	0.000
10.667	7.73	7.73	0.000
10.750	7.81	7.81	0.000
10.833	7.88	7.88	0.000
10.917	7.96	7.96	0.000
11.000	8.04	8.04	0.000
11.083	8.12	8.12	0.000
11.167	8.21	8.21	0.000
11.250	8.29	8.29	0.000
11.333	8.38	8.38	0.000
11.417	8.47	8.47	0.000
11.500	8.57	8.57	0.000
11.583	8.66	8.66	0.000
11.667	8.76	8.76	0.000
11.750	8.87	8.87	0.000
11.833	8.97	8.97	0.000
11.917	9.08	9.08	0.000
12.000	9.19	9.19	0.000
12.083	9.49	9.49	0.000
12.167	10.59	10.59	0.000
12.250	11.65	11.65	0.000
12.333	12.06	12.06	0.000
12.417	12.24	12.24	0.000
12.500	12.40	12.40	0.000
12.583	12.56	12.56	0.000
12.667	12.72	12.72	0.000
12.750	12.88	12.88	0.000
12.833	13.05	13.05	0.000
12.917	13.23	13.23	0.000
13.000	13.41	13.41	0.000
13.083	13.60	13.60	0.000
13.167	13.80	13.80	0.000
13.250	14.00	14.00	0.000
13.333	14.22	14.22	0.000
13.417	14.44	14.44	0.000
13.500	14.68	14.68	0.000
13.583	14.92	14.92	0.000

13.667	15.19	15.19	0.000
13.750	15.45	15.45	0.000
13.833	15.74	15.74	0.000
13.917	16.04	16.04	0.000
14.000	16.37	16.37	0.000
14.083	16.71	16.71	0.000
14.167	17.14	17.14	0.000
14.250	17.58	17.58	0.000
14.333	18.01	18.01	0.000
14.417	18.44	18.44	0.000
14.500	18.92	18.92	0.000
14.583	19.43	19.43	0.000
14.667	19.99	19.99	0.000
14.750	20.58	20.58	0.000
14.833	21.24	21.24	0.000
14.917	21.95	21.95	0.000
15.000	22.75	22.75	0.000
15.083	23.62	23.62	0.000
15.167	24.63	24.63	0.000
15.250	25.73	25.73	0.000
15.333	27.04	27.04	0.000
15.417	28.21	28.21	0.000
15.500	28.42	28.42	0.000
15.583	28.96	28.96	0.000
15.667	31.17	31.17	0.000
15.750	34.41	34.41	0.000
15.833	39.31	39.31	0.000
15.917	46.75	46.75	0.000
16.000	61.37	61.37	0.000
16.083	98.79	98.79	0.000
16.167	178.88	121.00	0.399
16.250	161.12	121.00	0.675
16.333	78.02	78.02	0.675
16.417	43.22	43.22	0.675
16.500	33.72	33.72	0.675
16.583	29.91	29.91	0.675
16.667	26.69	26.69	0.675
16.750	24.18	24.18	0.675
16.833	22.38	22.38	0.675
16.917	20.92	20.92	0.675
17.000	19.71	19.71	0.675
17.083	18.67	18.67	0.675
17.167	17.73	17.73	0.675
17.250	16.90	16.90	0.675
17.333	16.20	16.20	0.675
17.417	15.59	15.59	0.675
17.500	15.04	15.04	0.675
17.583	14.55	14.55	0.675
17.667	14.10	14.10	0.675
17.750	13.69	13.69	0.675
17.833	13.31	13.31	0.675
17.917	12.96	12.96	0.675
18.000	12.63	12.63	0.675
18.083	12.15	12.15	0.675
18.167	10.90	10.90	0.675
18.250	9.71	9.71	0.675
18.333	9.20	9.20	0.675
18.417	8.94	8.94	0.675
18.500	8.72	8.72	0.675
18.583	8.52	8.52	0.675
18.667	8.33	8.33	0.675
18.750	8.16	8.16	0.675
18.833	8.00	8.00	0.675
18.917	7.84	7.84	0.675
19.000	7.69	7.69	0.675
19.083	7.55	7.55	0.675
19.167	7.42	7.42	0.675
19.250	7.29	7.29	0.675
19.333	7.17	7.17	0.675
19.417	7.05	7.05	0.675
19.500	6.94	6.94	0.675

19.583	6.83	6.83	0.675
19.667	6.73	6.73	0.675
19.750	6.63	6.63	0.675
19.833	6.53	6.53	0.675
19.917	6.44	6.44	0.675
20.000	6.35	6.35	0.675
20.083	6.26	6.26	0.675
20.167	6.18	6.18	0.675
20.250	6.10	6.10	0.675
20.333	6.02	6.02	0.675
20.417	5.95	5.95	0.675
20.500	5.87	5.87	0.675
20.583	5.80	5.80	0.675
20.667	5.73	5.73	0.675
20.750	5.67	5.67	0.675
20.833	5.60	5.60	0.675
20.917	5.54	5.54	0.675
21.000	5.48	5.48	0.675
21.083	5.42	5.42	0.675
21.167	5.36	5.36	0.675
21.250	5.31	5.31	0.675
21.333	5.25	5.25	0.675
21.417	5.20	5.20	0.675
21.500	5.15	5.15	0.675
21.583	5.10	5.10	0.675
21.667	5.05	5.05	0.675
21.750	5.00	5.00	0.675
21.833	4.96	4.96	0.675
21.917	4.91	4.91	0.675
22.000	4.87	4.87	0.675
22.083	4.82	4.82	0.675
22.167	4.78	4.78	0.675
22.250	4.74	4.74	0.675
22.333	4.70	4.70	0.675
22.417	4.66	4.66	0.675
22.500	4.62	4.62	0.675
22.583	4.58	4.58	0.675
22.667	4.54	4.54	0.675
22.750	4.51	4.51	0.675
22.833	4.47	4.47	0.675
22.917	4.44	4.44	0.675
23.000	4.40	4.40	0.675
23.083	4.37	4.37	0.675
23.167	4.34	4.34	0.675
23.250	4.30	4.30	0.675
23.333	4.27	4.27	0.675
23.417	4.24	4.24	0.675
23.500	4.21	4.21	0.675
23.583	4.18	4.18	0.675
23.667	4.15	4.15	0.675
23.750	4.12	4.12	0.675
23.833	4.09	4.09	0.675
23.917	4.07	4.07	0.675
24.000	4.04	4.04	0.675

END OF FLOODSCx ROUTING ANALYSIS

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                             Analysis prepared by:

                             HUNSAKER & ASSOCIATES
                                   Irvine,Inc
                         Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

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--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  NODE 193 - EAST - AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         25.40       49.00       75.(AMC II)     0.200       0.888

    TOTAL AREA (Acres) =     25.40

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.098

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.112
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 193, EAST AREA                                                   *
 ************************************************************************

  FILE NAME: EAST-193.DAT
  TIME/DATE OF STUDY: 13:53 11/01/2021


******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==============================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      25.400 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.125 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.098
         LOW LOSS FRACTION = 0.112
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  66.560


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==============================================================================
                      UNIT HYDROGRAPH DETERMINATION
```

INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.856	24.132
2	48.951	126.237
3	86.967	116.778
4	97.367	31.947
5	99.167	5.528
6	99.667	1.535
7	99.917	0.768
8	100.000	0.256

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.1802
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 10.7305

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 25.0 50.0 75.0 100.0
14.000	3.9034	8.18	. Q . V . . .
14.083	3.9609	8.35	. Q . V . . .
14.167	4.0199	8.56	. Q . V . . .
14.250	4.0803	8.77	. Q . V . . .
14.333	4.1423	8.99	. Q . V . . .
14.417	4.2057	9.21	. Q . V . . .
14.500	4.2707	9.45	. Q . V . . .
14.583	4.3375	9.70	. Q . V . . .
14.667	4.4063	9.98	. Q . V . . .
14.750	4.4770	10.27	. Q . V . . .
14.833	4.5501	10.61	. Q . V . . .
14.917	4.6256	10.96	. Q . V . . .
15.000	4.7039	11.37	. Q . V . . .
15.083	4.7852	11.80	. Q . V . . .
15.167	4.8699	12.31	. Q . V . . .
15.250	4.9585	12.86	. Q . V . . .
15.333	5.0516	13.52	. Q . V . . .
15.417	5.1487	14.10	. Q . V. . . .
15.500	5.2465	14.20	. Q . V. . . .
15.583	5.3464	14.50	. Q . V. . . .
15.667	5.4540	15.63	. Q . V . . .
15.750	5.5730	17.27	. Q . V . . .
15.833	5.7093	19.80	. Q . .V . . .
15.917	5.8718	23.59	. Q. .V . . .
16.000	6.0852	30.99	. Q . V . . .
16.083	6.4291	49.94	. Q. V . . .
16.167	7.0516	90.38	. V . Q .
16.250	7.5977	79.31	. V .Q . .
16.333	7.8581	37.81	. Q . V. . .
16.417	8.0041	21.20	. Q . V. . .
16.500	8.1191	16.70	. Q . V . .
16.583	8.2214	14.85	. Q . V . .
16.667	8.3128	13.27	. Q . V . .
16.750	8.3957	12.03	. Q . .V . .
16.833	8.4724	11.14	. Q . .V . .
16.917	8.5441	10.42	. Q . .V . .
17.000	8.6117	9.81	. Q . . V . .
17.083	8.6758	9.30	. Q . . V . .
17.167	8.7366	8.83	. Q . . V . .
17.250	8.7946	8.43	. Q . . V . .
17.333	8.8503	8.08	. Q . . V . .
17.417	8.9039	7.78	. Q . . . V .
17.500	8.9556	7.51	. Q . . . V .
17.583	9.0056	7.26	. Q . . . V .
17.667	9.0541	7.04	. Q . . . V .
17.750	9.1011	6.83	. Q . . . V .
17.833	9.1468	6.64	. Q . . . V .
17.917	9.1914	6.47	. Q . . . V .
18.000	9.2348	6.31	. Q . . . V .

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

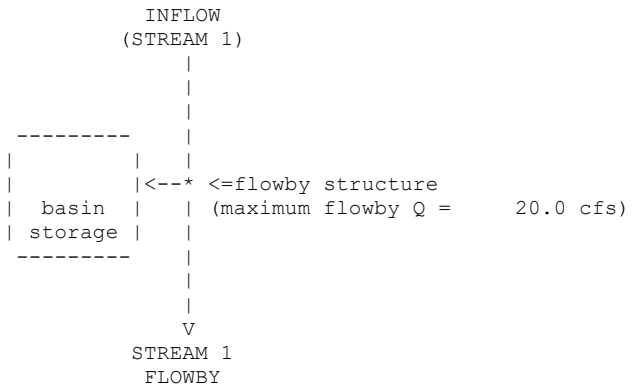
Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	165.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	5.0

****
FLOW PROCESS FROM NODE 2.00 TO NODE 2.00 IS CODE = 2

>>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
==========

MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
20.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.16	0.16	0.000
0.167	0.97	0.97	0.000
0.250	1.73	1.73	0.000
0.333	1.94	1.94	0.000
0.417	1.99	1.99	0.000
0.500	2.00	2.00	0.000
0.583	2.01	2.01	0.000
0.667	2.02	2.02	0.000
0.750	2.03	2.03	0.000
0.833	2.04	2.04	0.000
0.917	2.04	2.04	0.000
1.000	2.05	2.05	0.000
1.083	2.06	2.06	0.000
1.167	2.06	2.06	0.000
1.250	2.07	2.07	0.000
1.333	2.08	2.08	0.000
1.417	2.09	2.09	0.000
1.500	2.09	2.09	0.000
1.583	2.10	2.10	0.000
1.667	2.11	2.11	0.000
1.750	2.12	2.12	0.000

1.833	2.12	2.12	0.000
1.917	2.13	2.13	0.000
2.000	2.14	2.14	0.000
2.083	2.15	2.15	0.000
2.167	2.16	2.16	0.000
2.250	2.16	2.16	0.000
2.333	2.17	2.17	0.000
2.417	2.18	2.18	0.000
2.500	2.19	2.19	0.000
2.583	2.20	2.20	0.000
2.667	2.21	2.21	0.000
2.750	2.21	2.21	0.000
2.833	2.22	2.22	0.000
2.917	2.23	2.23	0.000
3.000	2.24	2.24	0.000
3.083	2.25	2.25	0.000
3.167	2.26	2.26	0.000
3.250	2.27	2.27	0.000
3.333	2.28	2.28	0.000
3.417	2.29	2.29	0.000
3.500	2.30	2.30	0.000
3.583	2.30	2.30	0.000
3.667	2.31	2.31	0.000
3.750	2.32	2.32	0.000
3.833	2.33	2.33	0.000
3.917	2.34	2.34	0.000
4.000	2.35	2.35	0.000
4.083	2.36	2.36	0.000
4.167	2.37	2.37	0.000
4.250	2.38	2.38	0.000
4.333	2.39	2.39	0.000
4.417	2.41	2.41	0.000
4.500	2.42	2.42	0.000
4.583	2.43	2.43	0.000
4.667	2.44	2.44	0.000
4.750	2.45	2.45	0.000
4.833	2.46	2.46	0.000
4.917	2.47	2.47	0.000
5.000	2.48	2.48	0.000
5.083	2.49	2.49	0.000
5.167	2.51	2.51	0.000
5.250	2.52	2.52	0.000
5.333	2.53	2.53	0.000
5.417	2.54	2.54	0.000
5.500	2.56	2.56	0.000
5.583	2.57	2.57	0.000
5.667	2.58	2.58	0.000
5.750	2.59	2.59	0.000
5.833	2.61	2.61	0.000
5.917	2.62	2.62	0.000
6.000	2.63	2.63	0.000
6.083	2.65	2.65	0.000
6.167	2.66	2.66	0.000
6.250	2.67	2.67	0.000
6.333	2.69	2.69	0.000
6.417	2.70	2.70	0.000
6.500	2.72	2.72	0.000
6.583	2.73	2.73	0.000
6.667	2.75	2.75	0.000
6.750	2.76	2.76	0.000
6.833	2.78	2.78	0.000
6.917	2.79	2.79	0.000
7.000	2.81	2.81	0.000
7.083	2.83	2.83	0.000
7.167	2.84	2.84	0.000
7.250	2.86	2.86	0.000
7.333	2.88	2.88	0.000
7.417	2.89	2.89	0.000
7.500	2.91	2.91	0.000
7.583	2.93	2.93	0.000
7.667	2.95	2.95	0.000

7.750	2.96	2.96	0.000
7.833	2.98	2.98	0.000
7.917	3.00	3.00	0.000
8.000	3.02	3.02	0.000
8.083	3.04	3.04	0.000
8.167	3.06	3.06	0.000
8.250	3.08	3.08	0.000
8.333	3.10	3.10	0.000
8.417	3.12	3.12	0.000
8.500	3.14	3.14	0.000
8.583	3.16	3.16	0.000
8.667	3.19	3.19	0.000
8.750	3.21	3.21	0.000
8.833	3.23	3.23	0.000
8.917	3.25	3.25	0.000
9.000	3.28	3.28	0.000
9.083	3.30	3.30	0.000
9.167	3.33	3.33	0.000
9.250	3.35	3.35	0.000
9.333	3.38	3.38	0.000
9.417	3.40	3.40	0.000
9.500	3.43	3.43	0.000
9.583	3.45	3.45	0.000
9.667	3.48	3.48	0.000
9.750	3.51	3.51	0.000
9.833	3.54	3.54	0.000
9.917	3.57	3.57	0.000
10.000	3.60	3.60	0.000
10.083	3.63	3.63	0.000
10.167	3.66	3.66	0.000
10.250	3.69	3.69	0.000
10.333	3.73	3.73	0.000
10.417	3.76	3.76	0.000
10.500	3.79	3.79	0.000
10.583	3.83	3.83	0.000
10.667	3.87	3.87	0.000
10.750	3.90	3.90	0.000
10.833	3.94	3.94	0.000
10.917	3.98	3.98	0.000
11.000	4.02	4.02	0.000
11.083	4.06	4.06	0.000
11.167	4.10	4.10	0.000
11.250	4.14	4.14	0.000
11.333	4.19	4.19	0.000
11.417	4.23	4.23	0.000
11.500	4.28	4.28	0.000
11.583	4.33	4.33	0.000
11.667	4.38	4.38	0.000
11.750	4.43	4.43	0.000
11.833	4.49	4.49	0.000
11.917	4.54	4.54	0.000
12.000	4.60	4.60	0.000
12.083	4.75	4.75	0.000
12.167	5.31	5.31	0.000
12.250	5.83	5.83	0.000
12.333	6.03	6.03	0.000
12.417	6.12	6.12	0.000
12.500	6.20	6.20	0.000
12.583	6.28	6.28	0.000
12.667	6.36	6.36	0.000
12.750	6.44	6.44	0.000
12.833	6.52	6.52	0.000
12.917	6.61	6.61	0.000
13.000	6.70	6.70	0.000
13.083	6.80	6.80	0.000
13.167	6.90	6.90	0.000
13.250	7.00	7.00	0.000
13.333	7.11	7.11	0.000
13.417	7.22	7.22	0.000
13.500	7.34	7.34	0.000
13.583	7.46	7.46	0.000

13.667	7.59	7.59	0.000
13.750	7.72	7.72	0.000
13.833	7.87	7.87	0.000
13.917	8.02	8.02	0.000
14.000	8.18	8.18	0.000
14.083	8.35	8.35	0.000
14.167	8.56	8.56	0.000
14.250	8.77	8.77	0.000
14.333	8.99	8.99	0.000
14.417	9.21	9.21	0.000
14.500	9.45	9.45	0.000
14.583	9.70	9.70	0.000
14.667	9.98	9.98	0.000
14.750	10.27	10.27	0.000
14.833	10.61	10.61	0.000
14.917	10.96	10.96	0.000
15.000	11.37	11.37	0.000
15.083	11.80	11.80	0.000
15.167	12.31	12.31	0.000
15.250	12.86	12.86	0.000
15.333	13.52	13.52	0.000
15.417	14.10	14.10	0.000
15.500	14.20	14.20	0.000
15.583	14.50	14.50	0.000
15.667	15.63	15.63	0.000
15.750	17.27	17.27	0.000
15.833	19.80	19.80	0.000
15.917	23.59	20.00	0.025
16.000	30.99	20.00	0.100
16.083	49.94	20.00	0.307
16.167	90.38	20.00	0.791
16.250	79.31	20.00	1.200
16.333	37.81	20.00	1.322
16.417	21.20	20.00	1.331
16.500	16.70	16.70	1.331
16.583	14.85	14.85	1.331
16.667	13.27	13.27	1.331
16.750	12.03	12.03	1.331
16.833	11.14	11.14	1.331
16.917	10.42	10.42	1.331
17.000	9.81	9.81	1.331
17.083	9.30	9.30	1.331
17.167	8.83	8.83	1.331
17.250	8.43	8.43	1.331
17.333	8.08	8.08	1.331
17.417	7.78	7.78	1.331
17.500	7.51	7.51	1.331
17.583	7.26	7.26	1.331
17.667	7.04	7.04	1.331
17.750	6.83	6.83	1.331
17.833	6.64	6.64	1.331
17.917	6.47	6.47	1.331
18.000	6.31	6.31	1.331
18.083	6.06	6.06	1.331
18.167	5.42	5.42	1.331
18.250	4.83	4.83	1.331
18.333	4.59	4.59	1.331
18.417	4.46	4.46	1.331
18.500	4.35	4.35	1.331
18.583	4.25	4.25	1.331
18.667	4.16	4.16	1.331
18.750	4.07	4.07	1.331
18.833	3.99	3.99	1.331
18.917	3.91	3.91	1.331
19.000	3.84	3.84	1.331
19.083	3.77	3.77	1.331
19.167	3.70	3.70	1.331
19.250	3.64	3.64	1.331
19.333	3.58	3.58	1.331
19.417	3.52	3.52	1.331
19.500	3.46	3.46	1.331

19.583	3.41	3.41	1.331
19.667	3.36	3.36	1.331
19.750	3.31	3.31	1.331
19.833	3.26	3.26	1.331
19.917	3.21	3.21	1.331
20.000	3.17	3.17	1.331
20.083	3.13	3.13	1.331
20.167	3.09	3.09	1.331
20.250	3.05	3.05	1.331
20.333	3.01	3.01	1.331
20.417	2.97	2.97	1.331
20.500	2.93	2.93	1.331
20.583	2.90	2.90	1.331
20.667	2.86	2.86	1.331
20.750	2.83	2.83	1.331
20.833	2.80	2.80	1.331
20.917	2.77	2.77	1.331
21.000	2.74	2.74	1.331
21.083	2.71	2.71	1.331
21.167	2.68	2.68	1.331
21.250	2.65	2.65	1.331
21.333	2.62	2.62	1.331
21.417	2.60	2.60	1.331
21.500	2.57	2.57	1.331
21.583	2.55	2.55	1.331
21.667	2.52	2.52	1.331
21.750	2.50	2.50	1.331
21.833	2.48	2.48	1.331
21.917	2.45	2.45	1.331
22.000	2.43	2.43	1.331
22.083	2.41	2.41	1.331
22.167	2.39	2.39	1.331
22.250	2.37	2.37	1.331
22.333	2.35	2.35	1.331
22.417	2.33	2.33	1.331
22.500	2.31	2.31	1.331
22.583	2.29	2.29	1.331
22.667	2.27	2.27	1.331
22.750	2.25	2.25	1.331
22.833	2.23	2.23	1.331
22.917	2.22	2.22	1.331
23.000	2.20	2.20	1.331
23.083	2.18	2.18	1.331
23.167	2.17	2.17	1.331
23.250	2.15	2.15	1.331
23.333	2.13	2.13	1.331
23.417	2.12	2.12	1.331
23.500	2.10	2.10	1.331
23.583	2.09	2.09	1.331
23.667	2.07	2.07	1.331
23.750	2.06	2.06	1.331
23.833	2.05	2.05	1.331
23.917	2.03	2.03	1.331
24.000	2.02	2.02	1.331

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END OF FLOODSCx ROUTING ANALYSIS

DETENTION BASIN CALCULATIONS

SOUTHEAST – AREA 'B'

100-YR STUDY

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

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--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265
  100-YR STUDY
  SOUTHEAST - AREA 'B' - NODE 63
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     5.63 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         26.50       60.00       75.(AMC II)     0.200       0.873

    TOTAL AREA (Acres) =     26.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.120

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.127
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
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          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 100-YR STUDY, FLOW-BY BASIN CALCS                                     *
* NODE 63, SOUTHEAST AREA                                               *
 ************************************************************************

  FILE NAME: S-EAST63.DAT
  TIME/DATE OF STUDY: 14:08 11/04/2021


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
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      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      26.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.130 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =  100-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.120
         LOW LOSS FRACTION = 0.127
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.52
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.09
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.45
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.43
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.36
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  5.63

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  64.201


         RUNOFF HYDROGRAPH LISTING LIMITS:
         MODEL TIME(HOURS) FOR BEGINNING OF RESULTS =  14.00
         MODEL TIME(HOURS) FOR END OF RESULTS =  18.00


==========================================================================
                      UNIT HYDROGRAPH DETERMINATION
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INTERVAL NUMBER	"S" GRAPH MEAN VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	7.317	23.451
2	46.210	124.646
3	85.135	124.748
4	96.863	37.585
5	99.006	6.867
6	99.602	1.912
7	99.901	0.956
8	100.000	0.319

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.4061
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 11.0205

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0. 25.0 50.0 75.0 100.0
14.000	4.0003	8.38	. Q . V . . .
14.083	4.0592	8.56	. Q . V . . .
14.167	4.1196	8.77	. Q . V . . .
14.250	4.1815	8.99	. Q . V . . .
14.333	4.2449	9.21	. Q . V . . .
14.417	4.3099	9.43	. Q . V . . .
14.500	4.3765	9.68	. Q . V . . .
14.583	4.4450	9.93	. Q . V . . .
14.667	4.5153	10.22	. Q . V . . .
14.750	4.5878	10.52	. Q . V . . .
14.833	4.6626	10.86	. Q . V . . .
14.917	4.7399	11.22	. Q . V . . .
15.000	4.8200	11.63	. Q . V . . .
15.083	4.9032	12.08	. Q . V . . .
15.167	4.9900	12.59	. Q . V . . .
15.250	5.0806	13.16	. Q . V . . .
15.333	5.1758	13.83	. Q . V . . .
15.417	5.2752	14.43	. Q . V. . . .
15.500	5.3755	14.56	. Q . V. . . .
15.583	5.4777	14.84	. Q . V. . . .
15.667	5.5876	15.96	. Q . V . . .
15.750	5.7089	17.60	. Q . V . . .
15.833	5.8470	20.06	. Q . .V . . .
15.917	6.0111	23.83	. Q. .V . . .
16.000	6.2264	31.26	. . Q . V . . .
16.083	6.5726	50.26	. . Q V . . .
16.167	7.1995	91.03	. . . V . Q .
16.250	7.7762	83.74	. . . V . Q . .
16.333	8.0594	41.12	. . Q . V. . .
16.417	8.2148	22.55	. Q. . V. . .
16.500	8.3348	17.42	. Q . . V . .
16.583	8.4408	15.40	. Q . . V . .
16.667	8.5353	13.72	. Q . . V . .
16.750	8.6208	12.41	. Q . . .V . .
16.833	8.6998	11.48	. Q . . .V . .
16.917	8.7737	10.73	. Q . . .V . .
17.000	8.8433	10.10	. Q . . . V . .
17.083	8.9092	9.57	. Q . . . V . .
17.167	8.9718	9.09	. Q . . . V . .
17.250	9.0315	8.67	. Q . . . V . .
17.333	9.0887	8.31	. Q . . . V . .
17.417	9.1438	8.00	. Q . . . V . .
17.500	9.1970	7.72	. Q . . . V . .
17.583	9.2483	7.46	. Q . . . V . .
17.667	9.2981	7.23	. Q . . . V . .
17.750	9.3465	7.02	. Q . . . V . .
17.833	9.3935	6.82	. Q . . . V . .
17.917	9.4392	6.64	. Q . . . V . .
18.000	9.4839	6.48	. Q . . . V . .

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1085.0
10%	170.0
20%	40.0

30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

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*******************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =   2
-------------------------------------------------------------------------------
  >>>>>FLOWBY STRUCTURE ROUTING MODEL APPLIED TO STREAM #1<<<<<
===============================================================================
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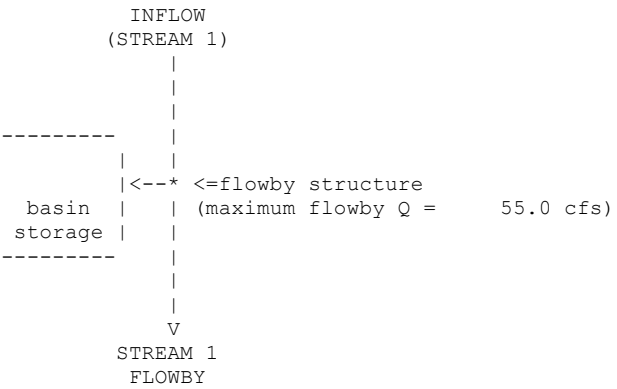
MODEL STREAM NUMBER 1 FLOWING PAST A FLOWBY STRUCTURE:
FLOWRATES IN STREAM # 1 WHICH ARE GREATER THAN
55.0 CFS ARE ASSUMED TO BE EXCESS FLOWS.
FLOW EXCESS IS ASSUMED TO BE PERMANENTLY STORED.



FLOWBY BASIN MODELING RESULTS:

MODEL TIME (HRS)	STREAM 1 INFLOW (CFS)	STREAM 1 FLOWBY (CFS)	BASIN VOLUME (AF)
0.083	0.15	0.15	0.000
0.167	0.94	0.94	0.000
0.250	1.74	1.74	0.000
0.333	1.98	1.98	0.000
0.417	2.03	2.03	0.000
0.500	2.05	2.05	0.000
0.583	2.07	2.07	0.000
0.667	2.07	2.07	0.000
0.750	2.08	2.08	0.000
0.833	2.09	2.09	0.000
0.917	2.10	2.10	0.000
1.000	2.10	2.10	0.000
1.083	2.11	2.11	0.000
1.167	2.12	2.12	0.000
1.250	2.12	2.12	0.000
1.333	2.13	2.13	0.000
1.417	2.14	2.14	0.000
1.500	2.15	2.15	0.000
1.583	2.15	2.15	0.000
1.667	2.16	2.16	0.000
1.750	2.17	2.17	0.000

1.833	2.18	2.18	0.000
1.917	2.19	2.19	0.000
2.000	2.19	2.19	0.000
2.083	2.20	2.20	0.000
2.167	2.21	2.21	0.000
2.250	2.22	2.22	0.000
2.333	2.23	2.23	0.000
2.417	2.24	2.24	0.000
2.500	2.24	2.24	0.000
2.583	2.25	2.25	0.000
2.667	2.26	2.26	0.000
2.750	2.27	2.27	0.000
2.833	2.28	2.28	0.000
2.917	2.29	2.29	0.000
3.000	2.30	2.30	0.000
3.083	2.31	2.31	0.000
3.167	2.32	2.32	0.000
3.250	2.32	2.32	0.000
3.333	2.33	2.33	0.000
3.417	2.34	2.34	0.000
3.500	2.35	2.35	0.000
3.583	2.36	2.36	0.000
3.667	2.37	2.37	0.000
3.750	2.38	2.38	0.000
3.833	2.39	2.39	0.000
3.917	2.40	2.40	0.000
4.000	2.41	2.41	0.000
4.083	2.42	2.42	0.000
4.167	2.43	2.43	0.000
4.250	2.44	2.44	0.000
4.333	2.46	2.46	0.000
4.417	2.47	2.47	0.000
4.500	2.48	2.48	0.000
4.583	2.49	2.49	0.000
4.667	2.50	2.50	0.000
4.750	2.51	2.51	0.000
4.833	2.52	2.52	0.000
4.917	2.53	2.53	0.000
5.000	2.55	2.55	0.000
5.083	2.56	2.56	0.000
5.167	2.57	2.57	0.000
5.250	2.58	2.58	0.000
5.333	2.60	2.60	0.000
5.417	2.61	2.61	0.000
5.500	2.62	2.62	0.000
5.583	2.63	2.63	0.000
5.667	2.65	2.65	0.000
5.750	2.66	2.66	0.000
5.833	2.67	2.67	0.000
5.917	2.69	2.69	0.000
6.000	2.70	2.70	0.000
6.083	2.71	2.71	0.000
6.167	2.73	2.73	0.000
6.250	2.74	2.74	0.000
6.333	2.76	2.76	0.000
6.417	2.77	2.77	0.000
6.500	2.79	2.79	0.000
6.583	2.80	2.80	0.000
6.667	2.82	2.82	0.000
6.750	2.83	2.83	0.000
6.833	2.85	2.85	0.000
6.917	2.86	2.86	0.000
7.000	2.88	2.88	0.000
7.083	2.90	2.90	0.000
7.167	2.91	2.91	0.000
7.250	2.93	2.93	0.000
7.333	2.95	2.95	0.000
7.417	2.97	2.97	0.000
7.500	2.98	2.98	0.000
7.583	3.00	3.00	0.000
7.667	3.02	3.02	0.000

7.750	3.04	3.04	0.000
7.833	3.06	3.06	0.000
7.917	3.08	3.08	0.000
8.000	3.10	3.10	0.000
8.083	3.12	3.12	0.000
8.167	3.14	3.14	0.000
8.250	3.16	3.16	0.000
8.333	3.18	3.18	0.000
8.417	3.20	3.20	0.000
8.500	3.22	3.22	0.000
8.583	3.24	3.24	0.000
8.667	3.27	3.27	0.000
8.750	3.29	3.29	0.000
8.833	3.31	3.31	0.000
8.917	3.34	3.34	0.000
9.000	3.36	3.36	0.000
9.083	3.38	3.38	0.000
9.167	3.41	3.41	0.000
9.250	3.43	3.43	0.000
9.333	3.46	3.46	0.000
9.417	3.49	3.49	0.000
9.500	3.51	3.51	0.000
9.583	3.54	3.54	0.000
9.667	3.57	3.57	0.000
9.750	3.60	3.60	0.000
9.833	3.63	3.63	0.000
9.917	3.66	3.66	0.000
10.000	3.69	3.69	0.000
10.083	3.72	3.72	0.000
10.167	3.75	3.75	0.000
10.250	3.79	3.79	0.000
10.333	3.82	3.82	0.000
10.417	3.85	3.85	0.000
10.500	3.89	3.89	0.000
10.583	3.93	3.93	0.000
10.667	3.96	3.96	0.000
10.750	4.00	4.00	0.000
10.833	4.04	4.04	0.000
10.917	4.08	4.08	0.000
11.000	4.12	4.12	0.000
11.083	4.16	4.16	0.000
11.167	4.21	4.21	0.000
11.250	4.25	4.25	0.000
11.333	4.29	4.29	0.000
11.417	4.34	4.34	0.000
11.500	4.39	4.39	0.000
11.583	4.44	4.44	0.000
11.667	4.49	4.49	0.000
11.750	4.54	4.54	0.000
11.833	4.60	4.60	0.000
11.917	4.65	4.65	0.000
12.000	4.71	4.71	0.000
12.083	4.86	4.86	0.000
12.167	5.41	5.41	0.000
12.250	5.96	5.96	0.000
12.333	6.17	6.17	0.000
12.417	6.27	6.27	0.000
12.500	6.35	6.35	0.000
12.583	6.43	6.43	0.000
12.667	6.52	6.52	0.000
12.750	6.60	6.60	0.000
12.833	6.69	6.69	0.000
12.917	6.77	6.77	0.000
13.000	6.87	6.87	0.000
13.083	6.96	6.96	0.000
13.167	7.07	7.07	0.000
13.250	7.17	7.17	0.000
13.333	7.28	7.28	0.000
13.417	7.40	7.40	0.000
13.500	7.52	7.52	0.000
13.583	7.64	7.64	0.000

13.667	7.78	7.78	0.000
13.750	7.91	7.91	0.000
13.833	8.06	8.06	0.000
13.917	8.22	8.22	0.000
14.000	8.38	8.38	0.000
14.083	8.56	8.56	0.000
14.167	8.77	8.77	0.000
14.250	8.99	8.99	0.000
14.333	9.21	9.21	0.000
14.417	9.43	9.43	0.000
14.500	9.68	9.68	0.000
14.583	9.93	9.93	0.000
14.667	10.22	10.22	0.000
14.750	10.52	10.52	0.000
14.833	10.86	10.86	0.000
14.917	11.22	11.22	0.000
15.000	11.63	11.63	0.000
15.083	12.08	12.08	0.000
15.167	12.59	12.59	0.000
15.250	13.16	13.16	0.000
15.333	13.83	13.83	0.000
15.417	14.43	14.43	0.000
15.500	14.56	14.56	0.000
15.583	14.84	14.84	0.000
15.667	15.96	15.96	0.000
15.750	17.60	17.60	0.000
15.833	20.06	20.06	0.000
15.917	23.83	23.83	0.000
16.000	31.26	31.26	0.000
16.083	50.26	50.26	0.000
16.167	91.03	55.00	0.248
16.250	83.74	55.00	0.446
16.333	41.12	41.12	0.446
16.417	22.55	22.55	0.446
16.500	17.42	17.42	0.446
16.583	15.40	15.40	0.446
16.667	13.72	13.72	0.446
16.750	12.41	12.41	0.446
16.833	11.48	11.48	0.446
16.917	10.73	10.73	0.446
17.000	10.10	10.10	0.446
17.083	9.57	9.57	0.446
17.167	9.09	9.09	0.446
17.250	8.67	8.67	0.446
17.333	8.31	8.31	0.446
17.417	8.00	8.00	0.446
17.500	7.72	7.72	0.446
17.583	7.46	7.46	0.446
17.667	7.23	7.23	0.446
17.750	7.02	7.02	0.446
17.833	6.82	6.82	0.446
17.917	6.64	6.64	0.446
18.000	6.48	6.48	0.446
18.083	6.23	6.23	0.446
18.167	5.60	5.60	0.446
18.250	4.99	4.99	0.446
18.333	4.72	4.72	0.446
18.417	4.58	4.58	0.446
18.500	4.47	4.47	0.446
18.583	4.37	4.37	0.446
18.667	4.27	4.27	0.446
18.750	4.18	4.18	0.446
18.833	4.10	4.10	0.446
18.917	4.02	4.02	0.446
19.000	3.94	3.94	0.446
19.083	3.87	3.87	0.446
19.167	3.80	3.80	0.446
19.250	3.74	3.74	0.446
19.333	3.67	3.67	0.446
19.417	3.61	3.61	0.446
19.500	3.56	3.56	0.446

19.583	3.50	3.50	0.446
19.667	3.45	3.45	0.446
19.750	3.40	3.40	0.446
19.833	3.35	3.35	0.446
19.917	3.30	3.30	0.446
20.000	3.25	3.25	0.446
20.083	3.21	3.21	0.446
20.167	3.17	3.17	0.446
20.250	3.13	3.13	0.446
20.333	3.09	3.09	0.446
20.417	3.05	3.05	0.446
20.500	3.01	3.01	0.446
20.583	2.97	2.97	0.446
20.667	2.94	2.94	0.446
20.750	2.91	2.91	0.446
20.833	2.87	2.87	0.446
20.917	2.84	2.84	0.446
21.000	2.81	2.81	0.446
21.083	2.78	2.78	0.446
21.167	2.75	2.75	0.446
21.250	2.72	2.72	0.446
21.333	2.69	2.69	0.446
21.417	2.67	2.67	0.446
21.500	2.64	2.64	0.446
21.583	2.61	2.61	0.446
21.667	2.59	2.59	0.446
21.750	2.56	2.56	0.446
21.833	2.54	2.54	0.446
21.917	2.52	2.52	0.446
22.000	2.49	2.49	0.446
22.083	2.47	2.47	0.446
22.167	2.45	2.45	0.446
22.250	2.43	2.43	0.446
22.333	2.41	2.41	0.446
22.417	2.39	2.39	0.446
22.500	2.37	2.37	0.446
22.583	2.35	2.35	0.446
22.667	2.33	2.33	0.446
22.750	2.31	2.31	0.446
22.833	2.29	2.29	0.446
22.917	2.27	2.27	0.446
23.000	2.26	2.26	0.446
23.083	2.24	2.24	0.446
23.167	2.22	2.22	0.446
23.250	2.21	2.21	0.446
23.333	2.19	2.19	0.446
23.417	2.17	2.17	0.446
23.500	2.16	2.16	0.446
23.583	2.14	2.14	0.446
23.667	2.13	2.13	0.446
23.750	2.11	2.11	0.446
23.833	2.10	2.10	0.446
23.917	2.08	2.08	0.446
24.000	2.07	2.07	0.446

==========

END OF FLOODSCx ROUTING ANALYSIS

SECTION 8

2-YR STUDY

HYDROLOGY CALCULATIONS

EXISTING CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

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******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* EXISTING - WEST - AREAS 'A', 'B' & 'C'                                *
 ************************************************************************

  FILE NAME: WEST-E.DAT
  TIME/DATE OF STUDY: 18:38 11/06/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    514.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.241
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.422
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL POOR COVER
  "BARREN"                   D        1.11      0.20     1.000    83   11.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      1.11   PEAK FLOW RATE(CFS) =      1.22

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  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    514.00  DOWNSTREAM(FEET) =    497.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   620.00   CHANNEL SLOPE =  0.0269
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.288
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        6.99      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.87
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   2.12
  Tc(MIN.) =   13.36
  SUBAREA AREA(ACRES) =     6.99       SUBAREA RUNOFF(CFS) =    6.84
  EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =       7.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   5.99
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.30  DOWNSTREAM(FEET) =   492.00
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 132.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.27
  GIVEN PIPE DIAMETER(INCH) = 132.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.93
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   13.63
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1055.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    492.00  DOWNSTREAM(FEET) =    479.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0255
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.212
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       10.16      0.20     1.000    83
  COMMERCIAL                  D        1.06      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.915
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.96
  AVERAGE FLOW DEPTH(FEET) =   0.33   TRAVEL TIME(MIN.) =   1.22
  Tc(MIN.) =   14.86
  SUBAREA AREA(ACRES) =    11.22       SUBAREA RUNOFF(CFS) =   10.39
  EFFECTIVE AREA(ACRES) =     19.32     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.95
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  TOTAL AREA(ACRES) =       19.3         PEAK FLOW RATE(CFS) =      17.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   7.66
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1565.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    479.00  DOWNSTREAM(FEET) =    453.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0261
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.127
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       40.34      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      34.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.14
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =   16.86
  SUBAREA AREA(ACRES) =    40.34       SUBAREA RUNOFF(CFS) =   33.64
  EFFECTIVE AREA(ACRES) =     59.66     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.98
  TOTAL AREA(ACRES) =       59.7         PEAK FLOW RATE(CFS) =      49.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   9.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    524.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.25      0.20      0.100    57    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.25   PEAK FLOW RATE(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  497.50
  STREET LENGTH(FEET) =   980.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.72
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   5.18   Tc(MIN.) =   11.49
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.404
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.69      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        5.71      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.903
  SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =    7.05
  EFFECTIVE AREA(ACRES) =      6.65    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =       7.36

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.98
  FLOW VELOCITY(FEET/SEC.) =  3.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   497.50  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.36
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.18
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =    1580.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.18
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.358
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.11      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        2.51      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.962
  SUBAREA AREA(ACRES) =    2.62      SUBAREA RUNOFF(CFS) =    2.75
  EFFECTIVE AREA(ACRES) =      9.27   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        9.3       PEAK FLOW RATE(CFS) =       9.83

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
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  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.00
  FLOW LENGTH(FEET) =   380.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.83
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.87
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =    1960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.316
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.19      0.20     0.100    57
  NATURAL POOR COVER
  "BARREN"                   D        8.58      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.981
  SUBAREA AREA(ACRES) =    8.77      SUBAREA RUNOFF(CFS) =    8.84
  EFFECTIVE AREA(ACRES) =     18.04   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =       18.0       PEAK FLOW RATE(CFS) =      18.31

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.31
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   13.44
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =    2160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.283
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                   D        2.69      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    2.69      SUBAREA RUNOFF(CFS) =    2.62
  EFFECTIVE AREA(ACRES) =     20.73   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =       20.7       PEAK FLOW RATE(CFS) =      20.42

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

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==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.50  DOWNSTREAM(FEET) =    503.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.337
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.976
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                D        0.29      0.20     0.100    57    6.34
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.29   PEAK FLOW RATE(CFS) =      0.51

**************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  61
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  503.50  DOWNSTREAM ELEVATION(FEET) =  498.50
  STREET LENGTH(FEET) =   270.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 24.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  19.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    8.46
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.673
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                D        0.25      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.37
  EFFECTIVE AREA(ACRES) =      0.54    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.5        PEAK FLOW RATE(CFS) =       0.80

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.41
  FLOW VELOCITY(FEET/SEC.) =  2.17   DEPTH*VELOCITY(FT*FT/SEC.) =   0.48
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     540.00 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    498.50  DOWNSTREAM(FEET) =    484.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   590.00   CHANNEL SLOPE =  0.0246
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.396
  SUBAREA LOSS RATE DATA(AMC  I ):
```

```
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D        2.57      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.13
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   3.15
  Tc(MIN.) =   11.61
  SUBAREA AREA(ACRES) =     2.57       SUBAREA RUNOFF(CFS) =    2.77
  EFFECTIVE AREA(ACRES) =      3.11     AREA-AVERAGED Fm(INCH/HR) =   0.17
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.84
  TOTAL AREA(ACRES) =        3.1          PEAK FLOW RATE(CFS) =       3.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   3.53
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1130.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    465.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   980.00   CHANNEL SLOPE =  0.0194
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.130
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL POOR COVER
  "BARREN"                    D       12.90      0.20     1.000    83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.16
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   5.17
  Tc(MIN.) =   16.78
  SUBAREA AREA(ACRES) =    12.90       SUBAREA RUNOFF(CFS) =   10.80
  EFFECTIVE AREA(ACRES) =     16.01     AREA-AVERAGED Fm(INCH/HR) =   0.19
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.97
  TOTAL AREA(ACRES) =       16.0          PEAK FLOW RATE(CFS) =      13.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   3.59
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =    2110.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.0  TC(MIN.) =     16.78
  EFFECTIVE AREA(ACRES) =     16.01  AREA-AVERAGED Fm(INCH/HR)=  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.970
  PEAK FLOW RATE(CFS)   =      13.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         59.70       98.00       75.(AMC II)     0.200       0.035

    TOTAL AREA (Acres) =     59.70

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.196

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.965
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'A'                                                              *
 ************************************************************************

  FILE NAME: WE-A.DAT
  TIME/DATE OF STUDY: 10:26 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      59.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.223 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.196
         LOW LOSS FRACTION = 0.965
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.997
          30-MINUTE FACTOR = 0.997
           1-HOUR FACTOR = 0.997
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  37.319



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	2.588	18.682
2	17.032	104.287
3	43.494	191.058
4	72.197	207.231
5	88.229	115.752
6	95.282	50.925
7	98.044	19.938
8	98.842	5.761
9	99.436	4.294
10	99.775	2.441
11	99.944	1.221
12	100.000	0.407

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 8.2280
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.9685

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	12.5	25.0	37.5	50.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0001	0.01	Q	.	.	.	.
0.250	0.0003	0.03	Q	.	.	.	.
0.333	0.0006	0.05	Q	.	.	.	.
0.417	0.0010	0.06	Q	.	.	.	.
0.500	0.0015	0.06	Q	.	.	.	.
0.583	0.0019	0.07	Q	.	.	.	.
0.667	0.0024	0.07	Q	.	.	.	.
0.750	0.0029	0.07	Q	.	.	.	.
0.833	0.0034	0.07	Q	.	.	.	.
0.917	0.0038	0.07	Q	.	.	.	.
1.000	0.0043	0.07	Q	.	.	.	.
1.083	0.0048	0.07	Q	.	.	.	.
1.167	0.0053	0.07	Q	.	.	.	.
1.250	0.0057	0.07	Q	.	.	.	.
1.333	0.0062	0.07	Q	.	.	.	.
1.417	0.0067	0.07	Q	.	.	.	.
1.500	0.0072	0.07	Q	.	.	.	.
1.583	0.0077	0.07	Q	.	.	.	.
1.667	0.0082	0.07	Q	.	.	.	.
1.750	0.0087	0.07	Q	.	.	.	.
1.833	0.0092	0.07	Q	.	.	.	.
1.917	0.0097	0.07	Q	.	.	.	.
2.000	0.0102	0.07	Q	.	.	.	.
2.083	0.0107	0.07	Q	.	.	.	.
2.167	0.0112	0.07	Q	.	.	.	.
2.250	0.0117	0.07	Q	.	.	.	.
2.333	0.0122	0.07	Q	.	.	.	.
2.417	0.0127	0.07	Q	.	.	.	.
2.500	0.0132	0.07	Q	.	.	.	.
2.583	0.0137	0.07	Q	.	.	.	.
2.667	0.0142	0.07	Q	.	.	.	.
2.750	0.0147	0.07	Q	.	.	.	.
2.833	0.0152	0.07	Q	.	.	.	.
2.917	0.0158	0.08	Q	.	.	.	.
3.000	0.0163	0.08	Q	.	.	.	.
3.083	0.0168	0.08	Q	.	.	.	.
3.167	0.0173	0.08	Q	.	.	.	.
3.250	0.0178	0.08	Q	.	.	.	.
3.333	0.0184	0.08	Q	.	.	.	.
3.417	0.0189	0.08	Q	.	.	.	.
3.500	0.0194	0.08	Q	.	.	.	.
3.583	0.0200	0.08	Q	.	.	.	.
3.667	0.0205	0.08	Q	.	.	.	.
3.750	0.0211	0.08	Q	.	.	.	.
3.833	0.0216	0.08	Q	.	.	.	.
3.917	0.0221	0.08	Q	.	.	.	.
4.000	0.0227	0.08	Q	.	.	.	.
4.083	0.0232	0.08	Q	.	.	.	.
4.167	0.0238	0.08	Q	.	.	.	.
4.250	0.0243	0.08	Q	.	.	.	.
4.333	0.0249	0.08	Q	.	.	.	.
4.417	0.0255	0.08	Q	.	.	.	.
4.500	0.0260	0.08	Q	.	.	.	.
4.583	0.0266	0.08	Q	.	.	.	.
4.667	0.0271	0.08	Q	.	.	.	.
4.750	0.0277	0.08	Q	.	.	.	.
4.833	0.0283	0.08	Q	.	.	.	.
4.917	0.0289	0.08	Q	.	.	.	.
5.000	0.0294	0.08	Q	.	.	.	.

5.083	0.0300	0.08	Q	.	.	.	.
5.167	0.0306	0.08	Q	.	.	.	.
5.250	0.0312	0.08	Q	.	.	.	.
5.333	0.0318	0.09	Q	.	.	.	.
5.417	0.0324	0.09	Q	.	.	.	.
5.500	0.0330	0.09	Q	.	.	.	.
5.583	0.0335	0.09	Q	.	.	.	.
5.667	0.0341	0.09	Q	.	.	.	.
5.750	0.0347	0.09	Q	.	.	.	.
5.833	0.0354	0.09	Q	.	.	.	.
5.917	0.0360	0.09	Q	.	.	.	.
6.000	0.0366	0.09	Q	.	.	.	.
6.083	0.0372	0.09	Q	.	.	.	.
6.167	0.0378	0.09	Q	.	.	.	.
6.250	0.0384	0.09	Q	.	.	.	.
6.333	0.0390	0.09	Q	.	.	.	.
6.417	0.0397	0.09	Q	.	.	.	.
6.500	0.0403	0.09	Q	.	.	.	.
6.583	0.0409	0.09	Q	.	.	.	.
6.667	0.0416	0.09	Q	.	.	.	.
6.750	0.0422	0.09	Q	.	.	.	.
6.833	0.0429	0.09	Q	.	.	.	.
6.917	0.0435	0.09	Q	.	.	.	.
7.000	0.0442	0.09	Q	.	.	.	.
7.083	0.0448	0.10	Q	.	.	.	.
7.167	0.0455	0.10	Q	.	.	.	.
7.250	0.0461	0.10	Q	.	.	.	.
7.333	0.0468	0.10	Q	.	.	.	.
7.417	0.0475	0.10	Q	.	.	.	.
7.500	0.0481	0.10	Q	.	.	.	.
7.583	0.0488	0.10	Q	.	.	.	.
7.667	0.0495	0.10	QV	.	.	.	.
7.750	0.0502	0.10	QV	.	.	.	.
7.833	0.0509	0.10	QV	.	.	.	.
7.917	0.0516	0.10	QV	.	.	.	.
8.000	0.0523	0.10	QV	.	.	.	.
8.083	0.0530	0.10	QV	.	.	.	.
8.167	0.0537	0.10	QV	.	.	.	.
8.250	0.0544	0.10	QV	.	.	.	.
8.333	0.0551	0.10	QV	.	.	.	.
8.417	0.0558	0.10	QV	.	.	.	.
8.500	0.0566	0.11	QV	.	.	.	.
8.583	0.0573	0.11	QV	.	.	.	.
8.667	0.0580	0.11	QV	.	.	.	.
8.750	0.0588	0.11	QV	.	.	.	.
8.833	0.0595	0.11	QV	.	.	.	.
8.917	0.0603	0.11	QV	.	.	.	.
9.000	0.0610	0.11	QV	.	.	.	.
9.083	0.0618	0.11	QV	.	.	.	.
9.167	0.0626	0.11	QV	.	.	.	.
9.250	0.0633	0.11	QV	.	.	.	.
9.333	0.0641	0.11	QV	.	.	.	.
9.417	0.0649	0.11	QV	.	.	.	.
9.500	0.0657	0.11	QV	.	.	.	.
9.583	0.0665	0.12	QV	.	.	.	.
9.667	0.0673	0.12	QV	.	.	.	.
9.750	0.0681	0.12	QV	.	.	.	.
9.833	0.0689	0.12	QV	.	.	.	.
9.917	0.0697	0.12	QV	.	.	.	.
10.000	0.0706	0.12	QV	.	.	.	.
10.083	0.0714	0.12	QV	.	.	.	.
10.167	0.0723	0.12	QV	.	.	.	.
10.250	0.0731	0.12	QV	.	.	.	.
10.333	0.0740	0.12	QV	.	.	.	.
10.417	0.0748	0.13	QV	.	.	.	.
10.500	0.0757	0.13	QV	.	.	.	.
10.583	0.0766	0.13	QV	.	.	.	.
10.667	0.0775	0.13	QV	.	.	.	.
10.750	0.0784	0.13	QV	.	.	.	.
10.833	0.0793	0.13	QV	.	.	.	.
10.917	0.0802	0.13	QV	.	.	.	.

11.000	0.0811	0.13	QV	.	.	.	.
11.083	0.0821	0.14	QV	.	.	.	.
11.167	0.0830	0.14	QV	.	.	.	.
11.250	0.0840	0.14	QV	.	.	.	.
11.333	0.0849	0.14	QV	.	.	.	.
11.417	0.0859	0.14	QV	.	.	.	.
11.500	0.0869	0.14	QV	.	.	.	.
11.583	0.0879	0.14	QV	.	.	.	.
11.667	0.0889	0.15	QV	.	.	.	.
11.750	0.0899	0.15	QV	.	.	.	.
11.833	0.0909	0.15	QV	.	.	.	.
11.917	0.0920	0.15	QV	.	.	.	.
12.000	0.0930	0.15	QV	.	.	.	.
12.083	0.0941	0.16	QV	.	.	.	.
12.167	0.0952	0.16	QV	.	.	.	.
12.250	0.0964	0.17	QV	.	.	.	.
12.333	0.0977	0.19	QV	.	.	.	.
12.417	0.0990	0.19	Q V	.	.	.	.
12.500	0.1004	0.20	Q V	.	.	.	.
12.583	0.1018	0.20	Q V	.	.	.	.
12.667	0.1032	0.20	Q V	.	.	.	.
12.750	0.1046	0.21	Q V	.	.	.	.
12.833	0.1061	0.21	Q V	.	.	.	.
12.917	0.1076	0.21	Q V	.	.	.	.
13.000	0.1090	0.22	Q V	.	.	.	.
13.083	0.1106	0.22	Q V	.	.	.	.
13.167	0.1121	0.22	Q V	.	.	.	.
13.250	0.1136	0.23	Q V	.	.	.	.
13.333	0.1152	0.23	Q V	.	.	.	.
13.417	0.1168	0.23	Q V	.	.	.	.
13.500	0.1185	0.24	Q V	.	.	.	.
13.583	0.1201	0.24	Q V	.	.	.	.
13.667	0.1218	0.24	Q V	.	.	.	.
13.750	0.1235	0.25	Q V	.	.	.	.
13.833	0.1253	0.25	Q V	.	.	.	.
13.917	0.1270	0.26	Q V	.	.	.	.
14.000	0.1288	0.26	Q V	.	.	.	.
14.083	0.1307	0.27	Q V	.	.	.	.
14.167	0.1326	0.28	Q V	.	.	.	.
14.250	0.1346	0.29	Q V	.	.	.	.
14.333	0.1366	0.30	Q V	.	.	.	.
14.417	0.1387	0.30	Q V	.	.	.	.
14.500	0.1408	0.31	Q V	.	.	.	.
14.583	0.1431	0.32	Q V	.	.	.	.
14.667	0.1453	0.33	Q V	.	.	.	.
14.750	0.1477	0.34	Q V	.	.	.	.
14.833	0.1501	0.35	Q V	.	.	.	.
14.917	0.1525	0.36	Q V	.	.	.	.
15.000	0.1551	0.37	Q V	.	.	.	.
15.083	0.1578	0.39	Q V	.	.	.	.
15.167	0.1607	0.43	Q V	.	.	.	.
15.250	0.1646	0.56	Q V	.	.	.	.
15.333	0.1705	0.86	Q V	.	.	.	.
15.417	0.1793	1.28	.Q V	.	.	.	.
15.500	0.1906	1.64	.Q V	.	.	.	.
15.583	0.2035	1.88	.Q V	.	.	.	.
15.667	0.2191	2.27	.Q V	.	.	.	.
15.750	0.2410	3.17	. Q V	.	.	.	.
15.833	0.2737	4.75	. Q V	.	.	.	.
15.917	0.3227	7.11	. QV	.	.	.	.
16.000	0.3986	11.02	. Q	.	.	.	.
16.083	0.5313	19.27	. V Q	.	.	.	.
16.167	0.7820	36.41	. V	.	. Q.	.	.
16.250	1.1256	49.89	.	.	. V	.	Q.
16.333	1.4596	48.49	.	.	.	V.	Q .
16.417	1.6662	30.01	.	.	. Q	. V	.
16.500	1.7748	15.76	.	. Q	.	.	V .
16.583	1.8297	7.97	. Q	.	.	.	V .
16.667	1.8571	3.98	. Q	.	.	.	V .
16.750	1.8742	2.48	.Q	.	.	.	V .
16.833	1.8841	1.44	.Q	.	.	.	V .

16.917	1.8900	0.86	Q	.	.	.	V .
17.000	1.8937	0.54	Q	.	.	.	V .
17.083	1.8964	0.39	Q	.	.	.	V .
17.167	1.8988	0.34	Q	.	.	.	V .
17.250	1.9009	0.31	Q	.	.	.	V .
17.333	1.9029	0.29	Q	.	.	.	V .
17.417	1.9048	0.27	Q	.	.	.	V .
17.500	1.9066	0.26	Q	.	.	.	V .
17.583	1.9083	0.25	Q	.	.	.	V .
17.667	1.9100	0.24	Q	.	.	.	V .
17.750	1.9116	0.23	Q	.	.	.	V .
17.833	1.9131	0.23	Q	.	.	.	V .
17.917	1.9146	0.22	Q	.	.	.	V .
18.000	1.9161	0.21	Q	.	.	.	V .
18.083	1.9175	0.21	Q	.	.	.	V .
18.167	1.9189	0.20	Q	.	.	.	V .
18.250	1.9202	0.18	Q	.	.	.	V.
18.333	1.9213	0.17	Q	.	.	.	V.
18.417	1.9224	0.16	Q	.	.	.	V.
18.500	1.9235	0.15	Q	.	.	.	V.
18.583	1.9245	0.15	Q	.	.	.	V.
18.667	1.9255	0.15	Q	.	.	.	V.
18.750	1.9265	0.14	Q	.	.	.	V.
18.833	1.9274	0.14	Q	.	.	.	V.
18.917	1.9284	0.14	Q	.	.	.	V.
19.000	1.9293	0.13	Q	.	.	.	V.
19.083	1.9302	0.13	Q	.	.	.	V.
19.167	1.9311	0.13	Q	.	.	.	V.
19.250	1.9320	0.13	Q	.	.	.	V.
19.333	1.9328	0.12	Q	.	.	.	V.
19.417	1.9336	0.12	Q	.	.	.	V.
19.500	1.9345	0.12	Q	.	.	.	V.
19.583	1.9353	0.12	Q	.	.	.	V.
19.667	1.9361	0.12	Q	.	.	.	V.
19.750	1.9369	0.11	Q	.	.	.	V.
19.833	1.9376	0.11	Q	.	.	.	V.
19.917	1.9384	0.11	Q	.	.	.	V.
20.000	1.9392	0.11	Q	.	.	.	V.
20.083	1.9399	0.11	Q	.	.	.	V.
20.167	1.9406	0.11	Q	.	.	.	V.
20.250	1.9414	0.10	Q	.	.	.	V.
20.333	1.9421	0.10	Q	.	.	.	V.
20.417	1.9428	0.10	Q	.	.	.	V.
20.500	1.9435	0.10	Q	.	.	.	V.
20.583	1.9441	0.10	Q	.	.	.	V.
20.667	1.9448	0.10	Q	.	.	.	V.
20.750	1.9455	0.10	Q	.	.	.	V.
20.833	1.9462	0.10	Q	.	.	.	V.
20.917	1.9468	0.10	Q	.	.	.	V.
21.000	1.9475	0.09	Q	.	.	.	V.
21.083	1.9481	0.09	Q	.	.	.	V.
21.167	1.9487	0.09	Q	.	.	.	V.
21.250	1.9494	0.09	Q	.	.	.	V.
21.333	1.9500	0.09	Q	.	.	.	V.
21.417	1.9506	0.09	Q	.	.	.	V.
21.500	1.9512	0.09	Q	.	.	.	V.
21.583	1.9518	0.09	Q	.	.	.	V.
21.667	1.9524	0.09	Q	.	.	.	V.
21.750	1.9530	0.09	Q	.	.	.	V.
21.833	1.9536	0.08	Q	.	.	.	V.
21.917	1.9542	0.08	Q	.	.	.	V.
22.000	1.9547	0.08	Q	.	.	.	V.
22.083	1.9553	0.08	Q	.	.	.	V.
22.167	1.9559	0.08	Q	.	.	.	V.
22.250	1.9564	0.08	Q	.	.	.	V.
22.333	1.9570	0.08	Q	.	.	.	V.
22.417	1.9575	0.08	Q	.	.	.	V.
22.500	1.9581	0.08	Q	.	.	.	V.
22.583	1.9586	0.08	Q	.	.	.	V.
22.667	1.9591	0.08	Q	.	.	.	V.
22.750	1.9597	0.08	Q	.	.	.	V.

22.833	1.9602	0.08	Q	.	.	.	V.
22.917	1.9607	0.08	Q	.	.	.	V.
23.000	1.9612	0.08	Q	.	.	.	V.
23.083	1.9618	0.07	Q	.	.	.	V.
23.167	1.9623	0.07	Q	.	.	.	V.
23.250	1.9628	0.07	Q	.	.	.	V.
23.333	1.9633	0.07	Q	.	.	.	V.
23.417	1.9638	0.07	Q	.	.	.	V.
23.500	1.9643	0.07	Q	.	.	.	V.
23.583	1.9648	0.07	Q	.	.	.	V.
23.667	1.9653	0.07	Q	.	.	.	V.
23.750	1.9657	0.07	Q	.	.	.	V.
23.833	1.9662	0.07	Q	.	.	.	V.
23.917	1.9667	0.07	Q	.	.	.	V.
24.000	1.9672	0.07	Q	.	.	.	V.
24.083	1.9676	0.07	Q	.	.	.	V.
24.167	1.9680	0.06	Q	.	.	.	V.
24.250	1.9683	0.04	Q	.	.	.	V.
24.333	1.9684	0.02	Q	.	.	.	V.
24.417	1.9685	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1465.0
10%	45.0
20%	35.0
30%	30.0
40%	20.0
50%	20.0
60%	20.0
70%	15.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'B'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         20.70       95.00       75.(AMC II)     0.200       0.061

    TOTAL AREA (Acres) =     20.70

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.190

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.939
==========================================================================
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**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
             USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                      Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'B'                                                              *
 ************************************************************************

  FILE NAME: WE-B.DAT
  TIME/DATE OF STUDY: 10:49 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      20.700 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.185 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.190
         LOW LOSS FRACTION = 0.939
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  44.996



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	3.625	9.074
2	24.314	51.794
3	59.212	87.363
4	84.735	63.896
5	94.844	25.305
6	98.167	8.321
7	99.078	2.279
8	99.631	1.385
9	99.908	0.693
10	100.000	0.231

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.7732
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.7625

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	7.5	15.0	22.5	30.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0001	0.01	Q	.	.	.	.
0.250	0.0002	0.02	Q	.	.	.	.
0.333	0.0005	0.03	Q	.	.	.	.
0.417	0.0008	0.04	Q	.	.	.	.
0.500	0.0010	0.04	Q	.	.	.	.
0.583	0.0013	0.04	Q	.	.	.	.
0.667	0.0016	0.04	Q	.	.	.	.
0.750	0.0019	0.04	Q	.	.	.	.
0.833	0.0022	0.04	Q	.	.	.	.
0.917	0.0025	0.04	Q	.	.	.	.
1.000	0.0027	0.04	Q	.	.	.	.
1.083	0.0030	0.04	Q	.	.	.	.
1.167	0.0033	0.04	Q	.	.	.	.
1.250	0.0036	0.04	Q	.	.	.	.
1.333	0.0039	0.04	Q	.	.	.	.
1.417	0.0042	0.04	Q	.	.	.	.
1.500	0.0045	0.04	Q	.	.	.	.
1.583	0.0048	0.04	Q	.	.	.	.
1.667	0.0051	0.04	Q	.	.	.	.
1.750	0.0054	0.04	Q	.	.	.	.
1.833	0.0057	0.04	Q	.	.	.	.
1.917	0.0060	0.04	Q	.	.	.	.
2.000	0.0063	0.04	Q	.	.	.	.
2.083	0.0066	0.04	Q	.	.	.	.
2.167	0.0069	0.04	Q	.	.	.	.
2.250	0.0072	0.04	Q	.	.	.	.
2.333	0.0075	0.04	Q	.	.	.	.
2.417	0.0078	0.04	Q	.	.	.	.
2.500	0.0081	0.04	Q	.	.	.	.
2.583	0.0084	0.04	Q	.	.	.	.
2.667	0.0087	0.05	Q	.	.	.	.
2.750	0.0090	0.05	Q	.	.	.	.
2.833	0.0094	0.05	Q	.	.	.	.
2.917	0.0097	0.05	Q	.	.	.	.
3.000	0.0100	0.05	Q	.	.	.	.
3.083	0.0103	0.05	Q	.	.	.	.
3.167	0.0106	0.05	Q	.	.	.	.
3.250	0.0109	0.05	Q	.	.	.	.
3.333	0.0113	0.05	Q	.	.	.	.
3.417	0.0116	0.05	Q	.	.	.	.
3.500	0.0119	0.05	Q	.	.	.	.
3.583	0.0122	0.05	Q	.	.	.	.
3.667	0.0126	0.05	Q	.	.	.	.
3.750	0.0129	0.05	Q	.	.	.	.
3.833	0.0132	0.05	Q	.	.	.	.
3.917	0.0135	0.05	Q	.	.	.	.
4.000	0.0139	0.05	Q	.	.	.	.
4.083	0.0142	0.05	Q	.	.	.	.
4.167	0.0145	0.05	Q	.	.	.	.
4.250	0.0149	0.05	Q	.	.	.	.
4.333	0.0152	0.05	Q	.	.	.	.
4.417	0.0155	0.05	Q	.	.	.	.
4.500	0.0159	0.05	Q	.	.	.	.
4.583	0.0162	0.05	Q	.	.	.	.
4.667	0.0166	0.05	Q	.	.	.	.
4.750	0.0169	0.05	Q	.	.	.	.
4.833	0.0173	0.05	Q	.	.	.	.
4.917	0.0176	0.05	Q	.	.	.	.
5.000	0.0180	0.05	Q	.	.	.	.

5.083	0.0183	0.05	Q	.	.	.	.
5.167	0.0187	0.05	Q	.	.	.	.
5.250	0.0190	0.05	Q	.	.	.	.
5.333	0.0194	0.05	QV	.	.	.	.
5.417	0.0197	0.05	QV	.	.	.	.
5.500	0.0201	0.05	QV	.	.	.	.
5.583	0.0204	0.05	QV	.	.	.	.
5.667	0.0208	0.05	QV	.	.	.	.
5.750	0.0212	0.05	QV	.	.	.	.
5.833	0.0215	0.05	QV	.	.	.	.
5.917	0.0219	0.05	QV	.	.	.	.
6.000	0.0223	0.05	QV	.	.	.	.
6.083	0.0227	0.05	QV	.	.	.	.
6.167	0.0230	0.05	QV	.	.	.	.
6.250	0.0234	0.05	QV	.	.	.	.
6.333	0.0238	0.05	QV	.	.	.	.
6.417	0.0242	0.06	QV	.	.	.	.
6.500	0.0245	0.06	QV	.	.	.	.
6.583	0.0249	0.06	QV	.	.	.	.
6.667	0.0253	0.06	QV	.	.	.	.
6.750	0.0257	0.06	QV	.	.	.	.
6.833	0.0261	0.06	QV	.	.	.	.
6.917	0.0265	0.06	QV	.	.	.	.
7.000	0.0269	0.06	QV	.	.	.	.
7.083	0.0273	0.06	QV	.	.	.	.
7.167	0.0277	0.06	QV	.	.	.	.
7.250	0.0281	0.06	QV	.	.	.	.
7.333	0.0285	0.06	QV	.	.	.	.
7.417	0.0289	0.06	QV	.	.	.	.
7.500	0.0293	0.06	QV	.	.	.	.
7.583	0.0297	0.06	QV	.	.	.	.
7.667	0.0301	0.06	QV	.	.	.	.
7.750	0.0305	0.06	QV	.	.	.	.
7.833	0.0309	0.06	QV	.	.	.	.
7.917	0.0314	0.06	QV	.	.	.	.
8.000	0.0318	0.06	QV	.	.	.	.
8.083	0.0322	0.06	QV	.	.	.	.
8.167	0.0326	0.06	QV	.	.	.	.
8.250	0.0331	0.06	QV	.	.	.	.
8.333	0.0335	0.06	QV	.	.	.	.
8.417	0.0340	0.06	QV	.	.	.	.
8.500	0.0344	0.06	QV	.	.	.	.
8.583	0.0348	0.06	QV	.	.	.	.
8.667	0.0353	0.06	QV	.	.	.	.
8.750	0.0357	0.07	QV	.	.	.	.
8.833	0.0362	0.07	QV	.	.	.	.
8.917	0.0366	0.07	QV	.	.	.	.
9.000	0.0371	0.07	QV	.	.	.	.
9.083	0.0376	0.07	QV	.	.	.	.
9.167	0.0380	0.07	QV	.	.	.	.
9.250	0.0385	0.07	Q V	.	.	.	.
9.333	0.0390	0.07	Q V	.	.	.	.
9.417	0.0394	0.07	Q V	.	.	.	.
9.500	0.0399	0.07	Q V	.	.	.	.
9.583	0.0404	0.07	Q V	.	.	.	.
9.667	0.0409	0.07	Q V	.	.	.	.
9.750	0.0414	0.07	Q V	.	.	.	.
9.833	0.0419	0.07	Q V	.	.	.	.
9.917	0.0424	0.07	Q V	.	.	.	.
10.000	0.0429	0.07	Q V	.	.	.	.
10.083	0.0434	0.07	Q V	.	.	.	.
10.167	0.0439	0.07	Q V	.	.	.	.
10.250	0.0444	0.08	Q V	.	.	.	.
10.333	0.0449	0.08	Q V	.	.	.	.
10.417	0.0455	0.08	Q V	.	.	.	.
10.500	0.0460	0.08	Q V	.	.	.	.
10.583	0.0465	0.08	Q V	.	.	.	.
10.667	0.0471	0.08	Q V	.	.	.	.
10.750	0.0476	0.08	Q V	.	.	.	.
10.833	0.0482	0.08	Q V	.	.	.	.
10.917	0.0487	0.08	Q V	.	.	.	.

11.000	0.0493	0.08	Q V	.	.	.	.
11.083	0.0499	0.08	Q V	.	.	.	.
11.167	0.0504	0.08	Q V	.	.	.	.
11.250	0.0510	0.08	Q V	.	.	.	.
11.333	0.0516	0.08	Q V	.	.	.	.
11.417	0.0522	0.09	Q V	.	.	.	.
11.500	0.0528	0.09	Q V	.	.	.	.
11.583	0.0534	0.09	Q V	.	.	.	.
11.667	0.0540	0.09	Q V	.	.	.	.
11.750	0.0546	0.09	Q V	.	.	.	.
11.833	0.0553	0.09	Q V	.	.	.	.
11.917	0.0559	0.09	Q V	.	.	.	.
12.000	0.0565	0.09	Q V	.	.	.	.
12.083	0.0572	0.09	Q V	.	.	.	.
12.167	0.0579	0.10	Q V	.	.	.	.
12.250	0.0586	0.11	Q V	.	.	.	.
12.333	0.0594	0.12	Q V	.	.	.	.
12.417	0.0602	0.12	Q V	.	.	.	.
12.500	0.0611	0.12	Q V	.	.	.	.
12.583	0.0619	0.12	Q V	.	.	.	.
12.667	0.0628	0.12	Q V	.	.	.	.
12.750	0.0637	0.13	Q V	.	.	.	.
12.833	0.0645	0.13	Q V	.	.	.	.
12.917	0.0654	0.13	Q V	.	.	.	.
13.000	0.0663	0.13	Q V	.	.	.	.
13.083	0.0673	0.13	Q V	.	.	.	.
13.167	0.0682	0.14	Q V	.	.	.	.
13.250	0.0691	0.14	Q V	.	.	.	.
13.333	0.0701	0.14	Q V	.	.	.	.
13.417	0.0711	0.14	Q V	.	.	.	.
13.500	0.0721	0.14	Q V	.	.	.	.
13.583	0.0731	0.15	Q V	.	.	.	.
13.667	0.0741	0.15	Q V	.	.	.	.
13.750	0.0751	0.15	Q V	.	.	.	.
13.833	0.0762	0.15	Q V	.	.	.	.
13.917	0.0773	0.16	Q V	.	.	.	.
14.000	0.0784	0.16	Q V	.	.	.	.
14.083	0.0795	0.16	Q V	.	.	.	.
14.167	0.0807	0.17	Q V	.	.	.	.
14.250	0.0819	0.18	Q V	.	.	.	.
14.333	0.0831	0.18	Q V	.	.	.	.
14.417	0.0844	0.19	Q V	.	.	.	.
14.500	0.0857	0.19	Q V	.	.	.	.
14.583	0.0871	0.20	Q V	.	.	.	.
14.667	0.0885	0.20	Q V	.	.	.	.
14.750	0.0899	0.21	Q V	.	.	.	.
14.833	0.0914	0.21	Q V	.	.	.	.
14.917	0.0929	0.22	Q V	.	.	.	.
15.000	0.0944	0.23	Q V	.	.	.	.
15.083	0.0961	0.24	Q V	.	.	.	.
15.167	0.0979	0.26	Q V	.	.	.	.
15.250	0.1002	0.33	Q V	.	.	.	.
15.333	0.1034	0.47	Q V	.	.	.	.
15.417	0.1078	0.64	Q V	.	.	.	.
15.500	0.1129	0.75	Q V	.	.	.	.
15.583	0.1185	0.80	.Q V	.	.	.	.
15.667	0.1253	0.99	.Q V	.	.	.	.
15.750	0.1349	1.40	.Q V	.	.	.	.
15.833	0.1491	2.05	. Q V	.	.	.	.
15.917	0.1699	3.02	. Q V	.	.	.	.
16.000	0.2017	4.62	. Q V	.	.	.	.
16.083	0.2583	8.22	. Q V	.	.	.	.
16.167	0.3678	15.89	. .	V.Q	.	.	.
16.250	0.5086	20.44	. .	.	VQ	.	.
16.333	0.6128	15.14	. .	Q	.	V	.
16.417	0.6643	7.48	. Q.	.	.	V	.
16.500	0.6883	3.49	. Q .	.	.	V	.
16.583	0.7005	1.76	. Q .	.	.	V	.
16.667	0.7080	1.10	.Q .	.	.	V	.
16.750	0.7124	0.64	Q .	.	.	V	.
16.833	0.7150	0.38	Q .	.	.	V	.

16.917	0.7168	0.26	Q	.	.	.	V .
17.000	0.7183	0.22	Q	.	.	.	V .
17.083	0.7197	0.20	Q	.	.	.	V .
17.167	0.7211	0.19	Q	.	.	.	V .
17.250	0.7223	0.18	Q	.	.	.	V .
17.333	0.7234	0.17	Q	.	.	.	V .
17.417	0.7245	0.16	Q	.	.	.	V .
17.500	0.7256	0.15	Q	.	.	.	V .
17.583	0.7266	0.15	Q	.	.	.	V .
17.667	0.7276	0.14	Q	.	.	.	V .
17.750	0.7286	0.14	Q	.	.	.	V .
17.833	0.7295	0.13	Q	.	.	.	V .
17.917	0.7304	0.13	Q	.	.	.	V .
18.000	0.7313	0.13	Q	.	.	.	V .
18.083	0.7321	0.12	Q	.	.	.	V .
18.167	0.7329	0.12	Q	.	.	.	V .
18.250	0.7336	0.11	Q	.	.	.	V .
18.333	0.7343	0.10	Q	.	.	.	V .
18.417	0.7350	0.09	Q	.	.	.	V .
18.500	0.7356	0.09	Q	.	.	.	V .
18.583	0.7362	0.09	Q	.	.	.	V .
18.667	0.7368	0.09	Q	.	.	.	V .
18.750	0.7374	0.08	Q	.	.	.	V .
18.833	0.7380	0.08	Q	.	.	.	V .
18.917	0.7385	0.08	Q	.	.	.	V .
19.000	0.7391	0.08	Q	.	.	.	V .
19.083	0.7396	0.08	Q	.	.	.	V .
19.167	0.7401	0.08	Q	.	.	.	V .
19.250	0.7407	0.08	Q	.	.	.	V .
19.333	0.7412	0.07	Q	.	.	.	V .
19.417	0.7417	0.07	Q	.	.	.	V .
19.500	0.7422	0.07	Q	.	.	.	V .
19.583	0.7426	0.07	Q	.	.	.	V .
19.667	0.7431	0.07	Q	.	.	.	V .
19.750	0.7436	0.07	Q	.	.	.	V.
19.833	0.7441	0.07	Q	.	.	.	V.
19.917	0.7445	0.07	Q	.	.	.	V.
20.000	0.7450	0.07	Q	.	.	.	V.
20.083	0.7454	0.06	Q	.	.	.	V.
20.167	0.7459	0.06	Q	.	.	.	V.
20.250	0.7463	0.06	Q	.	.	.	V.
20.333	0.7467	0.06	Q	.	.	.	V.
20.417	0.7471	0.06	Q	.	.	.	V.
20.500	0.7476	0.06	Q	.	.	.	V.
20.583	0.7480	0.06	Q	.	.	.	V.
20.667	0.7484	0.06	Q	.	.	.	V.
20.750	0.7488	0.06	Q	.	.	.	V.
20.833	0.7492	0.06	Q	.	.	.	V.
20.917	0.7496	0.06	Q	.	.	.	V.
21.000	0.7500	0.06	Q	.	.	.	V.
21.083	0.7503	0.06	Q	.	.	.	V.
21.167	0.7507	0.06	Q	.	.	.	V.
21.250	0.7511	0.05	Q	.	.	.	V.
21.333	0.7515	0.05	Q	.	.	.	V.
21.417	0.7518	0.05	Q	.	.	.	V.
21.500	0.7522	0.05	Q	.	.	.	V.
21.583	0.7526	0.05	Q	.	.	.	V.
21.667	0.7529	0.05	Q	.	.	.	V.
21.750	0.7533	0.05	Q	.	.	.	V.
21.833	0.7536	0.05	Q	.	.	.	V.
21.917	0.7540	0.05	Q	.	.	.	V.
22.000	0.7543	0.05	Q	.	.	.	V.
22.083	0.7547	0.05	Q	.	.	.	V.
22.167	0.7550	0.05	Q	.	.	.	V.
22.250	0.7554	0.05	Q	.	.	.	V.
22.333	0.7557	0.05	Q	.	.	.	V.
22.417	0.7560	0.05	Q	.	.	.	V.
22.500	0.7563	0.05	Q	.	.	.	V.
22.583	0.7567	0.05	Q	.	.	.	V.
22.667	0.7570	0.05	Q	.	.	.	V.
22.750	0.7573	0.05	Q	.	.	.	V.

22.833	0.7576	0.05	Q	.	.	.	V.
22.917	0.7579	0.05	Q	.	.	.	V.
23.000	0.7583	0.05	Q	.	.	.	V.
23.083	0.7586	0.04	Q	.	.	.	V.
23.167	0.7589	0.04	Q	.	.	.	V.
23.250	0.7592	0.04	Q	.	.	.	V.
23.333	0.7595	0.04	Q	.	.	.	V.
23.417	0.7598	0.04	Q	.	.	.	V.
23.500	0.7601	0.04	Q	.	.	.	V.
23.583	0.7604	0.04	Q	.	.	.	V.
23.667	0.7607	0.04	Q	.	.	.	V.
23.750	0.7610	0.04	Q	.	.	.	V.
23.833	0.7613	0.04	Q	.	.	.	V.
23.917	0.7615	0.04	Q	.	.	.	V.
24.000	0.7618	0.04	Q	.	.	.	V.
24.083	0.7621	0.04	Q	.	.	.	V.
24.167	0.7623	0.03	Q	.	.	.	V.
24.250	0.7624	0.02	Q	.	.	.	V.
24.333	0.7625	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	45.0
20%	30.0
30%	25.0
40%	20.0
50%	15.0
60%	15.0
70%	15.0
80%	5.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  EXISTING CONDITION
  AREA 'C'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         16.00       97.00       75.(AMC II)     0.200       0.044

    TOTAL AREA (Acres) =     16.00

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.194

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.956
==========================================================================
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**************************************************************************

             F L O O D    R O U T I N G    A N A L Y S I S
             USING COUNTY HYDROLOGY MANUAL OF ORANGE(1986)
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              Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - EXISTING CONDITION - WEST                                *
* AREA 'C'                                                              *
 ************************************************************************

  FILE NAME: WE-C.DAT
  TIME/DATE OF STUDY: 11:03 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      16.000 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.223 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.194
         LOW LOSS FRACTION = 0.956
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  37.369



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	2.593	5.018
2	17.076	28.024
3	43.597	51.319
4	72.304	55.549
5	88.291	30.934
6	95.315	13.592
7	98.055	5.303
8	98.849	1.535
9	99.440	1.144
10	99.776	0.650
11	99.944	0.325
12	100.000	0.108

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 2.1834
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 0.5496

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0001	0.01	Q	.	.	.	.
0.333	0.0002	0.02	Q	.	.	.	.
0.417	0.0004	0.02	Q	.	.	.	.
0.500	0.0005	0.02	Q	.	.	.	.
0.583	0.0007	0.02	Q	.	.	.	.
0.667	0.0008	0.02	Q	.	.	.	.
0.750	0.0010	0.02	Q	.	.	.	.
0.833	0.0011	0.02	Q	.	.	.	.
0.917	0.0013	0.02	Q	.	.	.	.
1.000	0.0015	0.02	Q	.	.	.	.
1.083	0.0016	0.02	Q	.	.	.	.
1.167	0.0018	0.02	Q	.	.	.	.
1.250	0.0019	0.02	Q	.	.	.	.
1.333	0.0021	0.02	Q	.	.	.	.
1.417	0.0023	0.02	Q	.	.	.	.
1.500	0.0024	0.02	Q	.	.	.	.
1.583	0.0026	0.02	Q	.	.	.	.
1.667	0.0028	0.02	Q	.	.	.	.
1.750	0.0029	0.02	Q	.	.	.	.
1.833	0.0031	0.02	Q	.	.	.	.
1.917	0.0033	0.02	Q	.	.	.	.
2.000	0.0034	0.02	Q	.	.	.	.
2.083	0.0036	0.02	Q	.	.	.	.
2.167	0.0038	0.02	Q	.	.	.	.
2.250	0.0039	0.02	Q	.	.	.	.
2.333	0.0041	0.02	Q	.	.	.	.
2.417	0.0043	0.02	Q	.	.	.	.
2.500	0.0044	0.02	Q	.	.	.	.
2.583	0.0046	0.02	Q	.	.	.	.
2.667	0.0048	0.03	Q	.	.	.	.
2.750	0.0050	0.03	Q	.	.	.	.
2.833	0.0051	0.03	Q	.	.	.	.
2.917	0.0053	0.03	Q	.	.	.	.
3.000	0.0055	0.03	Q	.	.	.	.
3.083	0.0057	0.03	Q	.	.	.	.
3.167	0.0058	0.03	Q	.	.	.	.
3.250	0.0060	0.03	Q	.	.	.	.
3.333	0.0062	0.03	Q	.	.	.	.
3.417	0.0064	0.03	Q	.	.	.	.
3.500	0.0066	0.03	Q	.	.	.	.
3.583	0.0067	0.03	Q	.	.	.	.
3.667	0.0069	0.03	Q	.	.	.	.
3.750	0.0071	0.03	Q	.	.	.	.
3.833	0.0073	0.03	Q	.	.	.	.
3.917	0.0075	0.03	Q	.	.	.	.
4.000	0.0076	0.03	Q	.	.	.	.
4.083	0.0078	0.03	Q	.	.	.	.
4.167	0.0080	0.03	Q	.	.	.	.
4.250	0.0082	0.03	Q	.	.	.	.
4.333	0.0084	0.03	Q	.	.	.	.
4.417	0.0086	0.03	Q	.	.	.	.
4.500	0.0088	0.03	Q	.	.	.	.
4.583	0.0090	0.03	Q	.	.	.	.
4.667	0.0091	0.03	Q	.	.	.	.
4.750	0.0093	0.03	Q	.	.	.	.
4.833	0.0095	0.03	Q	.	.	.	.
4.917	0.0097	0.03	Q	.	.	.	.
5.000	0.0099	0.03	Q	.	.	.	.

5.083	0.0101	0.03	Q	.	.	.	.
5.167	0.0103	0.03	Q	.	.	.	.
5.250	0.0105	0.03	Q	.	.	.	.
5.333	0.0107	0.03	Q	.	.	.	.
5.417	0.0109	0.03	Q	.	.	.	.
5.500	0.0111	0.03	Q	.	.	.	.
5.583	0.0113	0.03	Q	.	.	.	.
5.667	0.0115	0.03	Q	.	.	.	.
5.750	0.0117	0.03	Q	.	.	.	.
5.833	0.0119	0.03	Q	.	.	.	.
5.917	0.0121	0.03	Q	.	.	.	.
6.000	0.0123	0.03	Q	.	.	.	.
6.083	0.0125	0.03	Q	.	.	.	.
6.167	0.0127	0.03	Q	.	.	.	.
6.250	0.0129	0.03	Q	.	.	.	.
6.333	0.0132	0.03	Q	.	.	.	.
6.417	0.0134	0.03	Q	.	.	.	.
6.500	0.0136	0.03	Q	.	.	.	.
6.583	0.0138	0.03	QV	.	.	.	.
6.667	0.0140	0.03	QV	.	.	.	.
6.750	0.0142	0.03	QV	.	.	.	.
6.833	0.0144	0.03	QV	.	.	.	.
6.917	0.0147	0.03	QV	.	.	.	.
7.000	0.0149	0.03	QV	.	.	.	.
7.083	0.0151	0.03	QV	.	.	.	.
7.167	0.0153	0.03	QV	.	.	.	.
7.250	0.0155	0.03	QV	.	.	.	.
7.333	0.0158	0.03	QV	.	.	.	.
7.417	0.0160	0.03	QV	.	.	.	.
7.500	0.0162	0.03	QV	.	.	.	.
7.583	0.0164	0.03	QV	.	.	.	.
7.667	0.0167	0.03	QV	.	.	.	.
7.750	0.0169	0.03	QV	.	.	.	.
7.833	0.0171	0.03	QV	.	.	.	.
7.917	0.0174	0.03	QV	.	.	.	.
8.000	0.0176	0.03	QV	.	.	.	.
8.083	0.0178	0.03	QV	.	.	.	.
8.167	0.0181	0.03	QV	.	.	.	.
8.250	0.0183	0.03	QV	.	.	.	.
8.333	0.0186	0.04	QV	.	.	.	.
8.417	0.0188	0.04	QV	.	.	.	.
8.500	0.0191	0.04	QV	.	.	.	.
8.583	0.0193	0.04	QV	.	.	.	.
8.667	0.0196	0.04	QV	.	.	.	.
8.750	0.0198	0.04	QV	.	.	.	.
8.833	0.0201	0.04	QV	.	.	.	.
8.917	0.0203	0.04	QV	.	.	.	.
9.000	0.0206	0.04	QV	.	.	.	.
9.083	0.0208	0.04	QV	.	.	.	.
9.167	0.0211	0.04	QV	.	.	.	.
9.250	0.0213	0.04	QV	.	.	.	.
9.333	0.0216	0.04	QV	.	.	.	.
9.417	0.0219	0.04	QV	.	.	.	.
9.500	0.0221	0.04	QV	.	.	.	.
9.583	0.0224	0.04	QV	.	.	.	.
9.667	0.0227	0.04	QV	.	.	.	.
9.750	0.0229	0.04	QV	.	.	.	.
9.833	0.0232	0.04	QV	.	.	.	.
9.917	0.0235	0.04	QV	.	.	.	.
10.000	0.0238	0.04	QV	.	.	.	.
10.083	0.0241	0.04	QV	.	.	.	.
10.167	0.0243	0.04	QV	.	.	.	.
10.250	0.0246	0.04	QV	.	.	.	.
10.333	0.0249	0.04	QV	.	.	.	.
10.417	0.0252	0.04	QV	.	.	.	.
10.500	0.0255	0.04	QV	.	.	.	.
10.583	0.0258	0.04	QV	.	.	.	.
10.667	0.0261	0.04	QV	.	.	.	.
10.750	0.0264	0.04	QV	.	.	.	.
10.833	0.0267	0.04	QV	.	.	.	.
10.917	0.0270	0.04	QV	.	.	.	.

11.000	0.0273	0.05	QV	.	.	.	.
11.083	0.0276	0.05	Q V	.	.	.	.
11.167	0.0280	0.05	Q V	.	.	.	.
11.250	0.0283	0.05	Q V	.	.	.	.
11.333	0.0286	0.05	Q V	.	.	.	.
11.417	0.0289	0.05	Q V	.	.	.	.
11.500	0.0293	0.05	Q V	.	.	.	.
11.583	0.0296	0.05	Q V	.	.	.	.
11.667	0.0299	0.05	Q V	.	.	.	.
11.750	0.0303	0.05	Q V	.	.	.	.
11.833	0.0306	0.05	Q V	.	.	.	.
11.917	0.0310	0.05	Q V	.	.	.	.
12.000	0.0313	0.05	Q V	.	.	.	.
12.083	0.0317	0.05	Q V	.	.	.	.
12.167	0.0321	0.05	Q V	.	.	.	.
12.250	0.0325	0.06	Q V	.	.	.	.
12.333	0.0329	0.06	Q V	.	.	.	.
12.417	0.0334	0.07	Q V	.	.	.	.
12.500	0.0338	0.07	Q V	.	.	.	.
12.583	0.0343	0.07	Q V	.	.	.	.
12.667	0.0348	0.07	Q V	.	.	.	.
12.750	0.0353	0.07	Q V	.	.	.	.
12.833	0.0357	0.07	Q V	.	.	.	.
12.917	0.0362	0.07	Q V	.	.	.	.
13.000	0.0367	0.07	Q V	.	.	.	.
13.083	0.0372	0.07	Q V	.	.	.	.
13.167	0.0378	0.07	Q V	.	.	.	.
13.250	0.0383	0.08	Q V	.	.	.	.
13.333	0.0388	0.08	Q V	.	.	.	.
13.417	0.0394	0.08	Q V	.	.	.	.
13.500	0.0399	0.08	Q V	.	.	.	.
13.583	0.0405	0.08	Q V	.	.	.	.
13.667	0.0410	0.08	Q V	.	.	.	.
13.750	0.0416	0.08	Q V	.	.	.	.
13.833	0.0422	0.09	Q V	.	.	.	.
13.917	0.0428	0.09	Q V	.	.	.	.
14.000	0.0434	0.09	Q V	.	.	.	.
14.083	0.0440	0.09	Q V	.	.	.	.
14.167	0.0447	0.09	Q V	.	.	.	.
14.250	0.0453	0.10	Q V	.	.	.	.
14.333	0.0460	0.10	Q V	.	.	.	.
14.417	0.0467	0.10	Q V	.	.	.	.
14.500	0.0474	0.10	Q V	.	.	.	.
14.583	0.0482	0.11	Q V	.	.	.	.
14.667	0.0490	0.11	Q V	.	.	.	.
14.750	0.0497	0.11	Q V	.	.	.	.
14.833	0.0505	0.12	Q V	.	.	.	.
14.917	0.0514	0.12	Q V	.	.	.	.
15.000	0.0522	0.12	Q V	.	.	.	.
15.083	0.0531	0.13	Q V	.	.	.	.
15.167	0.0541	0.14	Q V	.	.	.	.
15.250	0.0553	0.18	Q V	.	.	.	.
15.333	0.0571	0.26	Q V	.	.	.	.
15.417	0.0597	0.37	Q V	.	.	.	.
15.500	0.0629	0.47	Q V	.	.	.	.
15.583	0.0666	0.54	.Q V	.	.	.	.
15.667	0.0710	0.64	.Q V	.	.	.	.
15.750	0.0771	0.89	.Q V	.	.	.	.
15.833	0.0862	1.31	. Q V	.	.	.	.
15.917	0.0996	1.95	. Q V	.	.	.	.
16.000	0.1203	3.00	. Q V	.	.	.	.
16.083	0.1562	5.22	. QV	.	.	.	.
16.167	0.2239	9.83	. .	V Q.	.	.	.
16.250	0.3166	13.45	. .	.	V Q	.	.
16.333	0.4065	13.06	. .	.	Q V.	.	.
16.417	0.4622	8.08	. .	Q	.	V	.
16.500	0.4915	4.26	. Q	.	.	V	.
16.583	0.5064	2.16	. Q	.	.	V	.
16.667	0.5139	1.10	. Q	.	.	V	.
16.750	0.5187	0.69	.Q	.	.	V	.
16.833	0.5215	0.41	Q	.	.	V	.

16.917	0.5233	0.26	Q	.	.	.	V .
17.000	0.5244	0.17	Q	.	.	.	V .
17.083	0.5253	0.13	Q	.	.	.	V .
17.167	0.5261	0.11	Q	.	.	.	V .
17.250	0.5268	0.10	Q	.	.	.	V .
17.333	0.5275	0.10	Q	.	.	.	V .
17.417	0.5281	0.09	Q	.	.	.	V .
17.500	0.5287	0.09	Q	.	.	.	V .
17.583	0.5293	0.08	Q	.	.	.	V .
17.667	0.5299	0.08	Q	.	.	.	V .
17.750	0.5304	0.08	Q	.	.	.	V .
17.833	0.5309	0.08	Q	.	.	.	V .
17.917	0.5314	0.07	Q	.	.	.	V .
18.000	0.5319	0.07	Q	.	.	.	V .
18.083	0.5324	0.07	Q	.	.	.	V .
18.167	0.5329	0.07	Q	.	.	.	V .
18.250	0.5333	0.06	Q	.	.	.	V .
18.333	0.5337	0.06	Q	.	.	.	V .
18.417	0.5341	0.05	Q	.	.	.	V .
18.500	0.5344	0.05	Q	.	.	.	V .
18.583	0.5348	0.05	Q	.	.	.	V .
18.667	0.5351	0.05	Q	.	.	.	V .
18.750	0.5354	0.05	Q	.	.	.	V .
18.833	0.5357	0.05	Q	.	.	.	V .
18.917	0.5361	0.05	Q	.	.	.	V.
19.000	0.5364	0.04	Q	.	.	.	V.
19.083	0.5367	0.04	Q	.	.	.	V.
19.167	0.5370	0.04	Q	.	.	.	V.
19.250	0.5373	0.04	Q	.	.	.	V.
19.333	0.5375	0.04	Q	.	.	.	V.
19.417	0.5378	0.04	Q	.	.	.	V.
19.500	0.5381	0.04	Q	.	.	.	V.
19.583	0.5384	0.04	Q	.	.	.	V.
19.667	0.5387	0.04	Q	.	.	.	V.
19.750	0.5389	0.04	Q	.	.	.	V.
19.833	0.5392	0.04	Q	.	.	.	V.
19.917	0.5394	0.04	Q	.	.	.	V.
20.000	0.5397	0.04	Q	.	.	.	V.
20.083	0.5399	0.04	Q	.	.	.	V.
20.167	0.5402	0.04	Q	.	.	.	V.
20.250	0.5404	0.04	Q	.	.	.	V.
20.333	0.5407	0.03	Q	.	.	.	V.
20.417	0.5409	0.03	Q	.	.	.	V.
20.500	0.5411	0.03	Q	.	.	.	V.
20.583	0.5414	0.03	Q	.	.	.	V.
20.667	0.5416	0.03	Q	.	.	.	V.
20.750	0.5418	0.03	Q	.	.	.	V.
20.833	0.5420	0.03	Q	.	.	.	V.
20.917	0.5423	0.03	Q	.	.	.	V.
21.000	0.5425	0.03	Q	.	.	.	V.
21.083	0.5427	0.03	Q	.	.	.	V.
21.167	0.5429	0.03	Q	.	.	.	V.
21.250	0.5431	0.03	Q	.	.	.	V.
21.333	0.5433	0.03	Q	.	.	.	V.
21.417	0.5435	0.03	Q	.	.	.	V.
21.500	0.5437	0.03	Q	.	.	.	V.
21.583	0.5440	0.03	Q	.	.	.	V.
21.667	0.5442	0.03	Q	.	.	.	V.
21.750	0.5444	0.03	Q	.	.	.	V.
21.833	0.5445	0.03	Q	.	.	.	V.
21.917	0.5447	0.03	Q	.	.	.	V.
22.000	0.5449	0.03	Q	.	.	.	V.
22.083	0.5451	0.03	Q	.	.	.	V.
22.167	0.5453	0.03	Q	.	.	.	V.
22.250	0.5455	0.03	Q	.	.	.	V.
22.333	0.5457	0.03	Q	.	.	.	V.
22.417	0.5459	0.03	Q	.	.	.	V.
22.500	0.5461	0.03	Q	.	.	.	V.
22.583	0.5462	0.03	Q	.	.	.	V.
22.667	0.5464	0.03	Q	.	.	.	V.
22.750	0.5466	0.03	Q	.	.	.	V.

22.833	0.5468	0.03	Q	.	.	.	V.
22.917	0.5470	0.03	Q	.	.	.	V.
23.000	0.5471	0.03	Q	.	.	.	V.
23.083	0.5473	0.03	Q	.	.	.	V.
23.167	0.5475	0.02	Q	.	.	.	V.
23.250	0.5476	0.02	Q	.	.	.	V.
23.333	0.5478	0.02	Q	.	.	.	V.
23.417	0.5480	0.02	Q	.	.	.	V.
23.500	0.5482	0.02	Q	.	.	.	V.
23.583	0.5483	0.02	Q	.	.	.	V.
23.667	0.5485	0.02	Q	.	.	.	V.
23.750	0.5486	0.02	Q	.	.	.	V.
23.833	0.5488	0.02	Q	.	.	.	V.
23.917	0.5490	0.02	Q	.	.	.	V.
24.000	0.5491	0.02	Q	.	.	.	V.
24.083	0.5493	0.02	Q	.	.	.	V.
24.167	0.5494	0.02	Q	.	.	.	V.
24.250	0.5495	0.01	Q	.	.	.	V.
24.333	0.5495	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	45.0
20%	35.0
30%	30.0
40%	20.0
50%	20.0
60%	20.0
70%	15.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

2-YR STUDY

HYDROLOGY CALCULATIONS

PROPOSED CONDITION

WEST - AREAS ‘A’, ‘B’ & ‘C’

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******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
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 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3, BREA CENTRAL                                             *
* 2-YR STUDY                                                             *
* PROPOSED - WEST AREA - DRAINAGE AREA 'A'                               *
 ***********************************************************************

  FILE NAME: WEST-A.DAT
  TIME/DATE OF STUDY: 10:40 01/12/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    522.00  DOWNSTREAM(FEET) =    519.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.646
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.774
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.40      0.20     0.200    57    7.65
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.18
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.18

******************************************************************************
```

```
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   519.00  DOWNSTREAM(FEET) =   515.00
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.18
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.598
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.35      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.35      SUBAREA RUNOFF(CFS) =    6.10
  EFFECTIVE AREA(ACRES) =      5.75   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =       8.06

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   515.00  DOWNSTREAM(FEET) =   507.50
  FLOW LENGTH(FEET) =   410.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.06
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.03
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.518
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        4.56      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    4.56      SUBAREA RUNOFF(CFS) =    6.07
  EFFECTIVE AREA(ACRES) =     10.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.3       PEAK FLOW RATE(CFS) =      13.72

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      7.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   507.50  DOWNSTREAM(FEET) =   502.50
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.72
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.95
  RAINFALL INTENSITY(INCH/HR) =   1.44
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.31
  TOTAL STREAM AREA(ACRES) =      10.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.72

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    507.50  DOWNSTREAM(FEET) =    504.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.082
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.854
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20     0.100    57    7.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  504.30  DOWNSTREAM ELEVATION(FEET) =  502.50
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.22
    HALFSTREET FLOOD WIDTH(FEET) =    4.84
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.37
  STREET FLOW TRAVEL TIME(MIN.) =   1.51   Tc(MIN.) =    8.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.659
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.18      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.18      SUBAREA RUNOFF(CFS) =    0.27
  EFFECTIVE AREA(ACRES) =      0.44    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   5.26
  FLOW VELOCITY(FEET/SEC.) =  1.76   DEPTH*VELOCITY(FT*FT/SEC.) =   0.39
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.60
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.659
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.40      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.40      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      0.84   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.24

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.60
  RAINFALL INTENSITY(INCH/HR) =   1.66
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.84
  TOTAL STREAM AREA(ACRES) =       0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.72   10.95    1.444  0.20( 0.04) 0.20      10.3       1.00
      2        1.24    8.60    1.659  0.20( 0.02) 0.10       0.8       5.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.66    8.60    1.659  0.20( 0.04) 0.19       8.9       5.00
      2       14.79   10.95    1.444  0.20( 0.04) 0.19      11.1       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.79    Tc(MIN.) =    10.95
  EFFECTIVE AREA(ACRES) =      11.15   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.50  DOWNSTREAM(FEET) =   502.00
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.79
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.08
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.15
  TOTAL STREAM AREA(ACRES) =      11.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.79

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    518.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.311
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.980
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.71      0.20     0.100    57    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.25

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  518.00  DOWNSTREAM ELEVATION(FEET) =  502.00
  STREET LENGTH(FEET) =   770.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   4.45   Tc(MIN.) =   10.77
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.458
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.64      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.64      SUBAREA RUNOFF(CFS) =    2.12
  EFFECTIVE AREA(ACRES) =      2.35    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       3.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.70
  FLOW VELOCITY(FEET/SEC.) =  3.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE     10.00 =    1070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.35
  TOTAL STREAM AREA(ACRES) =       2.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.04

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.66    8.73    1.644  0.20( 0.04) 0.19       8.9       5.00
      1       14.79   11.08    1.434  0.20( 0.04) 0.19      11.1       1.00
      2        3.04   10.77    1.458  0.20( 0.02) 0.10       2.3       8.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       16.44    8.73    1.644  0.20( 0.03) 0.17      10.8       5.00
      2       17.68   10.77    1.458  0.20( 0.04) 0.18      13.2       8.00
      3       17.78   11.08    1.434  0.20( 0.04) 0.18      13.5       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      17.78    Tc(MIN.) =    11.08
  EFFECTIVE AREA(ACRES) =      13.50   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       13.5
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   502.00  DOWNSTREAM(FEET) =   501.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.78
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.27
  RAINFALL INTENSITY(INCH/HR) =   1.42
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      13.50
  TOTAL STREAM AREA(ACRES) =      13.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      17.78

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    521.00  DOWNSTREAM(FEET) =    517.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.65      0.20     0.100    57    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.07
  TOTAL AREA(ACRES) =      0.65   PEAK FLOW RATE(CFS) =      1.07

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  517.00  DOWNSTREAM ELEVATION(FEET) =  501.50
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
```

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  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.00
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.82
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   4.35   Tc(MIN.) =   11.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.410
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.46      SUBAREA RUNOFF(CFS) =    1.83
  EFFECTIVE AREA(ACRES) =      2.11    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       2.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.00
  FLOW VELOCITY(FEET/SEC.) =  2.99   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =    1035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.41
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.11
  TOTAL STREAM AREA(ACRES) =       2.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.64

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       16.44    8.93    1.623  0.20( 0.03) 0.17      10.8       5.00
      1       17.68   10.96    1.443  0.20( 0.04) 0.18      13.2       8.00
      1       17.78   11.27    1.420  0.20( 0.04) 0.18      13.5       1.00
      2        2.64   11.41    1.410  0.20( 0.02) 0.10       2.1      11.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.83    8.93    1.623  0.20( 0.03) 0.16      12.5       5.00
      2       20.28   10.96    1.443  0.20( 0.03) 0.17      15.2       8.00
      3       20.41   11.27    1.420  0.20( 0.03) 0.17      15.6       1.00
      4       20.29   11.41    1.410  0.20( 0.03) 0.17      15.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.41    Tc(MIN.) =    11.27
  EFFECTIVE AREA(ACRES) =      15.58   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =    1650.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     16.00 IS CODE =  31
```

```
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   501.50  DOWNSTREAM(FEET) =   480.00
  FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.09
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.41
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   12.23
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
--------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.23
  RAINFALL INTENSITY(INCH/HR) =   1.35
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      15.58
  TOTAL STREAM AREA(ACRES) =      15.61
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.41

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    490.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.419
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.161
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.31      0.20     0.100    57    5.42
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.31   PEAK FLOW RATE(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  490.00  DOWNSTREAM ELEVATION(FEET) =  480.00
  STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.68   Tc(MIN.) =    7.10
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.851
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      0.72    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       1.19

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.50
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   0.69
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.10
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.851
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.41      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      1.13   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   1.85
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.13
  TOTAL STREAM AREA(ACRES) =       1.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.83    9.91    1.529  0.20( 0.03) 0.16      12.5       5.00
      1       20.28   11.92    1.375  0.20( 0.03) 0.17      15.2       8.00
      1       20.41   12.23    1.355  0.20( 0.03) 0.17      15.6       1.00
      1       20.29   12.37    1.346  0.20( 0.03) 0.17      15.6      11.00
      2        1.86    7.10    1.851  0.20( 0.02) 0.10       1.1      14.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.26    7.10    1.851  0.20( 0.03) 0.16      10.1      14.00
      2       20.36    9.91    1.529  0.20( 0.03) 0.16      13.6       5.00
      3       21.65   11.92    1.375  0.20( 0.03) 0.16      16.4       8.00
      4       21.76   12.23    1.355  0.20( 0.03) 0.16      16.7       1.00
      5       21.64   12.37    1.346  0.20( 0.03) 0.16      16.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.76    Tc(MIN.) =    12.23
  EFFECTIVE AREA(ACRES) =      16.71   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       16.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     16.00 =    2350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   480.00  DOWNSTREAM(FEET) =   479.70
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.76
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   12.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.55
  RAINFALL INTENSITY(INCH/HR) =   1.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      16.71
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.76

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.957
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.873
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.33      0.20      0.100    57    6.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.33   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 MAINLINE Tc(MIN.) =    6.96
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.873
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.29      0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.29      SUBAREA RUNOFF(CFS) =    0.48
 EFFECTIVE AREA(ACRES) =      0.62   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.03

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.96
 RAINFALL INTENSITY(INCH/HR) =   1.87
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.62
 TOTAL STREAM AREA(ACRES) =       0.62
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.03

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.26    7.44    1.802  0.20( 0.03) 0.16      10.1      14.00
     1       20.36   10.25    1.500  0.20( 0.03) 0.16      13.6       5.00
     1       21.65   12.25    1.354  0.20( 0.03) 0.16      16.4       8.00
     1       21.76   12.55    1.334  0.20( 0.03) 0.16      16.7       1.00
     1       21.64   12.70    1.326  0.20( 0.03) 0.16      16.7      11.00
     2        1.03    6.96    1.873  0.20( 0.02) 0.10       0.6      17.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       18.79    6.96    1.873  0.20( 0.03) 0.15      10.0      17.00
     2       19.25    7.44    1.802  0.20( 0.03) 0.15      10.7      14.00
     3       21.18   10.25    1.500  0.20( 0.03) 0.16      14.2       5.00
     4       22.40   12.25    1.354  0.20( 0.03) 0.16      17.0       8.00
     5       22.50   12.55    1.334  0.20( 0.03) 0.16      17.3       1.00
     6       22.37   12.70    1.326  0.20( 0.03) 0.16      17.4      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      22.50    Tc(MIN.) =    12.55
 EFFECTIVE AREA(ACRES) =      17.33   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =       17.4
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =    2450.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   479.70  DOWNSTREAM(FEET) =   479.60
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  21.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      22.50
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   12.65
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.65
  RAINFALL INTENSITY(INCH/HR) =   1.33
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.16
  EFFECTIVE STREAM AREA(ACRES) =      17.33
  TOTAL STREAM AREA(ACRES) =      17.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      22.50

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    495.50  DOWNSTREAM(FEET) =    491.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.348
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.815
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.57      0.20     0.200    57    7.35
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.51
  TOTAL AREA(ACRES) =      1.57   PEAK FLOW RATE(CFS) =      2.51

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   491.00  DOWNSTREAM(FEET) =   483.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.20
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.51
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    8.34
  LONGEST FLOWPATH FROM NODE     19.00 TO NODE     21.00 =     670.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.34
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.687
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.74      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.74      SUBAREA RUNOFF(CFS) =    5.54
  EFFECTIVE AREA(ACRES) =      5.31   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =       7.87

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   1.69
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       5.31
  TOTAL STREAM AREA(ACRES) =       5.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.87

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       18.79    7.06    1.858  0.20( 0.03) 0.15      10.0      17.00
      1       19.25    7.54    1.788  0.20( 0.03) 0.15      10.7      14.00
      1       21.18   10.34    1.492  0.20( 0.03) 0.16      14.2       5.00
      1       22.40   12.34    1.348  0.20( 0.03) 0.16      17.0       8.00
      1       22.50   12.65    1.329  0.20( 0.03) 0.16      17.3       1.00
      1       22.37   12.79    1.320  0.20( 0.03) 0.16      17.4      11.00
      2        7.87    8.34    1.687  0.20( 0.04) 0.20       5.3      19.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.13    7.06    1.858  0.20( 0.03) 0.17      14.5      17.00
      2       26.80    7.54    1.788  0.20( 0.03) 0.17      15.5      14.00
      3       27.68    8.34    1.687  0.20( 0.03) 0.17      17.0      19.00
      4       28.12   10.34    1.492  0.20( 0.03) 0.17      19.6       5.00
      5       28.65   12.34    1.348  0.20( 0.03) 0.17      22.3       8.00
      6       28.66   12.65    1.329  0.20( 0.03) 0.17      22.6       1.00
      7       28.48   12.79    1.320  0.20( 0.03) 0.17      22.7      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      28.66    Tc(MIN.) =    12.65
  EFFECTIVE AREA(ACRES) =      22.64   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       22.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.70
  FLOW LENGTH(FEET) =   425.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.66
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.16
  RAINFALL INTENSITY(INCH/HR) =   1.25
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      22.64
  TOTAL STREAM AREA(ACRES) =      22.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.66

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    486.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.700
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.914
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.28      0.20      0.100    57    6.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.28   PEAK FLOW RATE(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   1.91
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.28
  TOTAL STREAM AREA(ACRES) =       0.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.48

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    482.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.357
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.972
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.26      0.20      0.100    57    6.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.46
```

```
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.36
  RAINFALL INTENSITY(INCH/HR) =   1.97
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.26
  TOTAL STREAM AREA(ACRES) =       0.26
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       26.13    8.58    1.661  0.20( 0.03) 0.17      14.5      17.00
      1       26.80    9.06    1.610  0.20( 0.03) 0.17      15.5      14.00
      1       27.68    9.85    1.534  0.20( 0.03) 0.17      17.0      19.00
      1       28.12   11.85    1.379  0.20( 0.03) 0.17      19.6       5.00
      1       28.65   13.85    1.261  0.20( 0.03) 0.17      22.3       8.00
      1       28.66   14.16    1.246  0.20( 0.03) 0.17      22.6       1.00
      1       28.48   14.30    1.238  0.20( 0.03) 0.17      22.7      11.00
      2        0.48    6.70    1.914  0.20( 0.02) 0.10       0.3      22.00
      3        0.46    6.36    1.972  0.20( 0.02) 0.10       0.3      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       24.00    6.36    1.972  0.20( 0.03) 0.17      11.3      40.00
      2       24.51    6.70    1.914  0.20( 0.03) 0.17      11.9      22.00
      3       26.93    8.58    1.661  0.20( 0.03) 0.17      15.1      17.00
      4       27.58    9.06    1.610  0.20( 0.03) 0.17      16.0      14.00
      5       28.41    9.85    1.534  0.20( 0.03) 0.17      17.6      19.00
      6       28.78   11.85    1.379  0.20( 0.03) 0.17      20.1       5.00
      7       29.25   13.85    1.261  0.20( 0.03) 0.17      22.8       8.00
      8       29.25   14.16    1.246  0.20( 0.03) 0.17      23.2       1.00
      9       29.08   14.30    1.238  0.20( 0.03) 0.17      23.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      29.25    Tc(MIN.) =    14.16
  EFFECTIVE AREA(ACRES) =      23.18   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       23.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    2905.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.70  DOWNSTREAM(FEET) =   478.50
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.25
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   14.31
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
```

```
  FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.31
  RAINFALL INTENSITY(INCH/HR) =   1.24
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      23.18
  TOTAL STREAM AREA(ACRES) =      23.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.25

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    520.00  DOWNSTREAM(FEET) =    500.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.32      0.20      0.100    57    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.65
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      0.65

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   500.00  DOWNSTREAM(FEET) =   493.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.65
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    5.79
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.79
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.080
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.27      0.20      0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      0.59   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6       PEAK FLOW RATE(CFS) =       1.09

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   493.00  DOWNSTREAM(FEET) =   484.50
 FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.65
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.09
 PIPE TRAVEL TIME(MIN.) =   4.06    Tc(MIN.) =    9.85
 LONGEST FLOWPATH FROM NODE     24.00 TO NODE     27.00 =    1365.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.85
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.534
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        7.43      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    7.43      SUBAREA RUNOFF(CFS) =    9.99
 EFFECTIVE AREA(ACRES) =      8.02   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =        8.0       PEAK FLOW RATE(CFS) =      10.79

****************************************************************************
 FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   484.50  DOWNSTREAM(FEET) =   478.50
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.19
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      10.79
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.87
 LONGEST FLOWPATH FROM NODE     24.00 TO NODE     28.00 =    1390.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     28.00 TO NODE     28.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    9.87
 RAINFALL INTENSITY(INCH/HR) =   1.53
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =       8.02
 TOTAL STREAM AREA(ACRES) =       8.02
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.79

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.00    6.52    1.944  0.20( 0.03) 0.17      11.3      40.00
```

```
     1       24.51    6.86    1.888  0.20( 0.03) 0.17      11.9      22.00
     1       26.93    8.73    1.643  0.20( 0.03) 0.17      15.1      17.00
     1       27.58    9.21    1.594  0.20( 0.03) 0.17      16.0      14.00
     1       28.41   10.01    1.520  0.20( 0.03) 0.17      17.6      19.00
     1       28.78   12.01    1.369  0.20( 0.03) 0.17      20.1       5.00
     1       29.25   14.01    1.253  0.20( 0.03) 0.17      22.8       8.00
     1       29.25   14.31    1.238  0.20( 0.03) 0.17      23.2       1.00
     1       29.08   14.46    1.230  0.20( 0.03) 0.17      23.2      11.00
     2       10.79    9.87    1.532  0.20( 0.04) 0.19       8.0      24.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.10    6.52    1.944  0.20( 0.03) 0.17      16.6      40.00
      2       33.80    6.86    1.888  0.20( 0.03) 0.17      17.5      22.00
      3       37.19    8.73    1.643  0.20( 0.03) 0.17      22.2      17.00
      4       38.07    9.21    1.594  0.20( 0.03) 0.17      23.5      14.00
      5       39.06    9.87    1.532  0.20( 0.03) 0.17      25.3      24.00
      6       39.12   10.01    1.520  0.20( 0.03) 0.17      25.6      19.00
      7       38.40   12.01    1.369  0.20( 0.03) 0.17      28.1       5.00
      8       38.03   14.01    1.253  0.20( 0.03) 0.17      30.9       8.00
      9       37.92   14.31    1.238  0.20( 0.03) 0.17      31.2       1.00
     10       37.69   14.46    1.230  0.20( 0.03) 0.17      31.2      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      39.12    Tc(MIN.) =    10.01
  EFFECTIVE AREA(ACRES) =      25.59   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =       31.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     28.00 =    2960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.33
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.12
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   10.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.56
  RAINFALL INTENSITY(INCH/HR) =   1.47
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.17
  EFFECTIVE STREAM AREA(ACRES) =      25.59
  TOTAL STREAM AREA(ACRES) =      31.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      39.12

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    497.50  DOWNSTREAM(FEET) =    492.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.47      0.20     0.200    57    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.40
  TOTAL AREA(ACRES) =      1.47   PEAK FLOW RATE(CFS) =      2.40

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   492.00  DOWNSTREAM(FEET) =   483.50
  FLOW LENGTH(FEET) =   400.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    8.16
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     31.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.709
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.07      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.07      SUBAREA RUNOFF(CFS) =    4.61
  EFFECTIVE AREA(ACRES) =      4.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =       6.82

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   483.50  DOWNSTREAM(FEET) =   478.10
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.82
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =    8.94
  LONGEST FLOWPATH FROM NODE     29.00 TO NODE     32.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.94
  RAINFALL INTENSITY(INCH/HR) =   1.62
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       4.54
  TOTAL STREAM AREA(ACRES) =       4.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.82

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.10    7.09    1.852  0.20( 0.03) 0.17      16.6      40.00
      1       33.80    7.43    1.803  0.20( 0.03) 0.17      17.5      22.00
      1       37.19    9.30    1.585  0.20( 0.03) 0.17      22.2      17.00
      1       38.07    9.76    1.542  0.20( 0.03) 0.17      23.5      14.00
      1       39.06   10.42    1.485  0.20( 0.03) 0.17      25.3      24.00
      1       39.12   10.56    1.474  0.20( 0.03) 0.17      25.6      19.00
      1       38.40   12.56    1.334  0.20( 0.03) 0.17      28.1       5.00
      1       38.03   14.56    1.226  0.20( 0.03) 0.17      30.9       8.00
      1       37.92   14.86    1.211  0.20( 0.03) 0.17      31.2       1.00
      1       37.69   15.01    1.204  0.20( 0.03) 0.17      31.2      11.00
      2        6.82    8.94    1.622  0.20( 0.04) 0.20       4.5      29.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.30    7.09    1.852  0.20( 0.04) 0.18      20.2      40.00
      2       40.12    7.43    1.803  0.20( 0.04) 0.18      21.2      22.00
      3       43.35    8.94    1.622  0.20( 0.04) 0.18      25.8      29.00
      4       43.86    9.30    1.585  0.20( 0.04) 0.18      26.7      17.00
      5       44.54    9.76    1.542  0.20( 0.04) 0.18      28.1      14.00
      6       45.29   10.42    1.485  0.20( 0.04) 0.18      29.9      24.00
      7       45.30   10.56    1.474  0.20( 0.04) 0.18      30.1      19.00
      8       43.98   12.56    1.334  0.20( 0.04) 0.18      32.7       5.00
      9       43.14   14.56    1.226  0.20( 0.04) 0.18      35.4       8.00
     10       42.97   14.86    1.211  0.20( 0.04) 0.18      35.7       1.00
     11       42.71   15.01    1.204  0.20( 0.04) 0.18      35.8      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.30    Tc(MIN.) =    10.56
  EFFECTIVE AREA(ACRES) =      30.13   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.18
  TOTAL AREA(ACRES) =       35.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.10  DOWNSTREAM(FEET) =   478.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  32.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.30
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    3175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.98
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.30
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.72
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.72
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.18
  EFFECTIVE STREAM AREA(ACRES) =      30.13
  TOTAL STREAM AREA(ACRES) =      35.77
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.30

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  USER SPECIFIED Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.81      0.20     0.900    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =      1.52
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   471.00  DOWNSTREAM(FEET) =   470.50
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.52
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =    5.52
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
```

```
  TIME OF CONCENTRATION(MIN.) =    5.52
  RAINFALL INTENSITY(INCH/HR) =   2.14
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =       0.81
  TOTAL STREAM AREA(ACRES) =       0.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.30    7.26    1.828  0.20( 0.04) 0.18      20.2      40.00
      1       40.12    7.60    1.780  0.20( 0.04) 0.18      21.2      22.00
      1       43.35    9.10    1.605  0.20( 0.04) 0.18      25.8      29.00
      1       43.86    9.46    1.569  0.20( 0.04) 0.18      26.7      17.00
      1       44.54    9.93    1.527  0.20( 0.04) 0.18      28.1      14.00
      1       45.29   10.58    1.472  0.20( 0.04) 0.18      29.9      24.00
      1       45.30   10.72    1.461  0.20( 0.04) 0.18      30.1      19.00
      1       43.98   12.72    1.324  0.20( 0.04) 0.18      32.7       5.00
      1       43.14   14.72    1.218  0.20( 0.04) 0.18      35.4       8.00
      1       42.97   15.03    1.204  0.20( 0.04) 0.18      35.7       1.00
      1       42.71   15.18    1.197  0.20( 0.04) 0.18      35.8      11.00
      2        1.52    5.52    2.138  0.20( 0.18) 0.90       0.8      34.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.60    5.52    2.138  0.20( 0.04) 0.21      16.2      34.00
      2       40.58    7.26    1.828  0.20( 0.04) 0.21      21.0      40.00
      3       41.36    7.60    1.780  0.20( 0.04) 0.21      22.1      22.00
      4       44.46    9.10    1.605  0.20( 0.04) 0.20      26.6      29.00
      5       44.94    9.46    1.569  0.20( 0.04) 0.20      27.5      17.00
      6       45.59    9.93    1.527  0.20( 0.04) 0.20      28.9      14.00
      7       46.29   10.58    1.472  0.20( 0.04) 0.20      30.7      24.00
      8       46.29   10.72    1.461  0.20( 0.04) 0.20      30.9      19.00
      9       44.86   12.72    1.324  0.20( 0.04) 0.20      33.5       5.00
     10       43.95   14.72    1.218  0.20( 0.04) 0.19      36.2       8.00
     11       43.76   15.03    1.204  0.20( 0.04) 0.19      36.6       1.00
     12       43.50   15.18    1.197  0.20( 0.04) 0.19      36.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.29    Tc(MIN.) =    10.72
  EFFECTIVE AREA(ACRES) =      30.94   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       36.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.50  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.47
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.29
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.77
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      30.94
  TOTAL STREAM AREA(ACRES) =      36.58
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      46.29

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    491.00  DOWNSTREAM(FEET) =    487.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        2.06      0.20     0.200    57    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.25
  TOTAL AREA(ACRES) =      2.06   PEAK FLOW RATE(CFS) =      3.25

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   487.00  DOWNSTREAM(FEET) =   470.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.25
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.73
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.73
  RAINFALL INTENSITY(INCH/HR) =   1.76
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       2.06
  TOTAL STREAM AREA(ACRES) =       2.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       36.60    5.57    2.128  0.20( 0.04) 0.21      16.2      34.00
      1       40.58    7.31    1.821  0.20( 0.04) 0.21      21.0      40.00
```

```
     1       41.36    7.64    1.774  0.20( 0.04) 0.21      22.1      22.00
     1       44.46    9.15    1.600  0.20( 0.04) 0.20      26.6      29.00
     1       44.94    9.51    1.565  0.20( 0.04) 0.20      27.5      17.00
     1       45.59    9.97    1.523  0.20( 0.04) 0.20      28.9      14.00
     1       46.29   10.63    1.469  0.20( 0.04) 0.20      30.7      24.00
     1       46.29   10.77    1.458  0.20( 0.04) 0.20      30.9      19.00
     1       44.86   12.77    1.322  0.20( 0.04) 0.20      33.5       5.00
     1       43.95   14.77    1.216  0.20( 0.04) 0.19      36.2       8.00
     1       43.76   15.07    1.201  0.20( 0.04) 0.19      36.6       1.00
     1       43.50   15.22    1.195  0.20( 0.04) 0.19      36.6      11.00
     2        3.25    7.73    1.762  0.20( 0.04) 0.20       2.1      37.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       39.44    5.57    2.128  0.20( 0.04) 0.21      17.7      34.00
      2       43.75    7.31    1.821  0.20( 0.04) 0.21      23.0      40.00
      3       44.59    7.64    1.774  0.20( 0.04) 0.20      24.1      22.00
      4       44.79    7.73    1.762  0.20( 0.04) 0.20      24.4      37.00
      5       47.40    9.15    1.600  0.20( 0.04) 0.20      28.7      29.00
      6       47.81    9.51    1.565  0.20( 0.04) 0.20      29.6      17.00
      7       48.38    9.97    1.523  0.20( 0.04) 0.20      30.9      14.00
      8       48.98   10.63    1.469  0.20( 0.04) 0.20      32.7      24.00
      9       48.96   10.77    1.458  0.20( 0.04) 0.20      33.0      19.00
     10       47.28   12.77    1.322  0.20( 0.04) 0.20      35.5       5.00
     11       46.16   14.77    1.216  0.20( 0.04) 0.19      38.3       8.00
     12       45.95   15.07    1.201  0.20( 0.04) 0.19      38.6       1.00
     13       45.67   15.22    1.195  0.20( 0.04) 0.19      38.6      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      48.98    Tc(MIN.) =    10.63
  EFFECTIVE AREA(ACRES) =      32.73   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       38.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     39.00 =    3260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.40  DOWNSTREAM(FEET) =   469.80
  FLOW LENGTH(FEET) =   260.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.98
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.39
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      32.73
  TOTAL STREAM AREA(ACRES) =      38.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      48.98

****************************************************************************
```

```
 FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.059
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.26      0.20     0.100    57    7.06
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.06
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.857
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.55      0.20     0.100    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.55      SUBAREA RUNOFF(CFS) =    0.91
 EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.34

****************************************************************************
 FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.06
 RAINFALL INTENSITY(INCH/HR) =   1.86
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.81
 TOTAL STREAM AREA(ACRES) =       0.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.34

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.44    6.38    1.968  0.20( 0.04) 0.21      17.7      34.00
     1       43.75    8.10    1.716  0.20( 0.04) 0.21      23.0      40.00
     1       44.59    8.44    1.676  0.20( 0.04) 0.20      24.1      22.00
     1       44.79    8.53    1.666  0.20( 0.04) 0.20      24.4      37.00
     1       47.40    9.92    1.528  0.20( 0.04) 0.20      28.7      29.00
     1       47.81   10.28    1.497  0.20( 0.04) 0.20      29.6      17.00
     1       48.38   10.74    1.459  0.20( 0.04) 0.20      30.9      14.00
     1       48.98   11.39    1.411  0.20( 0.04) 0.20      32.7      24.00
     1       48.96   11.54    1.401  0.20( 0.04) 0.20      33.0      19.00
     1       47.28   13.54    1.278  0.20( 0.04) 0.20      35.5       5.00
     1       46.16   15.54    1.181  0.20( 0.04) 0.19      38.3       8.00
     1       45.95   15.85    1.167  0.20( 0.04) 0.19      38.6       1.00
     1       45.67   16.02    1.160  0.20( 0.04) 0.19      38.6      11.00
```

```
     2        1.34    7.06    1.857  0.20( 0.02) 0.10       0.8      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       40.72    6.38    1.968  0.20( 0.04) 0.21      18.4      34.00
      2       42.47    7.06    1.857  0.20( 0.04) 0.21      20.6      40.00
      3       44.98    8.10    1.716  0.20( 0.04) 0.20      23.8      40.00
      4       45.80    8.44    1.676  0.20( 0.04) 0.20      24.9      22.00
      5       45.99    8.53    1.666  0.20( 0.04) 0.20      25.2      37.00
      6       48.50    9.92    1.528  0.20( 0.04) 0.20      29.5      29.00
      7       48.89   10.28    1.497  0.20( 0.04) 0.20      30.4      17.00
      8       49.43   10.74    1.459  0.20( 0.04) 0.20      31.8      14.00
      9       50.00   11.39    1.411  0.20( 0.04) 0.20      33.5      24.00
     10       49.97   11.54    1.401  0.20( 0.04) 0.20      33.8      19.00
     11       48.20   13.54    1.278  0.20( 0.04) 0.19      36.3       5.00
     12       47.01   15.54    1.181  0.20( 0.04) 0.19      39.1       8.00
     13       46.79   15.85    1.167  0.20( 0.04) 0.19      39.4       1.00
     14       46.51   16.02    1.160  0.20( 0.04) 0.19      39.5      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      50.00    Tc(MIN.) =    11.39
  EFFECTIVE AREA(ACRES) =      33.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       39.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    3520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.80  DOWNSTREAM(FEET) =   469.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.00
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.47
  RAINFALL INTENSITY(INCH/HR) =   1.41
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      33.54
  TOTAL STREAM AREA(ACRES) =      39.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.00

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
```

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.835
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.892
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 D        0.43      0.20     0.100    57    6.83
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.72
 TOTAL AREA(ACRES) =      0.43   PEAK FLOW RATE(CFS) =      0.72

****************************************************************************
 FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.83
 RAINFALL INTENSITY(INCH/HR) =   1.89
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.43
 TOTAL STREAM AREA(ACRES) =       0.43
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.72

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       40.72    6.46    1.954  0.20( 0.04) 0.21      18.4      34.00
     1       42.47    7.14    1.845  0.20( 0.04) 0.21      20.6      40.00
     1       44.98    8.18    1.706  0.20( 0.04) 0.20      23.8      40.00
     1       45.80    8.52    1.667  0.20( 0.04) 0.20      24.9      22.00
     1       45.99    8.61    1.657  0.20( 0.04) 0.20      25.2      37.00
     1       48.50   10.00    1.521  0.20( 0.04) 0.20      29.5      29.00
     1       48.89   10.36    1.490  0.20( 0.04) 0.20      30.4      17.00
     1       49.43   10.82    1.453  0.20( 0.04) 0.20      31.8      14.00
     1       50.00   11.47    1.405  0.20( 0.04) 0.20      33.5      24.00
     1       49.97   11.61    1.396  0.20( 0.04) 0.20      33.8      19.00
     1       48.20   13.62    1.274  0.20( 0.04) 0.19      36.3       5.00
     1       47.01   15.62    1.177  0.20( 0.04) 0.19      39.1       8.00
     1       46.79   15.93    1.164  0.20( 0.04) 0.19      39.4       1.00
     1       46.51   16.10    1.157  0.20( 0.04) 0.19      39.5      11.00
     2        0.72    6.83    1.892  0.20( 0.02) 0.10       0.4      42.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       41.43    6.46    1.954  0.20( 0.04) 0.21      18.8      34.00
     2       42.41    6.83    1.892  0.20( 0.04) 0.21      20.0      42.00
     3       43.18    7.14    1.845  0.20( 0.04) 0.20      21.0      40.00
     4       45.64    8.18    1.706  0.20( 0.04) 0.20      24.2      40.00
     5       46.44    8.52    1.667  0.20( 0.04) 0.20      25.3      22.00
     6       46.62    8.61    1.657  0.20( 0.04) 0.20      25.6      37.00
     7       49.08   10.00    1.521  0.20( 0.04) 0.20      29.9      29.00
     8       49.45   10.36    1.490  0.20( 0.04) 0.20      30.8      17.00
     9       49.99   10.82    1.453  0.20( 0.04) 0.20      32.2      14.00
    10       50.53   11.47    1.405  0.20( 0.04) 0.19      34.0      24.00
    11       50.50   11.61    1.396  0.20( 0.04) 0.19      34.2      19.00
    12       48.68   13.62    1.274  0.20( 0.04) 0.19      36.8       5.00
    13       47.46   15.62    1.177  0.20( 0.04) 0.19      39.5       8.00
    14       47.23   15.93    1.164  0.20( 0.04) 0.19      39.9       1.00
    15       46.95   16.10    1.157  0.20( 0.04) 0.19      39.9      11.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      50.53    Tc(MIN.) =    11.47
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```
  EFFECTIVE AREA(ACRES) =      33.97   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       39.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    3550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.70  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  35.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.53
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   11.90
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.90
  RAINFALL INTENSITY(INCH/HR) =   1.38
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      33.97
  TOTAL STREAM AREA(ACRES) =      39.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      50.53

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    483.70  DOWNSTREAM(FEET) =    480.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.731
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.909
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.37      0.20      0.100    57    6.73
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.63
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      0.63

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     47.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  480.00  DOWNSTREAM ELEVATION(FEET) =  476.00
  STREET LENGTH(FEET) =   205.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018
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  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.95
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.54
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    8.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.42      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    0.64
  EFFECTIVE AREA(ACRES) =      0.79    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       1.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.49
  FLOW VELOCITY(FEET/SEC.) =  2.41   DEPTH*VELOCITY(FT*FT/SEC.) =   0.59
  LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.20
  RAINFALL INTENSITY(INCH/HR) =   1.70
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.79
  TOTAL STREAM AREA(ACRES) =       0.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.20

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     46.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.00  DOWNSTREAM(FEET) =    479.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.73      0.20     0.100    57    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.00  DOWNSTREAM(FEET) =   469.40
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.24
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.91
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     47.00 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.91
  RAINFALL INTENSITY(INCH/HR) =   1.88
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.24

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.43    6.91    1.880  0.20( 0.04) 0.21      18.8      34.00
      1       42.41    7.28    1.824  0.20( 0.04) 0.21      20.0      42.00
      1       43.18    7.59    1.782  0.20( 0.04) 0.20      21.0      40.00
      1       45.64    8.62    1.656  0.20( 0.04) 0.20      24.2      40.00
      1       46.44    8.95    1.621  0.20( 0.04) 0.20      25.3      22.00
      1       46.62    9.04    1.611  0.20( 0.04) 0.20      25.6      37.00
      1       49.08   10.42    1.485  0.20( 0.04) 0.20      29.9      29.00
      1       49.45   10.79    1.456  0.20( 0.04) 0.20      30.8      17.00
      1       49.99   11.25    1.421  0.20( 0.04) 0.20      32.2      14.00
      1       50.53   11.90    1.376  0.20( 0.04) 0.19      34.0      24.00
      1       50.50   12.04    1.367  0.20( 0.04) 0.19      34.2      19.00
      1       48.68   14.05    1.251  0.20( 0.04) 0.19      36.8       5.00
      1       47.46   16.05    1.159  0.20( 0.04) 0.19      39.5       8.00
      1       47.23   16.36    1.146  0.20( 0.04) 0.19      39.9       1.00
      1       46.95   16.53    1.140  0.20( 0.04) 0.19      39.9      11.00
      2        1.20    8.20    1.704  0.20( 0.02) 0.10       0.8      44.00
      3        1.24    6.91    1.880  0.20( 0.02) 0.10       0.7      40.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       43.78    6.91    1.880  0.20( 0.04) 0.20      20.2      34.00
      2       43.78    6.91    1.880  0.20( 0.04) 0.20      20.2      40.00
      3       44.75    7.28    1.824  0.20( 0.04) 0.20      21.5      42.00
      4       45.51    7.59    1.782  0.20( 0.04) 0.20      22.5      40.00
      5       46.97    8.20    1.704  0.20( 0.04) 0.20      24.4      44.00
      6       47.89    8.62    1.656  0.20( 0.04) 0.19      25.7      40.00
      7       48.64    8.95    1.621  0.20( 0.04) 0.19      26.9      22.00
      8       48.82    9.04    1.611  0.20( 0.04) 0.19      27.1      37.00
      9       51.10   10.42    1.485  0.20( 0.04) 0.19      31.4      29.00
     10       51.43   10.79    1.456  0.20( 0.04) 0.19      32.3      17.00
     11       51.92   11.25    1.421  0.20( 0.04) 0.19      33.7      14.00
     12       52.40   11.90    1.376  0.20( 0.04) 0.19      35.5      24.00
     13       52.36   12.04    1.367  0.20( 0.04) 0.19      35.8      19.00
     14       50.38   14.05    1.251  0.20( 0.04) 0.19      38.3       5.00
     15       49.02   16.05    1.159  0.20( 0.04) 0.19      41.0       8.00
     16       48.78   16.36    1.146  0.20( 0.04) 0.19      41.4       1.00
```

```
     17       48.49   16.53    1.140  0.20( 0.04) 0.19      41.4      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      52.40    Tc(MIN.) =    11.90
  EFFECTIVE AREA(ACRES) =      35.49   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       41.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    3690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     47.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   469.40  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   655.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.40
  PIPE TRAVEL TIME(MIN.) =   1.61    Tc(MIN.) =   13.50
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.10 =    4345.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.10 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.34
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.40
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   13.99
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    490.00  DOWNSTREAM(FEET) =    486.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.523
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.790
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.60      0.20     0.200    57    7.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.52
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      2.52

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   486.00  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =   565.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.52
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =    9.05
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     50.00 =     865.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     50.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.05
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.610
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        9.31      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    9.31      SUBAREA RUNOFF(CFS) =   13.16
  EFFECTIVE AREA(ACRES) =     10.91   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      15.42

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.00
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.42
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   10.30
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.30
  RAINFALL INTENSITY(INCH/HR) =   1.50
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =      10.91
  TOTAL STREAM AREA(ACRES) =      10.91
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.42

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   225.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.292
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.20      0.20     0.100    57    6.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  477.00  DOWNSTREAM ELEVATION(FEET) =  475.00
  STREET LENGTH(FEET) =   190.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.52
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.73
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.35
  STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    8.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.22      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.33
  EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       0.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   5.38
  FLOW VELOCITY(FEET/SEC.) =  1.67   DEPTH*VELOCITY(FT*FT/SEC.) =   0.38
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     53.00 =     415.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.699
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.46      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
```

```
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       1.33

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   475.00  DOWNSTREAM(FEET) =   473.40
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.33
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    8.46
  LONGEST FLOWPATH FROM NODE     51.00 TO NODE     54.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.46
  RAINFALL INTENSITY(INCH/HR) =   1.67
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.88
  TOTAL STREAM AREA(ACRES) =       0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.42   10.30    1.495  0.20( 0.04) 0.20      10.9      48.00
      2        1.33    8.46    1.674  0.20( 0.02) 0.10       0.9      51.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.55    8.46    1.674  0.20( 0.04) 0.19       9.8      51.00
      2       16.61   10.30    1.495  0.20( 0.04) 0.19      11.8      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.61    Tc(MIN.) =    10.30
  EFFECTIVE AREA(ACRES) =      11.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       11.8
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     54.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   473.40  DOWNSTREAM(FEET) =   470.00
  FLOW LENGTH(FEET) =   230.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.61
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.61
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   10.74
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   10.74
 RAINFALL INTENSITY(INCH/HR) =   1.46
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.19
 EFFECTIVE STREAM AREA(ACRES) =      11.79
 TOTAL STREAM AREA(ACRES) =      11.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.61

****************************************************************************
 FLOW PROCESS FROM NODE     53.00 TO NODE     55.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    475.00  DOWNSTREAM(FEET) =    470.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.604
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.120
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.17      0.20      0.100    57    5.60
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.32
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.32

****************************************************************************
 FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.60
 RAINFALL INTENSITY(INCH/HR) =   2.12
 AREA-AVERAGED Fm(INCH/HR) =  0.02
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.17
 TOTAL STREAM AREA(ACRES) =       0.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.32

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.55    8.91    1.625  0.20( 0.04) 0.19       9.8      51.00
     1       16.61   10.74    1.459  0.20( 0.04) 0.19      11.8      48.00
     2        0.32    5.60    2.120  0.20( 0.02) 0.10       0.2      53.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       13.16    5.60    2.120  0.20( 0.04) 0.19       6.4      53.00
     2       15.80    8.91    1.625  0.20( 0.04) 0.19      10.0      51.00
     3       16.83   10.74    1.459  0.20( 0.04) 0.19      12.0      48.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.83    Tc(MIN.) =    10.74
  EFFECTIVE AREA(ACRES) =      11.96   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       12.0
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     55.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   468.00
  FLOW LENGTH(FEET) =   235.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.83
  PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   11.30
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.30
  RAINFALL INTENSITY(INCH/HR) =   1.42
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      11.96
  TOTAL STREAM AREA(ACRES) =      11.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.83

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    476.00  DOWNSTREAM(FEET) =    471.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.20     0.100    57    6.75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.36

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  471.00  DOWNSTREAM ELEVATION(FEET) =  468.00
  STREET LENGTH(FEET) =   275.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
```

```
  INSIDE STREET CROSSFALL(DECIMAL) =  0.018
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.018

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.32
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
  STREET FLOW TRAVEL TIME(MIN.) =   1.97   Tc(MIN.) =    8.72
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.645
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        3.47      0.20     0.200    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    3.47      SUBAREA RUNOFF(CFS) =    5.01
  EFFECTIVE AREA(ACRES) =      3.68    AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =       5.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  14.40
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     575.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.72
  RAINFALL INTENSITY(INCH/HR) =   1.64
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       3.68
  TOTAL STREAM AREA(ACRES) =       3.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       13.16    6.20    2.000  0.20( 0.04) 0.19       6.4      53.00
      1       15.80    9.47    1.569  0.20( 0.04) 0.19      10.0      51.00
      1       16.83   11.30    1.418  0.20( 0.04) 0.19      12.0      48.00
      2        5.32    8.72    1.645  0.20( 0.04) 0.19       3.7      56.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       17.78    6.20    2.000  0.20( 0.04) 0.19       9.0      53.00
      2       20.51    8.72    1.645  0.20( 0.04) 0.19      12.9      56.00
      3       20.87    9.47    1.569  0.20( 0.04) 0.19      13.7      51.00
      4       21.39   11.30    1.418  0.20( 0.04) 0.19      15.6      48.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      21.39    Tc(MIN.) =    11.30
```

```
  EFFECTIVE AREA(ACRES) =      15.64   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     58.00 =    1630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   468.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.39
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.50
  RAINFALL INTENSITY(INCH/HR) =   1.40
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =      15.64
  TOTAL STREAM AREA(ACRES) =      15.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.39

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     60.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   295.00
  ELEVATION DATA: UPSTREAM(FEET) =    480.00  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.760
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.386
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 D        1.10      0.20      0.850    57   11.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.20
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.20

****************************************************************************
  FLOW PROCESS FROM NODE     60.00 TO NODE     61.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   467.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.21
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.20
  PIPE TRAVEL TIME(MIN.) =   2.99    Tc(MIN.) =   14.75
```

```
 LONGEST FLOWPATH FROM NODE     59.00 TO NODE     61.00 =    1050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.75
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.217
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                D        8.75      0.20     0.850    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    8.75      SUBAREA RUNOFF(CFS) =    8.24
 EFFECTIVE AREA(ACRES) =      9.85   AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        9.9       PEAK FLOW RATE(CFS) =       9.28

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     61.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   14.75
 RAINFALL INTENSITY(INCH/HR) =   1.22
 AREA-AVERAGED Fm(INCH/HR) =  0.17
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       9.85
 TOTAL STREAM AREA(ACRES) =       9.85
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.28

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       17.78    6.40    1.964  0.20( 0.04) 0.19       9.0      53.00
     1       20.51    8.92    1.623  0.20( 0.04) 0.19      12.9      56.00
     1       20.87    9.67    1.550  0.20( 0.04) 0.19      13.7      51.00
     1       21.39   11.50    1.404  0.20( 0.04) 0.19      15.6      48.00
     2        9.28   14.75    1.217  0.20( 0.17) 0.85       9.9      59.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.68    6.40    1.964  0.20( 0.08) 0.40      13.3      53.00
     2       28.31    8.92    1.623  0.20( 0.08) 0.40      18.8      56.00
     3       28.89    9.67    1.550  0.20( 0.08) 0.40      20.2      51.00
     4       29.92   11.50    1.404  0.20( 0.08) 0.41      23.3      48.00
     5       27.74   14.75    1.217  0.20( 0.09) 0.45      25.5      59.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      29.92    Tc(MIN.) =    11.50
 EFFECTIVE AREA(ACRES) =      23.32   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
 TOTAL AREA(ACRES) =       25.5
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     61.00 =    1725.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =   467.00  DOWNSTREAM(FEET) =   466.00
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.11
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.92
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   11.74
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       24.68    6.67    1.919  0.20( 0.08) 0.40      13.3      53.00
     2       28.31    9.17    1.598  0.20( 0.08) 0.40      18.8      56.00
     3       28.89    9.92    1.528  0.20( 0.08) 0.40      20.2      51.00
     4       29.92   11.74    1.387  0.20( 0.08) 0.41      23.3      48.00
     5       27.74   15.00    1.205  0.20( 0.09) 0.45      25.5      59.00
 LONGEST FLOWPATH FROM NODE     48.00 TO NODE     62.00 =    1845.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       43.78    9.09    1.606  0.20( 0.04) 0.20      20.2      34.00
     2       43.78    9.09    1.606  0.20( 0.04) 0.20      20.2      40.00
     3       44.75    9.46    1.570  0.20( 0.04) 0.20      21.5      42.00
     4       45.51    9.76    1.542  0.20( 0.04) 0.20      22.5      40.00
     5       46.97   10.37    1.489  0.20( 0.04) 0.20      24.4      44.00
     6       47.89   10.73    1.460  0.20( 0.04) 0.19      25.7      40.00
     7       48.64   11.06    1.435  0.20( 0.04) 0.19      26.9      22.00
     8       48.82   11.15    1.428  0.20( 0.04) 0.19      27.1      37.00
     9       51.10   12.52    1.336  0.20( 0.04) 0.19      31.4      29.00
    10       51.43   12.88    1.315  0.20( 0.04) 0.19      32.3      17.00
    11       51.92   13.34    1.289  0.20( 0.04) 0.19      33.7      14.00
    12       52.40   13.99    1.254  0.20( 0.04) 0.19      35.5      24.00
    13       52.36   14.13    1.247  0.20( 0.04) 0.19      35.8      19.00
    14       50.38   16.15    1.155  0.20( 0.04) 0.19      38.3       5.00
    15       49.02   18.16    1.080  0.20( 0.04) 0.19      41.0       8.00
    16       48.78   18.47    1.069  0.20( 0.04) 0.19      41.4       1.00
    17       48.49   18.64    1.064  0.20( 0.04) 0.19      41.4      11.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       63.21    6.67    1.919  0.20( 0.06) 0.30      28.1      53.00
     2       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      34.00
     3       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      40.00
     4       72.31    9.17    1.598  0.20( 0.06) 0.29      39.3      56.00
     5       73.28    9.46    1.570  0.20( 0.06) 0.29      40.8      42.00
     6       74.28    9.76    1.542  0.20( 0.06) 0.29      42.3      40.00
     7       74.78    9.92    1.528  0.20( 0.06) 0.29      43.1      51.00
     8       76.11   10.37    1.489  0.20( 0.06) 0.29      45.4      44.00
     9       77.24   10.73    1.460  0.20( 0.06) 0.29      47.3      40.00
    10       78.18   11.06    1.435  0.20( 0.06) 0.29      49.0      22.00
    11       78.40   11.15    1.428  0.20( 0.06) 0.29      49.4      37.00
    12       79.72   11.74    1.387  0.20( 0.06) 0.29      52.3      48.00
    13       80.49   12.52    1.336  0.20( 0.06) 0.29      55.3      29.00
    14       80.59   12.88    1.315  0.20( 0.06) 0.29      56.4      17.00
    15       80.77   13.34    1.289  0.20( 0.06) 0.29      58.1      14.00
    16       80.82   13.99    1.254  0.20( 0.06) 0.29      60.3      24.00
    17       80.68   14.13    1.247  0.20( 0.06) 0.29      60.7      19.00
    18       79.25   15.00    1.205  0.20( 0.06) 0.29      62.3      59.00
    19       76.87   16.15    1.155  0.20( 0.06) 0.29      63.8       5.00
    20       73.65   18.16    1.080  0.20( 0.06) 0.29      66.5       8.00
    21       73.15   18.47    1.069  0.20( 0.06) 0.29      66.9       1.00
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    22       72.71   18.64    1.064  0.20( 0.06) 0.29      66.9      11.00
   TOTAL AREA(ACRES) =        66.9

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       80.82  Tc(MIN.) =   13.991
  EFFECTIVE AREA(ACRES) =     60.31  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =       66.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     62.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       66.9  TC(MIN.) =     13.99
  EFFECTIVE AREA(ACRES) =     60.31  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.291
  PEAK FLOW RATE(CFS)   =      80.82

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       63.21    6.67    1.919  0.20( 0.06) 0.30      28.1      53.00
      2       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      34.00
      3       71.97    9.09    1.606  0.20( 0.06) 0.30      38.8      40.00
      4       72.31    9.17    1.598  0.20( 0.06) 0.29      39.3      56.00
      5       73.28    9.46    1.570  0.20( 0.06) 0.29      40.8      42.00
      6       74.28    9.76    1.542  0.20( 0.06) 0.29      42.3      40.00
      7       74.78    9.92    1.528  0.20( 0.06) 0.29      43.1      51.00
      8       76.11   10.37    1.489  0.20( 0.06) 0.29      45.4      44.00
      9       77.24   10.73    1.460  0.20( 0.06) 0.29      47.3      40.00
     10       78.18   11.06    1.435  0.20( 0.06) 0.29      49.0      22.00
     11       78.40   11.15    1.428  0.20( 0.06) 0.29      49.4      37.00
     12       79.72   11.74    1.387  0.20( 0.06) 0.29      52.3      48.00
     13       80.49   12.52    1.336  0.20( 0.06) 0.29      55.3      29.00
     14       80.59   12.88    1.315  0.20( 0.06) 0.29      56.4      17.00
     15       80.77   13.34    1.289  0.20( 0.06) 0.29      58.1      14.00
     16       80.82   13.99    1.254  0.20( 0.06) 0.29      60.3      24.00
     17       80.68   14.13    1.247  0.20( 0.06) 0.29      60.7      19.00
     18       79.25   15.00    1.205  0.20( 0.06) 0.29      62.3      59.00
     19       76.87   16.15    1.155  0.20( 0.06) 0.29      63.8       5.00
     20       73.65   18.16    1.080  0.20( 0.06) 0.29      66.5       8.00
     21       73.15   18.47    1.069  0.20( 0.06) 0.29      66.9       1.00
     22       72.71   18.64    1.064  0.20( 0.06) 0.29      66.9      11.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'A'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         66.90       29.00       75.(AMC II)     0.200       0.637

    TOTAL AREA (Acres) =     66.90

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.058

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.363
==========================================================================
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**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'A'                                                              *
 ************************************************************************

  FILE NAME: WP-A.DAT
  TIME/DATE OF STUDY: 10:35 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      66.900 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.134 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.058
         LOW LOSS FRACTION = 0.363
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.997
          30-MINUTE FACTOR = 0.997
           1-HOUR FACTOR = 0.997
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  62.143



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	6.866	55.549
2	43.778	298.650
3	83.351	320.167
4	96.304	104.799
5	98.837	20.497
6	99.517	5.501
7	99.807	2.345
8	99.952	1.172
9	100.000	0.391

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 3.3045
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 8.1185

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	22.5	45.0	67.5	90.0
0.083	0.0007	0.09	Q	.	.	.	.
0.167	0.0048	0.60	Q	.	.	.	.
0.250	0.0127	1.15	Q	.	.	.	.
0.333	0.0219	1.33	Q	.	.	.	.
0.417	0.0313	1.37	Q	.	.	.	.
0.500	0.0408	1.38	Q	.	.	.	.
0.583	0.0504	1.39	Q	.	.	.	.
0.667	0.0600	1.40	Q	.	.	.	.
0.750	0.0697	1.40	Q	.	.	.	.
0.833	0.0794	1.41	Q	.	.	.	.
0.917	0.0891	1.41	Q	.	.	.	.
1.000	0.0989	1.42	Q	.	.	.	.
1.083	0.1087	1.42	Q	.	.	.	.
1.167	0.1185	1.43	Q	.	.	.	.
1.250	0.1284	1.43	Q	.	.	.	.
1.333	0.1383	1.44	Q	.	.	.	.
1.417	0.1482	1.44	Q	.	.	.	.
1.500	0.1582	1.45	Q	.	.	.	.
1.583	0.1682	1.45	Q	.	.	.	.
1.667	0.1782	1.46	Q	.	.	.	.
1.750	0.1883	1.46	Q	.	.	.	.
1.833	0.1984	1.47	Q	.	.	.	.
1.917	0.2085	1.47	QV	.	.	.	.
2.000	0.2187	1.48	QV	.	.	.	.
2.083	0.2289	1.48	QV	.	.	.	.
2.167	0.2392	1.49	QV	.	.	.	.
2.250	0.2495	1.50	QV	.	.	.	.
2.333	0.2599	1.50	QV	.	.	.	.
2.417	0.2702	1.51	QV	.	.	.	.
2.500	0.2806	1.51	QV	.	.	.	.
2.583	0.2911	1.52	QV	.	.	.	.
2.667	0.3016	1.52	QV	.	.	.	.
2.750	0.3121	1.53	QV	.	.	.	.
2.833	0.3227	1.54	QV	.	.	.	.
2.917	0.3333	1.54	QV	.	.	.	.
3.000	0.3440	1.55	QV	.	.	.	.
3.083	0.3547	1.55	QV	.	.	.	.
3.167	0.3655	1.56	QV	.	.	.	.
3.250	0.3762	1.57	QV	.	.	.	.
3.333	0.3871	1.57	QV	.	.	.	.
3.417	0.3980	1.58	QV	.	.	.	.
3.500	0.4089	1.59	Q V	.	.	.	.
3.583	0.4198	1.59	Q V	.	.	.	.
3.667	0.4309	1.60	Q V	.	.	.	.
3.750	0.4419	1.61	Q V	.	.	.	.
3.833	0.4530	1.61	Q V	.	.	.	.
3.917	0.4642	1.62	Q V	.	.	.	.
4.000	0.4754	1.63	Q V	.	.	.	.
4.083	0.4866	1.63	Q V	.	.	.	.
4.167	0.4979	1.64	Q V	.	.	.	.
4.250	0.5093	1.65	Q V	.	.	.	.
4.333	0.5207	1.65	Q V	.	.	.	.
4.417	0.5321	1.66	Q V	.	.	.	.
4.500	0.5436	1.67	Q V	.	.	.	.
4.583	0.5552	1.68	Q V	.	.	.	.
4.667	0.5668	1.68	Q V	.	.	.	.
4.750	0.5784	1.69	Q V	.	.	.	.
4.833	0.5901	1.70	Q V	.	.	.	.
4.917	0.6019	1.71	Q V	.	.	.	.
5.000	0.6137	1.72	Q V	.	.	.	.

5.083	0.6256	1.72	Q	V	.	.	.	.
5.167	0.6375	1.73	Q	V	.	.	.	.
5.250	0.6495	1.74	Q	V	.	.	.	.
5.333	0.6615	1.75	Q	V	.	.	.	.
5.417	0.6736	1.76	Q	V	.	.	.	.
5.500	0.6858	1.77	Q	V	.	.	.	.
5.583	0.6980	1.77	Q	V	.	.	.	.
5.667	0.7103	1.78	Q	V	.	.	.	.
5.750	0.7226	1.79	Q	V	.	.	.	.
5.833	0.7350	1.80	Q	V	.	.	.	.
5.917	0.7475	1.81	Q	V	.	.	.	.
6.000	0.7600	1.82	Q	V	.	.	.	.
6.083	0.7726	1.83	Q	V	.	.	.	.
6.167	0.7853	1.84	Q	V	.	.	.	.
6.250	0.7980	1.85	Q	V	.	.	.	.
6.333	0.8108	1.86	Q	V	.	.	.	.
6.417	0.8236	1.87	Q	V	.	.	.	.
6.500	0.8365	1.88	Q	V	.	.	.	.
6.583	0.8495	1.89	Q	V	.	.	.	.
6.667	0.8626	1.90	Q	V	.	.	.	.
6.750	0.8757	1.91	Q	V	.	.	.	.
6.833	0.8890	1.92	Q	V	.	.	.	.
6.917	0.9022	1.93	Q	V	.	.	.	.
7.000	0.9156	1.94	Q	V	.	.	.	.
7.083	0.9290	1.95	Q	V	.	.	.	.
7.167	0.9426	1.96	Q	V	.	.	.	.
7.250	0.9562	1.97	Q	V	.	.	.	.
7.333	0.9698	1.99	Q	V	.	.	.	.
7.417	0.9836	2.00	Q	V	.	.	.	.
7.500	0.9974	2.01	Q	V	.	.	.	.
7.583	1.0113	2.02	Q	V	.	.	.	.
7.667	1.0253	2.03	Q	V	.	.	.	.
7.750	1.0394	2.05	Q	V	.	.	.	.
7.833	1.0536	2.06	Q	V	.	.	.	.
7.917	1.0679	2.07	Q	V	.	.	.	.
8.000	1.0822	2.08	Q	V	.	.	.	.
8.083	1.0967	2.10	Q	V	.	.	.	.
8.167	1.1112	2.11	Q	V	.	.	.	.
8.250	1.1259	2.13	Q	V	.	.	.	.
8.333	1.1406	2.14	Q	V	.	.	.	.
8.417	1.1554	2.15	Q	V	.	.	.	.
8.500	1.1704	2.17	Q	V	.	.	.	.
8.583	1.1854	2.18	Q	V	.	.	.	.
8.667	1.2005	2.20	Q	V	.	.	.	.
8.750	1.2158	2.21	Q	V	.	.	.	.
8.833	1.2311	2.23	Q	V	.	.	.	.
8.917	1.2466	2.24	Q	V	.	.	.	.
9.000	1.2622	2.26	.Q	V	.	.	.	.
9.083	1.2778	2.28	.Q	V	.	.	.	.
9.167	1.2936	2.29	.Q	V	.	.	.	.
9.250	1.3096	2.31	.Q	V	.	.	.	.
9.333	1.3256	2.33	.Q	V	.	.	.	.
9.417	1.3418	2.35	.Q	V	.	.	.	.
9.500	1.3580	2.37	.Q	V	.	.	.	.
9.583	1.3745	2.38	.Q	V	.	.	.	.
9.667	1.3910	2.40	.Q	V	.	.	.	.
9.750	1.4077	2.42	.Q	V	.	.	.	.
9.833	1.4245	2.44	.Q	V	.	.	.	.
9.917	1.4415	2.46	.Q	V	.	.	.	.
10.000	1.4586	2.48	.Q	V	.	.	.	.
10.083	1.4758	2.50	.Q	V	.	.	.	.
10.167	1.4932	2.53	.Q	V	.	.	.	.
10.250	1.5107	2.55	.Q	V	.	.	.	.
10.333	1.5284	2.57	.Q	V	.	.	.	.
10.417	1.5463	2.59	.Q	V	.	.	.	.
10.500	1.5643	2.62	.Q	V	.	.	.	.
10.583	1.5825	2.64	.Q	V	.	.	.	.
10.667	1.6008	2.67	.Q	V	.	.	.	.
10.750	1.6194	2.69	.Q	V	.	.	.	.
10.833	1.6381	2.72	.Q	V	.	.	.	.
10.917	1.6570	2.74	.Q	V	.	.	.	.

11.000	1.6760	2.77	.Q V . . . .
11.083	1.6953	2.80	.Q V . . . .
11.167	1.7148	2.83	.Q V . . . .
11.250	1.7345	2.86	.Q V . . . .
11.333	1.7544	2.89	.Q V . . . .
11.417	1.7745	2.92	.Q V . . . .
11.500	1.7948	2.95	.Q V . . . .
11.583	1.8153	2.98	.Q V . . . .
11.667	1.8361	3.02	.Q V. . . .
11.750	1.8571	3.05	.Q V. . . .
11.833	1.8784	3.09	.Q V. . . .
11.917	1.9000	3.13	.Q V. . . .
12.000	1.9218	3.17	.Q V. . . .
12.083	1.9442	3.25	.Q V. . . .
12.167	1.9687	3.56	.Q V. . . .
12.250	1.9954	3.88	.Q V. . . .
12.333	2.0231	4.02	.Q V. . . .
12.417	2.0512	4.08	.Q V . . .
12.500	2.0797	4.14	.Q V . . .
12.583	2.1085	4.19	.Q V . . .
12.667	2.1378	4.25	.Q V . . .
12.750	2.1674	4.30	.Q V . . .
12.833	2.1974	4.36	.Q V . . .
12.917	2.2279	4.42	.Q V . . .
13.000	2.2587	4.48	.Q .V . . .
13.083	2.2900	4.55	. Q .V . . .
13.167	2.3218	4.61	. Q .V . . .
13.250	2.3541	4.68	. Q .V . . .
13.333	2.3868	4.76	. Q .V . . .
13.417	2.4201	4.83	. Q .V . . .
13.500	2.4539	4.91	. Q . V . . .
13.583	2.4884	5.00	. Q . V . . .
13.667	2.5234	5.09	. Q . V . . .
13.750	2.5591	5.18	. Q . V . . .
13.833	2.5954	5.28	. Q . V . . .
13.917	2.6325	5.38	. Q . V . . .
14.000	2.6703	5.49	. Q . V . . .
14.083	2.7091	5.62	. Q . V . . .
14.167	2.7493	5.84	. Q . V . . .
14.250	2.7910	6.06	. Q . V . . .
14.333	2.8340	6.24	. Q . V . . .
14.417	2.8780	6.39	. Q . V . . .
14.500	2.9232	6.56	. Q . V . . .
14.583	2.9696	6.74	. Q . V . . .
14.667	3.0177	6.99	. Q . V . . .
14.750	3.0679	7.29	. Q . V . . .
14.833	3.1205	7.64	. Q . V . . .
14.917	3.1757	8.02	. Q . V . . .
15.000	3.2339	8.45	. Q . V . . .
15.083	3.2953	8.92	. Q . V . . .
15.167	3.3604	9.46	. Q . V . . .
15.250	3.4297	10.05	. Q . V . . .
15.333	3.5037	10.75	. Q . V . . .
15.417	3.5820	11.37	. Q . V . . .
15.500	3.6607	11.42	. Q . V . . .
15.583	3.7404	11.57	. Q . V . . .
15.667	3.8276	12.66	. Q . V . . .
15.750	3.9267	14.39	. Q . V. . . .
15.833	4.0441	17.05	. Q . V. . . .
15.917	4.1878	20.87	. Q. V . . .
16.000	4.3782	27.65	. . Q .V . . .
16.083	4.6852	44.58	. . Q. V . . .
16.167	5.2417	80.80	. . . V . Q .
16.250	5.7746	77.37	. . . V . Q .
16.333	6.0403	38.59	. . Q . V. . .
16.417	6.1779	19.97	. Q . . V . .
16.500	6.2778	14.52	. Q . . V . .
16.583	6.3635	12.43	. Q . . .V . .
16.667	6.4378	10.79	. Q . . .V . .
16.750	6.5027	9.42	. Q . . . V . .
16.833	6.5603	8.37	. Q . . . V . .

| | | |

22.833	7.9611	1.55	Q	.	.	.	V.
22.917	7.9717	1.53	Q	.	.	.	V.
23.000	7.9821	1.52	Q	.	.	.	V.
23.083	7.9926	1.51	Q	.	.	.	V.
23.167	8.0029	1.50	Q	.	.	.	V.
23.250	8.0131	1.49	Q	.	.	.	V.
23.333	8.0233	1.48	Q	.	.	.	V.
23.417	8.0334	1.47	Q	.	.	.	V.
23.500	8.0434	1.46	Q	.	.	.	V.
23.583	8.0534	1.45	Q	.	.	.	V.
23.667	8.0633	1.44	Q	.	.	.	V.
23.750	8.0731	1.43	Q	.	.	.	V.
23.833	8.0828	1.42	Q	.	.	.	V.
23.917	8.0925	1.41	Q	.	.	.	V.
24.000	8.1021	1.40	Q	.	.	.	V.
24.083	8.1111	1.29	Q	.	.	.	V.
24.167	8.1164	0.78	Q	.	.	.	V.
24.250	8.1180	0.23	Q	.	.	.	V.
24.333	8.1184	0.05	Q	.	.	.	V.
24.417	8.1185	0.02	Q	.	.	.	V.
24.500	8.1185	0.01	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1470.0
10%	115.0
20%	40.0
30%	25.0
40%	20.0
50%	15.0
60%	10.0
70%	10.0
80%	10.0
90%	10.0

END OF FLOODSCx ROUTING ANALYSIS

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* W.O. #4213-3X, BREA CENTRAL                                           *
* 2-YR STUDY                                                            *
* PROPOSED - WEST AREA - DRAINAGE AREA 'B'                              *
 ************************************************************************

  FILE NAME: WEST-B.DAT
  TIME/DATE OF STUDY: 11:26 11/09/2021
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    508.00  DOWNSTREAM(FEET) =    505.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.560
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"       D        1.00      0.20     0.500    57    9.57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      1.31
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      1.31

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   505.00  DOWNSTREAM(FEET) =   497.00
 FLOW LENGTH(FEET) =   700.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.10
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.31
 PIPE TRAVEL TIME(MIN.) =   2.85    Tc(MIN.) =   12.41
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.41
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.343
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE"        D       10.02      0.20     0.500    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
 SUBAREA AREA(ACRES) =   10.02      SUBAREA RUNOFF(CFS) =   11.21
 EFFECTIVE AREA(ACRES) =     11.02   AREA-AVERAGED Fm(INCH/HR) =  0.10
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
 TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      12.33

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   497.00  DOWNSTREAM(FEET) =   482.00
 FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.33
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   13.16
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    502.50  DOWNSTREAM(FEET) =    497.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.751
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.905
 SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.60      0.20     0.100    57    6.75
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  484.00
  STREET LENGTH(FEET) =   720.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.71
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.82
  STREET FLOW TRAVEL TIME(MIN.) =   4.42   Tc(MIN.) =   11.17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.427
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.57      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.57      SUBAREA RUNOFF(CFS) =    1.99
  EFFECTIVE AREA(ACRES) =      2.17    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       2.75

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.44
  FLOW VELOCITY(FEET/SEC.) =  2.88   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.17
  RAINFALL INTENSITY(INCH/HR) =   1.43
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.17
  TOTAL STREAM AREA(ACRES) =       2.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.75

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>>>>USE SPECIFIED Tc VALUE FOR INITIAL SUBAREA<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   720.00
```

```
 USER SPECIFIED Tc(MIN.) =    5.000
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  2.264
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"         D        1.03      0.20     0.900    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA RUNOFF(CFS) =      1.93
 TOTAL AREA(ACRES) =      1.03   PEAK FLOW RATE(CFS) =      1.93

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   485.00  DOWNSTREAM(FEET) =   484.00
 FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.93
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.28
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     800.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.28
 RAINFALL INTENSITY(INCH/HR) =   2.19
 AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.90
 EFFECTIVE STREAM AREA(ACRES) =       1.03
 TOTAL STREAM AREA(ACRES) =       1.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.93

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.75   11.17    1.427  0.20( 0.02) 0.10       2.2       4.00
     2        1.93    5.28    2.194  0.20( 0.18) 0.90       1.0       6.00

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.94    5.28    2.194  0.20( 0.10) 0.50       2.1       6.00
     2        3.94   11.17    1.427  0.20( 0.07) 0.36       3.2       4.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.94    Tc(MIN.) =    11.17
 EFFECTIVE AREA(ACRES) =       3.20   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =        3.2
 LONGEST FLOWPATH FROM NODE      4.00 TO NODE      8.00 =    1020.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   484.00  DOWNSTREAM(FEET) =   482.00
  FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.94
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =   11.40
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.94    5.51    2.141  0.20( 0.10) 0.50       2.1       6.00
      2        3.94   11.40    1.410  0.20( 0.07) 0.36       3.2       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE     11.00 =    1115.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.33   13.16    1.299  0.20( 0.10) 0.50      11.0       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       12.73    5.51    2.141  0.20( 0.10) 0.50       6.7       6.00
      2       15.62   11.40    1.410  0.20( 0.09) 0.46      12.8       4.00
      3       15.94   13.16    1.299  0.20( 0.09) 0.47      14.2       1.00
    TOTAL AREA(ACRES) =        14.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       15.94  Tc(MIN.) =   13.156
  EFFECTIVE AREA(ACRES) =     14.22  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.16
  RAINFALL INTENSITY(INCH/HR) =   1.30
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =      14.22
  TOTAL STREAM AREA(ACRES) =      14.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.94

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    505.00  DOWNSTREAM(FEET) =    497.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.225
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.996
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.54      0.20     0.100    57    6.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.96
  TOTAL AREA(ACRES) =      0.54   PEAK FLOW RATE(CFS) =      0.96

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  497.50  DOWNSTREAM ELEVATION(FEET) =  482.00
  STREET LENGTH(FEET) =   795.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 50.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  45.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.88
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.79
  STREET FLOW TRAVEL TIME(MIN.) =   4.92   Tc(MIN.) =   11.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.429
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.43      0.20     0.100    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.43      SUBAREA RUNOFF(CFS) =    1.81
  EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       2.50

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.91
  FLOW VELOCITY(FEET/SEC.) =  2.87   DEPTH*VELOCITY(FT*FT/SEC.) =   0.91
  LONGEST FLOWPATH FROM NODE      9.00 TO NODE     11.00 =    1095.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.14
  RAINFALL INTENSITY(INCH/HR) =   1.43
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.97
  TOTAL STREAM AREA(ACRES) =       1.97
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.50

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       12.73    5.51    2.141  0.20( 0.10) 0.50       6.7       6.00
      1       15.62   11.40    1.410  0.20( 0.09) 0.46      12.8       4.00
      1       15.94   13.16    1.299  0.20( 0.09) 0.47      14.2       1.00
      2        2.50   11.14    1.429  0.20( 0.02) 0.10       2.0       9.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.59    5.51    2.141  0.20( 0.09) 0.45       7.6       6.00
      2       17.99   11.14    1.429  0.20( 0.08) 0.42      14.5       9.00
      3       18.08   11.40    1.410  0.20( 0.08) 0.42      14.7       4.00
      4       18.21   13.16    1.299  0.20( 0.08) 0.42      16.2       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.21    Tc(MIN.) =    13.16
  EFFECTIVE AREA(ACRES) =      16.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       16.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1480.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       16.2  TC(MIN.) =     13.16
  EFFECTIVE AREA(ACRES) =     16.19  AREA-AVERAGED Fm(INCH/HR)=  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.423
  PEAK FLOW RATE(CFS)   =      18.21

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       14.59    5.51    2.141  0.20( 0.09) 0.45       7.6       6.00
      2       17.99   11.14    1.429  0.20( 0.08) 0.42      14.5       9.00
      3       18.08   11.40    1.410  0.20( 0.08) 0.42      14.7       4.00
      4       18.21   13.16    1.299  0.20( 0.08) 0.42      16.2       1.00
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'B'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         16.20       42.00       75.(AMC II)     0.200       0.523

    TOTAL AREA (Acres) =     16.20

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.084

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.477
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
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           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'B'                                                              *
 ************************************************************************

  FILE NAME: WP-B.DAT
  TIME/DATE OF STUDY: 10:55 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      16.200 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.176 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.084
         LOW LOSS FRACTION = 0.477
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 0.999
          30-MINUTE FACTOR = 0.999
           1-HOUR FACTOR = 0.999
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  47.483



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	4.024	7.884
2	26.902	44.823
3	63.826	72.339
4	87.472	46.327
5	96.118	16.941
6	98.490	4.647
7	99.323	1.632
8	99.729	0.795
9	99.932	0.398
10	100.000	0.133

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 1.0737
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.6929

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0001	0.01	Q	.	.	.	.
0.167	0.0006	0.07	Q	.	.	.	.
0.250	0.0018	0.17	Q	.	.	.	.
0.333	0.0034	0.24	Q	.	.	.	.
0.417	0.0053	0.26	Q	.	.	.	.
0.500	0.0071	0.27	Q	.	.	.	.
0.583	0.0090	0.27	Q	.	.	.	.
0.667	0.0109	0.28	Q	.	.	.	.
0.750	0.0128	0.28	Q	.	.	.	.
0.833	0.0148	0.28	Q	.	.	.	.
0.917	0.0167	0.28	Q	.	.	.	.
1.000	0.0186	0.28	Q	.	.	.	.
1.083	0.0206	0.28	Q	.	.	.	.
1.167	0.0225	0.28	Q	.	.	.	.
1.250	0.0245	0.28	Q	.	.	.	.
1.333	0.0265	0.29	Q	.	.	.	.
1.417	0.0284	0.29	Q	.	.	.	.
1.500	0.0304	0.29	Q	.	.	.	.
1.583	0.0324	0.29	Q	.	.	.	.
1.667	0.0344	0.29	Q	.	.	.	.
1.750	0.0364	0.29	Q	.	.	.	.
1.833	0.0384	0.29	Q	.	.	.	.
1.917	0.0404	0.29	Q	.	.	.	.
2.000	0.0424	0.29	QV	.	.	.	.
2.083	0.0444	0.29	QV	.	.	.	.
2.167	0.0465	0.30	QV	.	.	.	.
2.250	0.0485	0.30	QV	.	.	.	.
2.333	0.0506	0.30	QV	.	.	.	.
2.417	0.0526	0.30	QV	.	.	.	.
2.500	0.0547	0.30	QV	.	.	.	.
2.583	0.0568	0.30	QV	.	.	.	.
2.667	0.0589	0.30	QV	.	.	.	.
2.750	0.0610	0.30	QV	.	.	.	.
2.833	0.0631	0.30	QV	.	.	.	.
2.917	0.0652	0.31	QV	.	.	.	.
3.000	0.0673	0.31	QV	.	.	.	.
3.083	0.0694	0.31	QV	.	.	.	.
3.167	0.0715	0.31	QV	.	.	.	.
3.250	0.0737	0.31	QV	.	.	.	.
3.333	0.0758	0.31	QV	.	.	.	.
3.417	0.0780	0.31	QV	.	.	.	.
3.500	0.0801	0.31	QV	.	.	.	.
3.583	0.0823	0.32	QV	.	.	.	.
3.667	0.0845	0.32	QV	.	.	.	.
3.750	0.0867	0.32	Q V	.	.	.	.
3.833	0.0889	0.32	Q V	.	.	.	.
3.917	0.0911	0.32	Q V	.	.	.	.
4.000	0.0933	0.32	Q V	.	.	.	.
4.083	0.0956	0.32	Q V	.	.	.	.
4.167	0.0978	0.33	Q V	.	.	.	.
4.250	0.1001	0.33	Q V	.	.	.	.
4.333	0.1023	0.33	Q V	.	.	.	.
4.417	0.1046	0.33	Q V	.	.	.	.
4.500	0.1069	0.33	Q V	.	.	.	.
4.583	0.1092	0.33	Q V	.	.	.	.
4.667	0.1115	0.33	Q V	.	.	.	.
4.750	0.1138	0.34	Q V	.	.	.	.
4.833	0.1161	0.34	Q V	.	.	.	.
4.917	0.1184	0.34	Q V	.	.	.	.
5.000	0.1208	0.34	Q V	.	.	.	.

5.083	0.1231	0.34	Q V	.	.	.	.
5.167	0.1255	0.34	Q V	.	.	.	.
5.250	0.1279	0.35	Q V	.	.	.	.
5.333	0.1303	0.35	Q V	.	.	.	.
5.417	0.1327	0.35	Q V	.	.	.	.
5.500	0.1351	0.35	Q V	.	.	.	.
5.583	0.1375	0.35	Q V	.	.	.	.
5.667	0.1399	0.35	Q V	.	.	.	.
5.750	0.1424	0.36	Q V	.	.	.	.
5.833	0.1448	0.36	Q V	.	.	.	.
5.917	0.1473	0.36	Q V	.	.	.	.
6.000	0.1498	0.36	Q V	.	.	.	.
6.083	0.1523	0.36	Q V	.	.	.	.
6.167	0.1548	0.36	Q V	.	.	.	.
6.250	0.1573	0.37	Q V	.	.	.	.
6.333	0.1599	0.37	Q V	.	.	.	.
6.417	0.1624	0.37	Q V	.	.	.	.
6.500	0.1650	0.37	Q V	.	.	.	.
6.583	0.1675	0.37	Q V	.	.	.	.
6.667	0.1701	0.38	Q V	.	.	.	.
6.750	0.1727	0.38	Q V	.	.	.	.
6.833	0.1754	0.38	Q V	.	.	.	.
6.917	0.1780	0.38	Q V	.	.	.	.
7.000	0.1806	0.38	Q V	.	.	.	.
7.083	0.1833	0.39	Q V	.	.	.	.
7.167	0.1860	0.39	Q V	.	.	.	.
7.250	0.1887	0.39	Q V	.	.	.	.
7.333	0.1914	0.39	Q V	.	.	.	.
7.417	0.1941	0.40	Q V	.	.	.	.
7.500	0.1969	0.40	Q V	.	.	.	.
7.583	0.1996	0.40	Q V	.	.	.	.
7.667	0.2024	0.40	Q V	.	.	.	.
7.750	0.2052	0.41	Q V	.	.	.	.
7.833	0.2080	0.41	Q V	.	.	.	.
7.917	0.2108	0.41	Q V	.	.	.	.
8.000	0.2137	0.41	Q V	.	.	.	.
8.083	0.2165	0.42	Q V	.	.	.	.
8.167	0.2194	0.42	Q V	.	.	.	.
8.250	0.2223	0.42	Q V	.	.	.	.
8.333	0.2252	0.42	Q V	.	.	.	.
8.417	0.2282	0.43	Q V	.	.	.	.
8.500	0.2311	0.43	Q V	.	.	.	.
8.583	0.2341	0.43	Q V	.	.	.	.
8.667	0.2371	0.44	Q V	.	.	.	.
8.750	0.2401	0.44	Q V	.	.	.	.
8.833	0.2432	0.44	Q V	.	.	.	.
8.917	0.2462	0.44	Q V	.	.	.	.
9.000	0.2493	0.45	Q V	.	.	.	.
9.083	0.2524	0.45	Q V	.	.	.	.
9.167	0.2555	0.45	Q V	.	.	.	.
9.250	0.2587	0.46	Q V	.	.	.	.
9.333	0.2619	0.46	Q V	.	.	.	.
9.417	0.2651	0.46	Q V	.	.	.	.
9.500	0.2683	0.47	Q V	.	.	.	.
9.583	0.2715	0.47	Q V	.	.	.	.
9.667	0.2748	0.48	Q V	.	.	.	.
9.750	0.2781	0.48	Q V	.	.	.	.
9.833	0.2815	0.48	Q V	.	.	.	.
9.917	0.2848	0.49	Q V	.	.	.	.
10.000	0.2882	0.49	Q V	.	.	.	.
10.083	0.2916	0.50	Q V	.	.	.	.
10.167	0.2951	0.50	Q V	.	.	.	.
10.250	0.2985	0.50	.Q V	.	.	.	.
10.333	0.3020	0.51	.Q V	.	.	.	.
10.417	0.3056	0.51	.Q V	.	.	.	.
10.500	0.3091	0.52	.Q V	.	.	.	.
10.583	0.3127	0.52	.Q V	.	.	.	.
10.667	0.3164	0.53	.Q V	.	.	.	.
10.750	0.3200	0.53	.Q V	.	.	.	.
10.833	0.3237	0.54	.Q V	.	.	.	.
10.917	0.3275	0.54	.Q V	.	.	.	.

11.000	0.3312	0.55	.Q V . . . .
11.083	0.3350	0.55	.Q V . . . .
11.167	0.3389	0.56	.Q V . . . .
11.250	0.3428	0.56	.Q V . . . .
11.333	0.3467	0.57	.Q V . . . .
11.417	0.3507	0.58	.Q V . . . .
11.500	0.3547	0.58	.Q V . . . .
11.583	0.3588	0.59	.Q V . . . .
11.667	0.3629	0.60	.Q V . . . .
11.750	0.3670	0.60	.Q V . . . .
11.833	0.3712	0.61	.Q V . . . .
11.917	0.3755	0.62	.Q V . . . .
12.000	0.3798	0.63	.Q V . . . .
12.083	0.3842	0.64	.Q V. . . .
12.167	0.3889	0.68	.Q V. . . .
12.250	0.3940	0.74	.Q V. . . .
12.333	0.3994	0.78	.Q V. . . .
12.417	0.4049	0.80	.Q V. . . .
12.500	0.4105	0.82	.Q V. . . .
12.583	0.4162	0.83	.Q V. . . .
12.667	0.4220	0.84	.Q V. . . .
12.750	0.4278	0.85	.Q V . . .
12.833	0.4337	0.86	.Q V . . .
12.917	0.4397	0.87	.Q V . . .
13.000	0.4458	0.88	.Q V . . .
13.083	0.4520	0.90	.Q V . . .
13.167	0.4583	0.91	.Q V . . .
13.250	0.4646	0.92	.Q V . . .
13.333	0.4711	0.94	.Q .V . . .
13.417	0.4777	0.95	.Q .V . . .
13.500	0.4843	0.97	.Q .V . . .
13.583	0.4911	0.98	.Q .V . . .
13.667	0.4980	1.00	. Q .V . . .
13.750	0.5050	1.02	. Q .V . . .
13.833	0.5122	1.04	. Q . V . . .
13.917	0.5195	1.06	. Q . V . . .
14.000	0.5269	1.08	. Q . V . . .
14.083	0.5345	1.10	. Q . V . . .
14.167	0.5424	1.14	. Q . V . . .
14.250	0.5505	1.18	. Q . V . . .
14.333	0.5589	1.22	. Q . V . . .
14.417	0.5675	1.25	. Q . V . . .
14.500	0.5763	1.28	. Q . V . . .
14.583	0.5854	1.32	. Q . V . . .
14.667	0.5947	1.35	. Q . V . . .
14.750	0.6043	1.39	. Q . V . . .
14.833	0.6142	1.44	. Q . V . . .
14.917	0.6245	1.49	. Q . V . . .
15.000	0.6353	1.57	. Q . V . . .
15.083	0.6468	1.67	. Q . V . . .
15.167	0.6591	1.79	. Q . V . . .
15.250	0.6724	1.93	. Q . V . . .
15.333	0.6868	2.09	. Q . V . . .
15.417	0.7023	2.24	. Q . V . . .
15.500	0.7182	2.32	. Q . V . . .
15.583	0.7345	2.36	. Q . V . . .
15.667	0.7519	2.53	. Q . V . . .
15.750	0.7717	2.87	. Q . V . . .
15.833	0.7951	3.40	. Q . V . . .
15.917	0.8239	4.19	. Q . V. . .
16.000	0.8618	5.50	. Q V . . .
16.083	0.9204	8.51	. . Q .V . .
16.167	1.0233	14.93	. . . V Q. .
16.250	1.1488	18.23	. . . V . Q .
16.333	1.2375	12.87	. . . Q V. .
16.417	1.2854	6.97	. . Q . V .
16.500	1.3134	4.06	. Q . . .V .
16.583	1.3341	3.00	. Q . . .V .
16.667	1.3511	2.47	. Q . . .V .
16.750	1.3653	2.07	. Q . . . V .
16.833	1.3775	1.76	. Q . . . V .

16.917	1.3882	1.55	.	Q	.	.	.	V	.	
17.000	1.3980	1.43	.	Q	.	.	.	V	.	
17.083	1.4072	1.34	.	Q	.	.	.	V	.	
17.167	1.4159	1.26	.	Q	.	.	.	V	.	
17.250	1.4240	1.18	.	Q	.	.	.	V	.	
17.333	1.4317	1.12	.	Q	.	.	.	V	.	
17.417	1.4390	1.07	.	Q	.	.	.	V	.	
17.500	1.4461	1.03	.	Q	.	.	.	V	.	
17.583	1.4529	0.99	.	Q	.	.	.	V	.	
17.667	1.4595	0.96	.	Q	.	.	.	V	.	
17.750	1.4659	0.93	.	Q	.	.	.	V	.	
17.833	1.4721	0.90	.	Q	.	.	.	V	.	
17.917	1.4782	0.88	.	Q	.	.	.	V	.	
18.000	1.4840	0.85	.	Q	.	.	.	V	.	
18.083	1.4897	0.83	.	Q	.	.	.	V	.	
18.167	1.4950	0.77	.	Q	.	.	.	V	.	
18.250	1.4999	0.70	.	Q	.	.	.	V	.	
18.333	1.5044	0.65	.	Q	.	.	.	V	.	
18.417	1.5087	0.63	.	Q	.	.	.	V	.	
18.500	1.5129	0.61	.	Q	.	.	.	V	.	
18.583	1.5170	0.59	.	Q	.	.	.	V	.	
18.667	1.5210	0.58	.	Q	.	.	.	V	.	
18.750	1.5249	0.57	.	Q	.	.	.	V	.	
18.833	1.5287	0.56	.	Q	.	.	.	V	.	
18.917	1.5324	0.54	.	Q	.	.	.	V	.	
19.000	1.5361	0.53	.	Q	.	.	.	V	.	
19.083	1.5397	0.52	.	Q	.	.	.	V	.	
19.167	1.5433	0.51	.	Q	.	.	.	V	.	
19.250	1.5467	0.51	.	Q	.	.	.	V	.	
19.333	1.5502	0.50	Q	.	.	.	.	V	.	
19.417	1.5535	0.49	Q	.	.	.	.	V	.	
19.500	1.5568	0.48	Q	.	.	.	.	V	.	
19.583	1.5601	0.47	Q	.	.	.	.	V	.	
19.667	1.5633	0.47	Q	.	.	.	.	V	.	
19.750	1.5665	0.46	Q	.	.	.	.	V	.	
19.833	1.5696	0.45	Q	.	.	.	.	V	.	
19.917	1.5726	0.45	Q	.	.	.	.	V	.	
20.000	1.5757	0.44	Q	.	.	.	.	V	.	
20.083	1.5786	0.43	Q	.	.	.	.	V	.	
20.167	1.5816	0.43	Q	.	.	.	.	V	.	
20.250	1.5845	0.42	Q	.	.	.	.	V	.	
20.333	1.5874	0.42	Q	.	.	.	.	V	.	
20.417	1.5902	0.41	Q	.	.	.	.	V	.	
20.500	1.5930	0.41	Q	.	.	.	.	V	.	
20.583	1.5958	0.40	Q	.	.	.	.	V	.	
20.667	1.5985	0.40	Q	.	.	.	.	V	.	
20.750	1.6012	0.39	Q	.	.	.	.	V	.	
20.833	1.6038	0.39	Q	.	.	.	.	V	.	
20.917	1.6065	0.38	Q	.	.	.	.	V	.	
21.000	1.6091	0.38	Q	.	.	.	.	V	.	
21.083	1.6117	0.37	Q	.	.	.	.	V	.	
21.167	1.6142	0.37	Q	.	.	.	.	V	.	
21.250	1.6168	0.37	Q	.	.	.	.	V	.	
21.333	1.6193	0.36	Q	.	.	.	.	V	.	
21.417	1.6217	0.36	Q	.	.	.	.	V	.	
21.500	1.6242	0.36	Q	.	.	.	.	V	.	
21.583	1.6266	0.35	Q	.	.	.	.	V	.	
21.667	1.6290	0.35	Q	.	.	.	.	V	.	
21.750	1.6314	0.35	Q	.	.	.	.	V	.	
21.833	1.6337	0.34	Q	.	.	.	.	V	.	
21.917	1.6361	0.34	Q	.	.	.	.	V	.	
22.000	1.6384	0.34	Q	.	.	.	.	V	.	
22.083	1.6407	0.33	Q	.	.	.	.	V	.	
22.167	1.6430	0.33	Q	.	.	.	.	V	.	
22.250	1.6452	0.33	Q	.	.	.	.	V	.	
22.333	1.6474	0.32	Q	.	.	.	.	V	.	
22.417	1.6497	0.32	Q	.	.	.	.	V	.	
22.500	1.6519	0.32	Q	.	.	.	.	V	.	
22.583	1.6540	0.32	Q	.	.	.	.	V	.	
22.667	1.6562	0.31	Q	.	.	.	.	V	.	
22.750	1.6583	0.31	Q	.	.	.	.	V	.	

22.833	1.6605	0.31	Q	.	.	.	V.
22.917	1.6626	0.31	Q	.	.	.	V.
23.000	1.6647	0.30	Q	.	.	.	V.
23.083	1.6667	0.30	Q	.	.	.	V.
23.167	1.6688	0.30	Q	.	.	.	V.
23.250	1.6708	0.30	Q	.	.	.	V.
23.333	1.6729	0.29	Q	.	.	.	V.
23.417	1.6749	0.29	Q	.	.	.	V.
23.500	1.6769	0.29	Q	.	.	.	V.
23.583	1.6789	0.29	Q	.	.	.	V.
23.667	1.6809	0.29	Q	.	.	.	V.
23.750	1.6828	0.28	Q	.	.	.	V.
23.833	1.6848	0.28	Q	.	.	.	V.
23.917	1.6867	0.28	Q	.	.	.	V.
24.000	1.6886	0.28	Q	.	.	.	V.
24.083	1.6904	0.27	Q	.	.	.	V.
24.167	1.6918	0.20	Q	.	.	.	V.
24.250	1.6925	0.10	Q	.	.	.	V.
24.333	1.6928	0.03	Q	.	.	.	V.
24.417	1.6928	0.01	Q	.	.	.	V.
24.500	1.6929	0.00	Q	.	.	.	V.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1470.0
10%	95.0
20%	40.0
30%	30.0
40%	20.0
50%	15.0
60%	15.0
70%	15.0
80%	10.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                       Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY ************************
* W.O. #4213-3X, BREA CENTRAL                                            *
* 2-YR STUDY                                                             *
* PROPOSED - WEST AREA - DRAINAGE AREA 'C'                               *
 ***********************************************************************

  FILE NAME: WEST-C.DAT
  TIME/DATE OF STUDY: 10:42 01/12/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   20.0     15.0    0.018/0.018/0.020   0.50    1.50 0.0312 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    484.60  DOWNSTREAM(FEET) =    477.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.617
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.927
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        1.24      0.20     0.200    57    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      1.24   PEAK FLOW RATE(CFS) =      2.11

******************************************************************************
```

```
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.00  DOWNSTREAM(FEET) =   470.00
 FLOW LENGTH(FEET) =   600.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.11
 PIPE TRAVEL TIME(MIN.) =   2.11    Tc(MIN.) =    8.73
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     900.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.73
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        5.21      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    5.21      SUBAREA RUNOFF(CFS) =    7.52
 EFFECTIVE AREA(ACRES) =      6.45   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =        6.4       PEAK FLOW RATE(CFS) =       9.31

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.73
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.644
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       D        4.09      0.20     0.200    57
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    4.09      SUBAREA RUNOFF(CFS) =    5.90
 EFFECTIVE AREA(ACRES) =     10.54   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
 TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      15.21
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       10.5  TC(MIN.) =      8.73
 EFFECTIVE AREA(ACRES) =     10.54  AREA-AVERAGED Fm(INCH/HR)=  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.200
 PEAK FLOW RATE(CFS)   =      15.21
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
          NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
                    AND LOW LOSS FRACTION ESTIMATIONS
==========================================================================
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                            Analysis prepared by:

                            HUNSAKER & ASSOCIATES
                                  Irvine,Inc
                        Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

**************************************************************************
--------------------------------------------------------------------------

 Problem Descriptions:
  BREA 265, 2-YR STUDY
  PROPOSED CONDITION
  AREA 'C'
==========================================================================
*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
    AND LOW LOSS FRACTION ESTIMATIONS FOR AMC I:

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     2.05 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
       TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
         1         10.50       20.00       75.(AMC II)     0.200       0.715

    TOTAL AREA (Acres) =     10.50

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.040

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.285
==========================================================================
```

```
**************************************************************************

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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine,Inc
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* BREA 265                                                              *
* 2-YR STUDY - PROPOSED CONDITION - WEST                                *
* AREA 'C'                                                              *
 ************************************************************************

  FILE NAME: WP-C.DAT
  TIME/DATE OF STUDY: 11:13 01/14/2022


**************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERSHED AREA =      10.500 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         *USER ENTERED "LAG" TIME =    0.108 HOURS
          CAUTION: LAG TIME IS LESS THAN 0.50 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         STORM RETURN FREQUENCY =    2-YEAR
         VALLEY(DEVELOPED) S-GRAPH SELECTED
         MAXIMUM WATERSHED LOSS RATE(INCH/HOUR) =  0.040
         LOW LOSS FRACTION = 0.285
         *HYDROGRAPH MODEL #1 SPECIFIED*

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.19
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  0.40
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  0.53
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  0.89
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  1.22
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  2.05

         PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
           5-MINUTE FACTOR = 1.000
          30-MINUTE FACTOR = 1.000
           1-HOUR FACTOR = 1.000
           3-HOUR FACTOR = 1.000
           6-HOUR FACTOR = 1.000
          24-HOUR FACTOR = 1.000

         UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
         UNIT INTERVAL PERCENTAGE OF LAG-TIME =  77.375



==========================================================================
                      UNIT HYDROGRAPH DETERMINATION

--------------------------------------------------------------------------
    INTERVAL          "S" GRAPH          UNIT HYDROGRAPH
     NUMBER          MEAN VALUES          ORDINATES(CFS)
```

1	10.503	13.337
2	60.658	63.689
3	92.954	41.011
4	98.668	7.257
5	99.521	1.082
6	99.808	0.365
7	99.952	0.183
8	100.000	0.061

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 0.3943
TOTAL STORM RUNOFF VOLUME(ACRE-FEET) = 1.3987

2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	5.0	10.0	15.0	20.0
0.083	0.0002	0.03	Q	.	.	.	.
0.167	0.0012	0.15	Q	.	.	.	.
0.250	0.0027	0.23	Q	.	.	.	.
0.333	0.0044	0.24	Q	.	.	.	.
0.417	0.0061	0.24	Q	.	.	.	.
0.500	0.0078	0.24	Q	.	.	.	.
0.583	0.0094	0.25	Q	.	.	.	.
0.667	0.0111	0.25	Q	.	.	.	.
0.750	0.0128	0.25	Q	.	.	.	.
0.833	0.0146	0.25	Q	.	.	.	.
0.917	0.0163	0.25	Q	.	.	.	.
1.000	0.0180	0.25	Q	.	.	.	.
1.083	0.0197	0.25	Q	.	.	.	.
1.167	0.0215	0.25	Q	.	.	.	.
1.250	0.0232	0.25	Q	.	.	.	.
1.333	0.0249	0.25	Q	.	.	.	.
1.417	0.0267	0.25	Q	.	.	.	.
1.500	0.0285	0.26	Q	.	.	.	.
1.583	0.0302	0.26	Q	.	.	.	.
1.667	0.0320	0.26	Q	.	.	.	.
1.750	0.0338	0.26	Q	.	.	.	.
1.833	0.0355	0.26	QV	.	.	.	.
1.917	0.0373	0.26	QV	.	.	.	.
2.000	0.0391	0.26	QV	.	.	.	.
2.083	0.0409	0.26	QV	.	.	.	.
2.167	0.0427	0.26	QV	.	.	.	.
2.250	0.0446	0.26	QV	.	.	.	.
2.333	0.0464	0.26	QV	.	.	.	.
2.417	0.0482	0.27	QV	.	.	.	.
2.500	0.0501	0.27	QV	.	.	.	.
2.583	0.0519	0.27	QV	.	.	.	.
2.667	0.0538	0.27	QV	.	.	.	.
2.750	0.0556	0.27	QV	.	.	.	.
2.833	0.0575	0.27	QV	.	.	.	.
2.917	0.0594	0.27	QV	.	.	.	.
3.000	0.0612	0.27	QV	.	.	.	.
3.083	0.0631	0.27	QV	.	.	.	.
3.167	0.0650	0.28	QV	.	.	.	.
3.250	0.0669	0.28	QV	.	.	.	.
3.333	0.0688	0.28	QV	.	.	.	.
3.417	0.0708	0.28	Q V	.	.	.	.
3.500	0.0727	0.28	Q V	.	.	.	.
3.583	0.0746	0.28	Q V	.	.	.	.
3.667	0.0766	0.28	Q V	.	.	.	.
3.750	0.0785	0.28	Q V	.	.	.	.
3.833	0.0805	0.28	Q V	.	.	.	.
3.917	0.0824	0.29	Q V	.	.	.	.
4.000	0.0844	0.29	Q V	.	.	.	.
4.083	0.0864	0.29	Q V	.	.	.	.
4.167	0.0884	0.29	Q V	.	.	.	.
4.250	0.0904	0.29	Q V	.	.	.	.
4.333	0.0924	0.29	Q V	.	.	.	.
4.417	0.0944	0.29	Q V	.	.	.	.
4.500	0.0964	0.29	Q V	.	.	.	.
4.583	0.0985	0.30	Q V	.	.	.	.
4.667	0.1005	0.30	Q V	.	.	.	.
4.750	0.1026	0.30	Q V	.	.	.	.
4.833	0.1047	0.30	Q V	.	.	.	.
4.917	0.1067	0.30	Q V	.	.	.	.
5.000	0.1088	0.30	Q V	.	.	.	.

5.083	0.1109	0.30	Q	V	.	.	.	.
5.167	0.1130	0.31	Q	V	.	.	.	.
5.250	0.1151	0.31	Q	V	.	.	.	.
5.333	0.1173	0.31	Q	V	.	.	.	.
5.417	0.1194	0.31	Q	V	.	.	.	.
5.500	0.1215	0.31	Q	V	.	.	.	.
5.583	0.1237	0.31	Q	V	.	.	.	.
5.667	0.1259	0.31	Q	V	.	.	.	.
5.750	0.1280	0.32	Q	V	.	.	.	.
5.833	0.1302	0.32	Q	V	.	.	.	.
5.917	0.1324	0.32	Q	V	.	.	.	.
6.000	0.1346	0.32	Q	V	.	.	.	.
6.083	0.1369	0.32	Q	V	.	.	.	.
6.167	0.1391	0.32	Q	V	.	.	.	.
6.250	0.1413	0.33	Q	V	.	.	.	.
6.333	0.1436	0.33	Q	V	.	.	.	.
6.417	0.1459	0.33	Q	V	.	.	.	.
6.500	0.1481	0.33	Q	V	.	.	.	.
6.583	0.1504	0.33	Q	V	.	.	.	.
6.667	0.1527	0.33	Q	V	.	.	.	.
6.750	0.1551	0.34	Q	V	.	.	.	.
6.833	0.1574	0.34	Q	V	.	.	.	.
6.917	0.1597	0.34	Q	V	.	.	.	.
7.000	0.1621	0.34	Q	V	.	.	.	.
7.083	0.1645	0.34	Q	V	.	.	.	.
7.167	0.1668	0.35	Q	V	.	.	.	.
7.250	0.1692	0.35	Q	V	.	.	.	.
7.333	0.1717	0.35	Q	V	.	.	.	.
7.417	0.1741	0.35	Q	V	.	.	.	.
7.500	0.1765	0.35	Q	V	.	.	.	.
7.583	0.1790	0.36	Q	V	.	.	.	.
7.667	0.1815	0.36	Q	V	.	.	.	.
7.750	0.1839	0.36	Q	V	.	.	.	.
7.833	0.1865	0.36	Q	V	.	.	.	.
7.917	0.1890	0.37	Q	V	.	.	.	.
8.000	0.1915	0.37	Q	V	.	.	.	.
8.083	0.1941	0.37	Q	V	.	.	.	.
8.167	0.1966	0.37	Q	V	.	.	.	.
8.250	0.1992	0.38	Q	V	.	.	.	.
8.333	0.2018	0.38	Q	V	.	.	.	.
8.417	0.2044	0.38	Q	V	.	.	.	.
8.500	0.2071	0.38	Q	V	.	.	.	.
8.583	0.2097	0.39	Q	V	.	.	.	.
8.667	0.2124	0.39	Q	V	.	.	.	.
8.750	0.2151	0.39	Q	V	.	.	.	.
8.833	0.2178	0.39	Q	V	.	.	.	.
8.917	0.2205	0.40	Q	V	.	.	.	.
9.000	0.2233	0.40	Q	V	.	.	.	.
9.083	0.2260	0.40	Q	V	.	.	.	.
9.167	0.2288	0.41	Q	V	.	.	.	.
9.250	0.2316	0.41	Q	V	.	.	.	.
9.333	0.2345	0.41	Q	V	.	.	.	.
9.417	0.2373	0.41	Q	V	.	.	.	.
9.500	0.2402	0.42	Q	V	.	.	.	.
9.583	0.2431	0.42	Q	V	.	.	.	.
9.667	0.2460	0.42	Q	V	.	.	.	.
9.750	0.2490	0.43	Q	V	.	.	.	.
9.833	0.2520	0.43	Q	V	.	.	.	.
9.917	0.2549	0.43	Q	V	.	.	.	.
10.000	0.2580	0.44	Q	V	.	.	.	.
10.083	0.2610	0.44	Q	V	.	.	.	.
10.167	0.2641	0.45	Q	V	.	.	.	.
10.250	0.2672	0.45	Q	V	.	.	.	.
10.333	0.2703	0.45	Q	V	.	.	.	.
10.417	0.2735	0.46	Q	V	.	.	.	.
10.500	0.2767	0.46	Q	V	.	.	.	.
10.583	0.2799	0.47	Q	V	.	.	.	.
10.667	0.2831	0.47	Q	V	.	.	.	.
10.750	0.2864	0.48	Q	V	.	.	.	.
10.833	0.2897	0.48	Q	V	.	.	.	.
10.917	0.2930	0.48	Q	V	.	.	.	.

11.000	0.2964	0.49	Q V . . . .
11.083	0.2998	0.49	Q V . . . .
11.167	0.3033	0.50	Q V . . . .
11.250	0.3067	0.50	.Q V . . . .
11.333	0.3102	0.51	.Q V . . . .
11.417	0.3138	0.52	.Q V . . . .
11.500	0.3174	0.52	.Q V. . . . .
11.583	0.3210	0.53	.Q V. . . . .
11.667	0.3247	0.53	.Q V. . . . .
11.750	0.3284	0.54	.Q V. . . . .
11.833	0.3322	0.55	.Q V. . . . .
11.917	0.3360	0.55	.Q V. . . . .
12.000	0.3399	0.56	.Q V. . . . .
12.083	0.3438	0.58	.Q V. . . . .
12.167	0.3483	0.65	.Q V. . . . .
12.250	0.3531	0.70	.Q V . . . .
12.333	0.3580	0.71	.Q V . . . .
12.417	0.3630	0.72	.Q V . . . .
12.500	0.3681	0.73	.Q V . . . .
12.583	0.3732	0.74	.Q V . . . .
12.667	0.3783	0.75	.Q V . . . .
12.750	0.3836	0.76	.Q V . . . .
12.833	0.3889	0.77	.Q .V . . . .
12.917	0.3943	0.78	.Q .V . . . .
13.000	0.3997	0.79	.Q .V . . . .
13.083	0.4053	0.80	.Q .V . . . .
13.167	0.4109	0.82	.Q .V . . . .
13.250	0.4166	0.83	.Q .V . . . .
13.333	0.4224	0.84	.Q . V . . . .
13.417	0.4283	0.86	.Q . V . . . .
13.500	0.4343	0.87	.Q . V . . . .
13.583	0.4404	0.89	.Q . V . . . .
13.667	0.4466	0.90	.Q . V . . . .
13.750	0.4529	0.92	.Q . V . . . .
13.833	0.4594	0.94	.Q . V . . . .
13.917	0.4659	0.95	.Q . V . . . .
14.000	0.4726	0.97	.Q . V . . . .
14.083	0.4795	1.00	.Q . V . . . .
14.167	0.4867	1.04	. Q . V . . . .
14.250	0.4942	1.08	. Q . V . . . .
14.333	0.5019	1.12	. Q . V . . . .
14.417	0.5099	1.16	. Q . V . . . .
14.500	0.5182	1.20	. Q . V . . . .
14.583	0.5267	1.24	. Q . V . . . .
14.667	0.5356	1.29	. Q . V . . . .
14.750	0.5449	1.34	. Q . V . . . .
14.833	0.5545	1.40	. Q . V . . . .
14.917	0.5646	1.46	. Q . V . . . .
15.000	0.5752	1.54	. Q . V . . . .
15.083	0.5863	1.61	. Q . V . . . .
15.167	0.5980	1.70	. Q . V . . . .
15.250	0.6104	1.79	. Q . V . . . .
15.333	0.6235	1.91	. Q . V . . . .
15.417	0.6373	2.00	. Q . V . . . .
15.500	0.6509	1.98	. Q . V . . . .
15.583	0.6649	2.03	. Q . V. . . .
15.667	0.6805	2.26	. Q . V. . . .
15.750	0.6980	2.55	. Q . V. . . .
15.833	0.7189	3.04	. Q . V . . .
15.917	0.7444	3.69	. Q . .V . . .
16.000	0.7786	4.98	. Q. . V . . .
16.083	0.8361	8.34	. . Q . V . . .
16.167	0.9405	15.17	. . . V Q . .
16.250	1.0140	10.66	. . .Q V . . .
16.333	1.0451	4.53	. Q. . V. . .
16.417	1.0640	2.73	. Q . . V . .
16.500	1.0796	2.28	. Q . . V . .
16.583	1.0936	2.02	. Q . . .V . .
16.667	1.1059	1.78	. Q . . .V . .
16.750	1.1168	1.59	. Q . . .V . .
16.833	1.1268	1.45	. Q . . . V . .

| | | |

22.833	1.3716	0.27	Q	.	.	.	V.
22.917	1.3735	0.27	Q	.	.	.	V.
23.000	1.3753	0.27	Q	.	.	.	V.
23.083	1.3771	0.27	Q	.	.	.	V.
23.167	1.3789	0.26	Q	.	.	.	V.
23.250	1.3807	0.26	Q	.	.	.	V.
23.333	1.3825	0.26	Q	.	.	.	V.
23.417	1.3843	0.26	Q	.	.	.	V.
23.500	1.3861	0.26	Q	.	.	.	V.
23.583	1.3878	0.25	Q	.	.	.	V.
23.667	1.3896	0.25	Q	.	.	.	V.
23.750	1.3913	0.25	Q	.	.	.	V.
23.833	1.3930	0.25	Q	.	.	.	V.
23.917	1.3947	0.25	Q	.	.	.	V.
24.000	1.3964	0.25	Q	.	.	.	V.
24.083	1.3979	0.22	Q	.	.	.	V.
24.167	1.3986	0.10	Q	.	.	.	V.
24.250	1.3987	0.02	Q	.	.	.	V.
24.333	1.3987	0.00	Q	.	.	.	V.

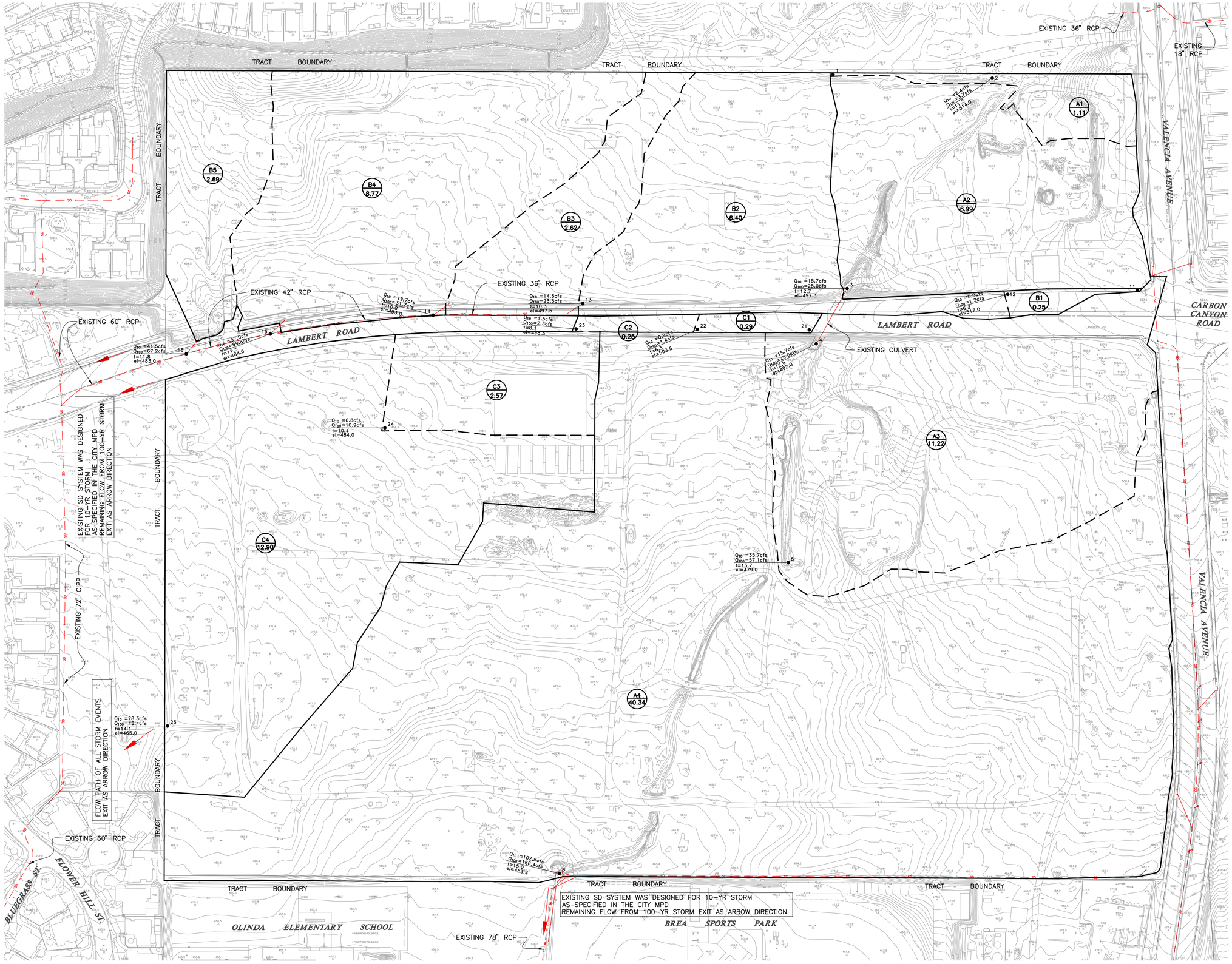
TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1460.0
10%	110.0
20%	35.0
30%	20.0
40%	15.0
50%	15.0
60%	10.0
70%	10.0
80%	5.0
90%	5.0

END OF FLOODSCx ROUTING ANALYSIS

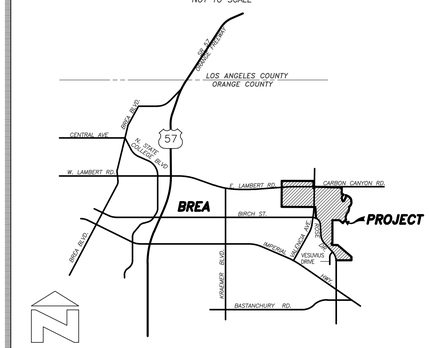
SECTION 9

HYDROLOGY MAPS



VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 25 — NODE NUMBER
- A1 / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{25} =8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- OVER FLOW PATH

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

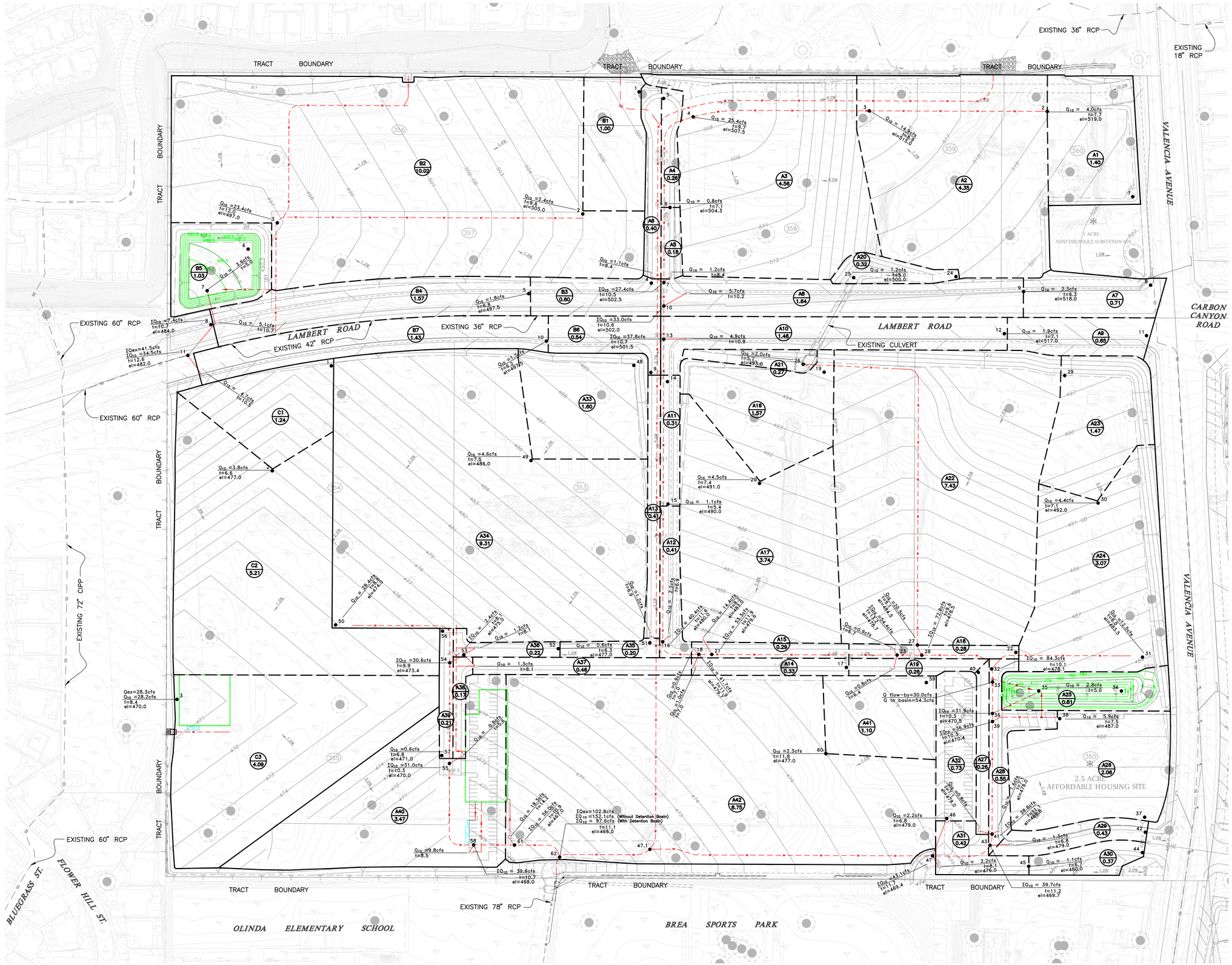
BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

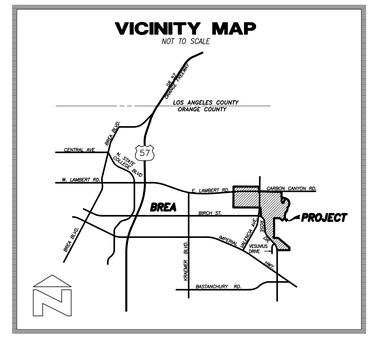
HYDROLOGY MAP
BREA 265 - WEST AREA
EXISTING CONDITION
10-yr & 100-yr STUDY

W.O. #4213-3X

K-1378

F:\0477\Engineering\SY_Hydrology\Brea265-Existing-West-10yr.dwg





LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- PROPOSED STORM DRAIN
- MWS
- WQ / DETENTION BASIN
- EXISTING STORM DRAIN

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

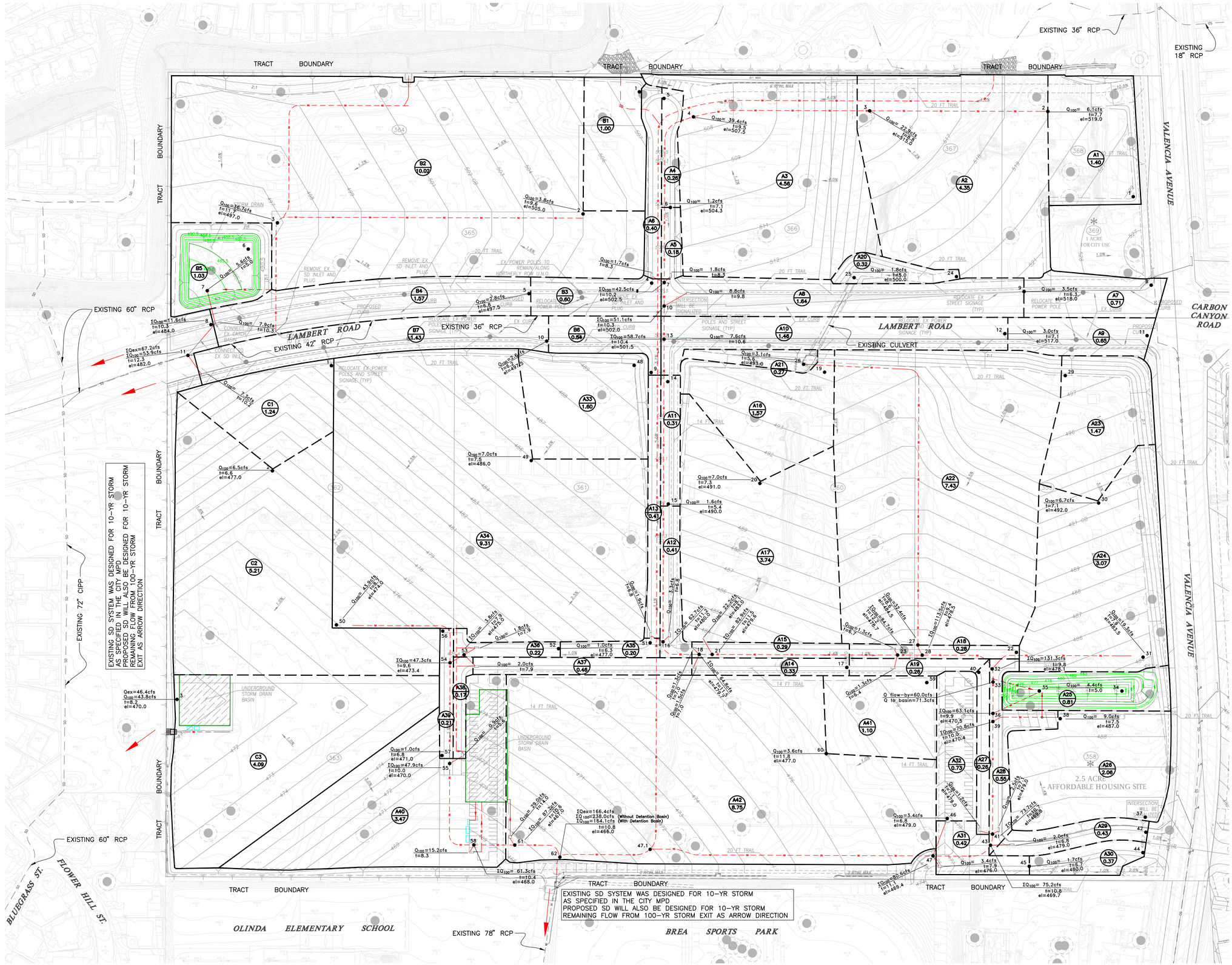
HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes • Irvine, CA 92618 • PH: (949) 583-1010 • FX: (949) 583-0759

PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

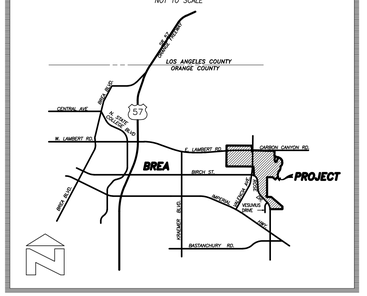
HYDROLOGY MAP
BREA 265 - WEST AREA
PROPOSED CONDITION
10-yr STUDY
WITH A DETENTION BASIN

WO: 4213-3



VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- NODE NUMBER
- AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- PROPOSED STORM DRAIN
- MWS
- WQ / DETENTION BASIN
- EXISTING STORM DRAIN
- OVER FLOW PATH

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

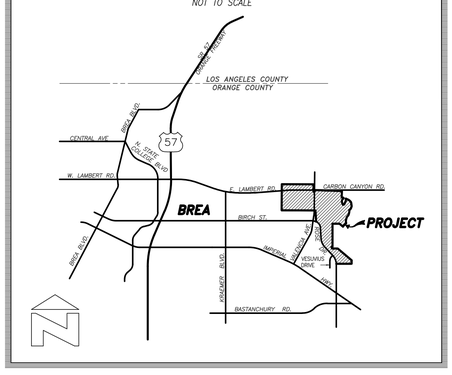
BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - WEST AREA
PROPOSED CONDITION
100-yr STUDY
WITH A DETENTION BASIN

WO: 4213-3

VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 25 — NODE NUMBER
- A1 / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{25} =8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED FOR:

HUNSAKER & ASSOCIATES
I R V I N E, I N C.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - EAST AREA
10-yr & 100-yr STUDY
EXISTING CONDITION

W.O. #4213-3X

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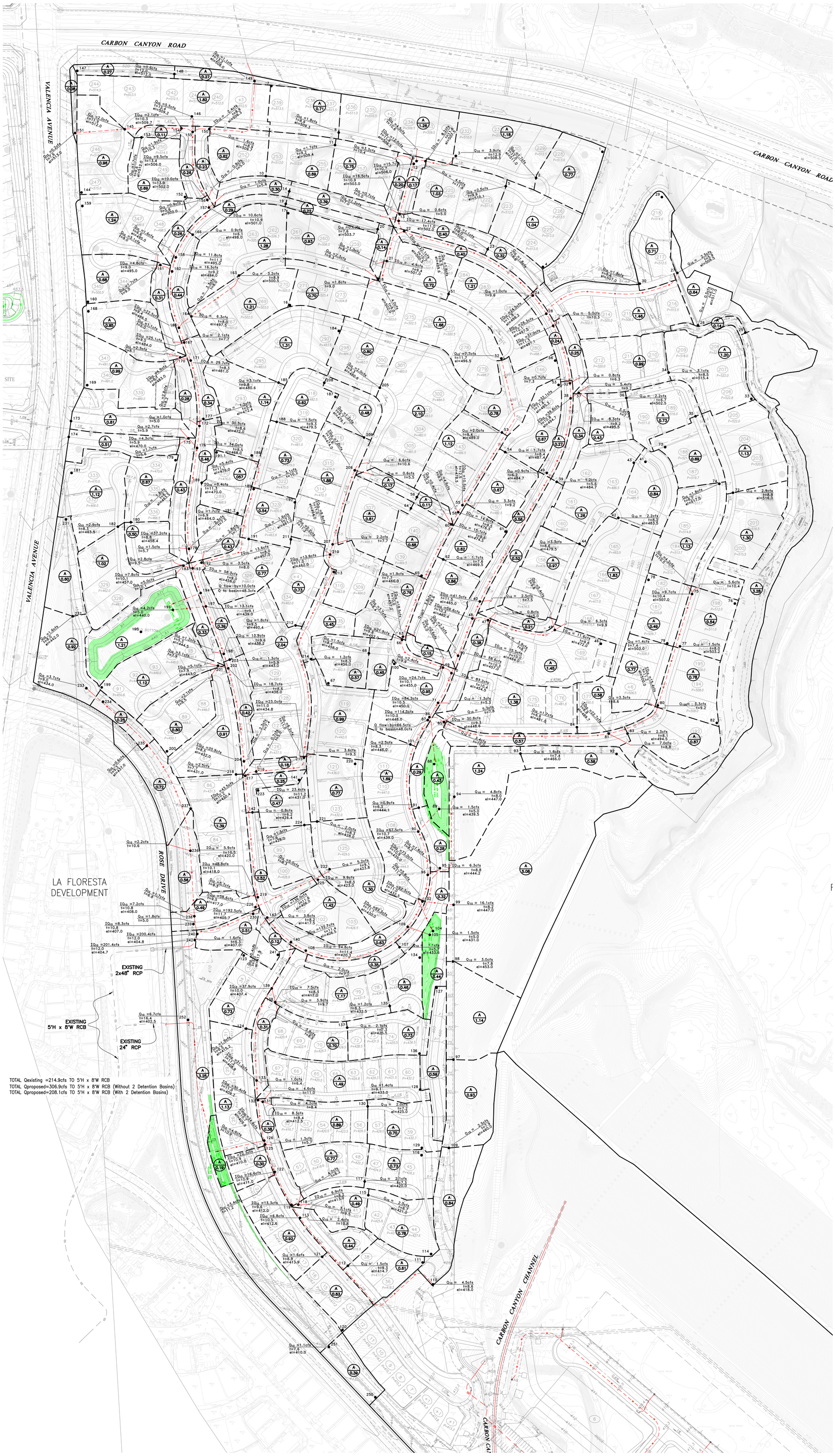
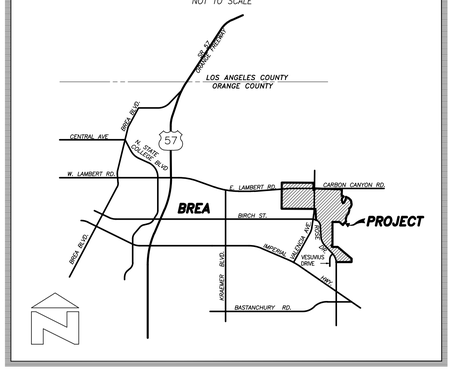


VICINITY MAP

NOT TO SCALE



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- 25 — NODE NUMBER
- A1 / 1.0 — AREA DESIGNATION / AREA ACREAGE (IN ACRES)
- Q_{100}=8.0cfs, t=15.0 — PEAK FLOW RATE / TIME OF CONCENTRATION
- ΣQ_{100}=10.0cfs, t=15.0 — PEAK CONFLUENCE FLOW RATE / TIME OF CONCENTRATION
- D — SOIL GROUP
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED BY:

HUNSAKER & ASSOCIATES
I R V I N E , I N C .
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

BROOKSSTREET
1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - EAST AREA
PROPOSED CONDITION
10-yr STUDY
WITH 2 DETENTION BASINS

WO: 4213-3

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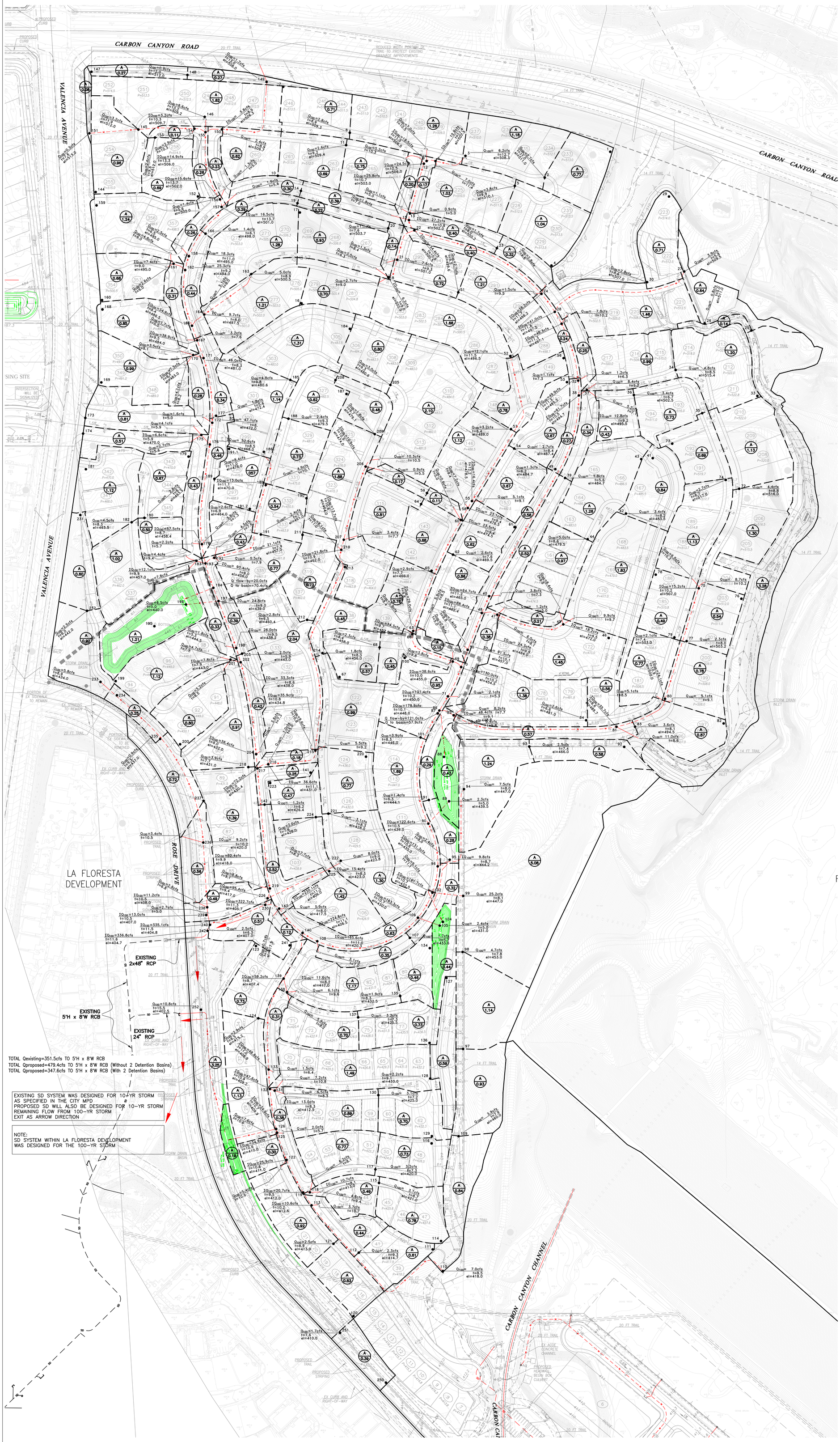

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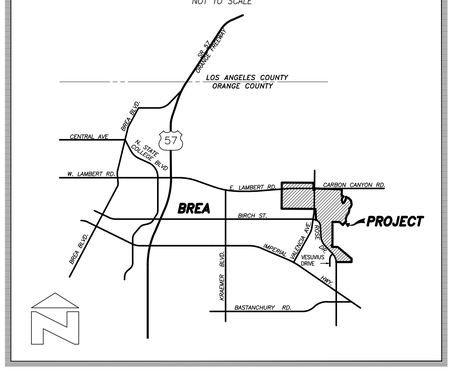

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- D — SOIL GROUP
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- OVER FLOW PATH

1" = 100'

100 50 0 100 300

GRAPHIC SCALE 1"=100'

TOTAL Qexisting=351.5cfs TO 5'H x 8'W RCB
TOTAL Qproposed=479.4cfs TO 5'H x 8'W RCB (Without 2 Detention Basins)
TOTAL Qproposed=347.6cfs TO 5'H x 8'W RCB (With 2 Detention Basins)

EXISTING SD SYSTEM WAS DESIGNED FOR 10-YR STORM AS SPECIFIED IN THE CITY MPD.
PROPOSED SD WILL ALSO BE DESIGNED FOR 10-YR STORM
REMAINING FLOW FROM 100-YR STORM
EXIT AS ARROW DIRECTION

NOTE:
SD SYSTEM WITHIN LA FLORESTA DEVELOPMENT
WAS DESIGNED FOR THE 100-YR STORM

PREPARED BY:
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PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:
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NEWPORT BEACH, CA 92660
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HYDROLOGY MAP
BREA 265 - EAST AREA
PROPOSED CONDITION
100-yr STUDY
WITH 2 DETENTION BASINS

WO: 4213-3

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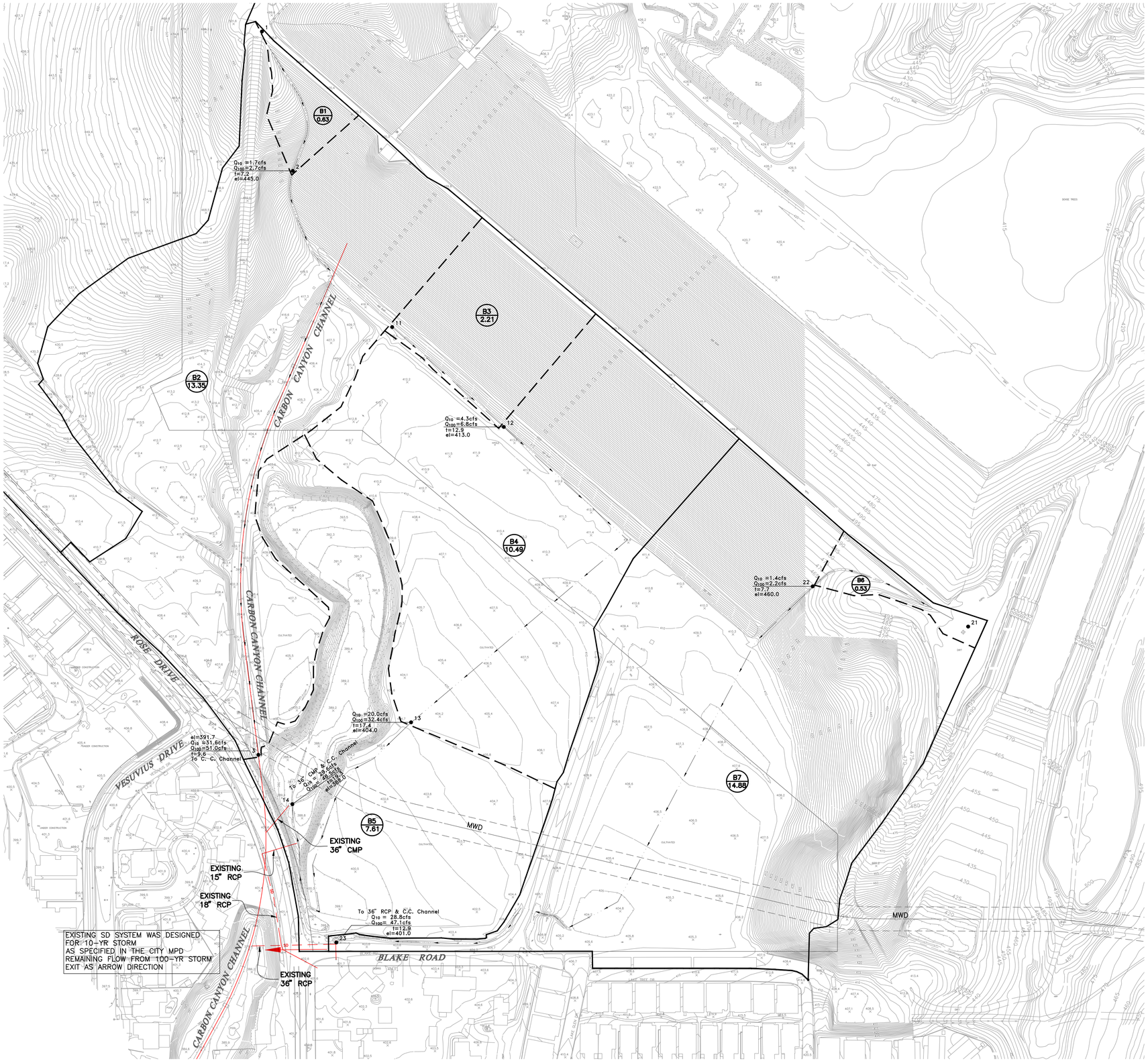

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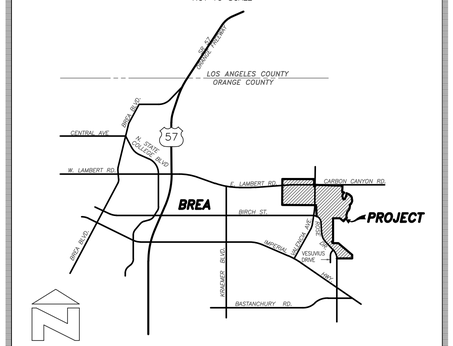

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- D — SOIL GROUP
- OVER FLOW PATH

100 50 0 100 300

GRAPHIC SCALE 1"=100'

PREPARED FOR:

HUNSAKER & ASSOCIATES
IRVINE, INC.
PLANNING ▪ ENGINEERING ▪ SURVEYING
Three Hughes ▪ Irvine, CA 92618 ▪ PH: (949) 583-1010 ▪ FX: (949) 583-0759

PREPARED FOR:

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1300 QUAIL STREET, SUITE 100
NEWPORT BEACH, CA 92660
PH. (949) 833-0222

HYDROLOGY MAP
BREA 265 - SOUTHEAST AREA
EXISTING CONDITION
10-yr & 100-yr STUDY

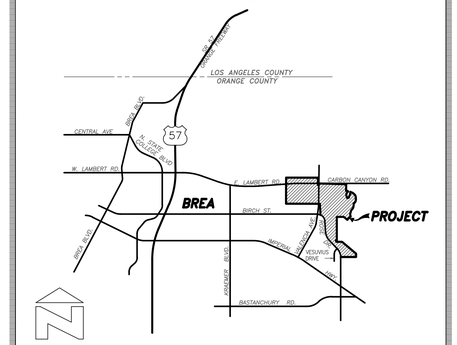
W.O. #4213-3X

F:\0477\Engineering\SY_Hydrology\Brea265-Existing-South-East-10yr.dwg

TOTAL Qexisting = 90.0cfs TO C.C. CHANNEL
TOTAL Qproposed=115.3cfs TO C.C. CHANNEL (Without a Detention Basin)
TOTAL Qproposed= 85.3cfs TO C.C. CHANNEL (With a Detention Basin)

VICINITY MAP

NOT TO SCALE



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100 50 0 100 300

GRAPHIC SCALE 1"=100'

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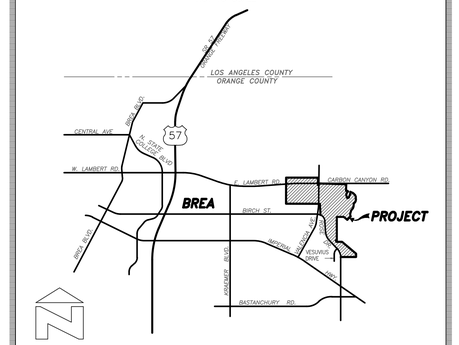
HYDROLOGY MAP
BREA 265 - SOUTHEAST AREA
PROPOSED CONDITION
10-yr STUDY
WITH A FLOW-BY DETENTION BASIN

WO: 4213-3

VICINITY MAP

NOT TO SCALE



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PROPOSED CONDITION
100-yr STUDY
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WO: 4213-3

F:\0477\Engineering\SY_Hydrology\Brea265-Proposed-South-East-With Detention Basin.dwg

SECTION 10

REFERENCES

STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA
T.T. 16934 - REMEDIAL GRADING
CITY OF BREA

STORM DRAIN NOTES:

1. ALL CONCRETE IN REINFORCED CONCRETE STRUCTURES MUST BE 3250 PSI IN 28 DAYS, TYPE V PORTLAND CEMENT CONCRETE, CLASS A.

2. ALL PIPE LENGTHS SHALL BE HORIZONTAL PROJECTIONS UNLESS OTHERWISE SHOWN.

3. SHORING SHALL BE PROVIDED FOR TRENCH EXCAVATIONS IN NATIVE SOIL TO SATISFY STATE OF CALIFORNIA SAFETY REQUIREMENTS.

4. ALL PIPE CONSTRUCTION WITHIN THE FILL AREA MUST BE COORDINATED WITH THE GRADING WORK TO INSURE THAT WHEN THE FILL OPERATION HAS BEEN COMPLETED AT GRADE, THERE IS A MINIMUM OF ONE FOOT ABOVE THE TOP OF PIPE OR TO A MAXIMUM OF FIVE FEET ABOVE THE PROPOSED SUBGRADE OF THE PIPE, THE STORM DRAIN SHALL BE EXCAVATED AND THE PIPE INSTALLED.

5. ALL WORK SHALL CONFORM TO THE ORANGE COUNTY PUBLIC FACILITIES & RESOURCES DEPARTMENT'S (PF&RD) STANDARD SPECIFICATIONS. THESE SPECIFICATIONS, WHICH CAN BE PURCHASED FROM THE COUNTY, SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

6. THE CONTRACTOR MUST NOTIFY THE CITY OF BREA INSPECTOR AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION (714) 990-7689.

7. ALL FILLS SHALL BE COMPACTED TO 90% RELATIVE COMPACTION AS DETERMINED BY THE CALIFORNIA TEST METHOD NO. 216-F, 1963 "FIVE LAYER METHOD". ALL BACKFILL MATERIAL MUST BE FREE OF ORGANIC MATTER.

8. THE CONTRACTOR OR DEVELOPER SHALL PROVIDE ALL SURVEYING REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT. AT THE REQUEST OF THE CITY OF BREA SUFFICIENT REFERENCE STAKING SHALL BE PROVIDED.

9. ALL REINFORCED CONCRETE PIPE SHALL BE BEDDED IN ACCORDANCE WITH PIPE BEDDING DETAIL PER PF&RD STANDARD PLAN 1319.

10. PRIOR TO THE PLACEMENT OF STORM DRAIN IMPROVEMENTS, THE DEVELOPER'S SOIL ENGINEER SHALL CERTIFY IN WRITING TO THE CITY ENGINEER THAT THE STORM DRAIN'S SUBGRADE IS OF ADEQUATE STRENGTH TO SUPPORT THE STRUCTURES AND ANTICIPATED LOADS.

11. PRIOR TO BEGINNING CONSTRUCTION WORK, THE DEVELOPER'S CONTRACTOR SHALL OBTAIN A PERMIT FROM THE STATE DIVISION OF INDUSTRIAL SAFETY. A COPY OF THE PERMIT SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

12. WHEN APPLICABLE, THE DEVELOPER SHALL OBTAIN A PERMIT FROM THE STATE DEPARTMENT OF FISH AND GAME IN ACCORDANCE WITH SECTION 1602 OF THE CALIFORNIA FISH AND GAME CODE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

13. ALL CONTINUOUS STEEL SHALL BE LAPPED A MINIMUM OF 45 BAR DIAMETERS.

14. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4 INCH MINIMUM.

15. A CITY OF BREA ENCROACHMENT PERMIT WILL BE REQUIRED TO PERFORM WORK WITHIN THE PUBLIC RIGHT-OF-WAY. ALL WORK SHALL CONFORM TO THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT.

16. THE LENGTH OF MANHOLE STRUCTURES MAY BE INCREASED TO MEET PIPE ENDS AS LONG AS THE REINFORCING STEEL IS CONTINUED AS REQUIRED. THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE MUST APPROVE ANY CHANGE IN SPUR LOCATION.

17. THE FLOOR OF THE MANHOLE STRUCTURES SHALL BE STEEL TROWELED TO THE SPRING LINE.

18. THE BODY OF THE MANHOLE STRUCTURES, INCLUDING SPUR, MUST BE POURED IN ONE CONTINUOUS OPERATION. A CONSTRUCTION JOINT AT THE SPRING LINE, WITH A LONGITUDINAL KEYWAY, WILL BE PERMITTED.

19. ALL REINFORCING BARS MUST BE SECURELY HELD IN PLACE IN THE FORMS. EACH MAT OF STEEL MUST BE TIE-WIRED TOGETHER TWO WAYS AT ALTERNATE INTERSECTIONS.

20. STORM DRAIN BACKFILL FOR ALL FACILITIES WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PLACED AND COMPACTED IN THE PRESENCE OF THE CITY OF BREA'S PUBLIC WORKS INSPECTOR AND MEET OR EXCEED MINIMUM PF&RD STANDARDS.

21. ALL PIPES SHALL BE BANDED AND GROUTED.

22. ALL AREA DRAIN PIPES SHALL BE:
   A. ACRYLONITRILE BUTADIENE STYRENE (ABS) SOLID WALL PIPE CONFORMING TO ASTM D2751, SDR35;
   B. POLYVINYL CHLORIDE PLASTIC (PVC) PIPE CONFORMING TO ASTM D3034, SDR35;
   C. ASBESTOS CEMENT PIPE CONFORMING TO ASTM C-663; OR
   D. AN APPROVED EQUAL.

23. R.C.P. SHALL COMPLY WITH ALL ASTM APPLICABLE STANDARDS.

24. CONSTRUCTION MATERIALS AND METHODS SHALL BE SUBJECT TO APPROVAL BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

25. CONSTRUCTION HOURS OF OPERATION SHALL BE BETWEEN 7:00AM AND 3:30PM, MONDAY THROUGH FRIDAY. CONSTRUCTION DURING HOURS OTHER THAN THOSE SPECIFIED SHALL REQUIRE A WRITTEN AUTHORIZATION FROM THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.

26. STATE LAW SB 3019 REQUIRES THE CONTRACTOR TO OBTAIN AN IDENTIFICATION NUMBER FROM UNDERGROUND SERVICE ALERT (USA) PRIOR TO THE ISSUANCE OF A CITY ENCROACHMENT PERMIT. THE CONTRACTOR SHALL NOTIFY USA TWO FULL WORKING DAYS (MINIMUM 48 HOURS) PRIOR TO ANY CONSTRUCTION ACTIVITIES, INCLUDING PAVEMENT OVERLAY, EXCAVATION AND ASPHALT CONCRETE OVERLAY, WHICH COULD AFFECT UNDERGROUND UTILITIES.

27. ANY CONTRACTORS OR SUBCONTRACTORS PERFORMING WORK ON THIS PROJECT SHALL FAMILARIZE THEMSELVES WITH THE SITE AND BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM THEIR OPERATIONS, WHETHER OR NOT SUCH FACILITIES ARE SHOWN ON THE PLANS.

28. PRIOR TO BEGINNING ANY CONSTRUCTION, WORK WHICH COULD DAMAGE OR CONFLICT WITH UNDERGROUND STRUCTURES OR UTILITIES, THE CONTRACTOR SHALL EXCAVATE INSPECTION HOLES TO DETERMINE THE LOCATION AND DEPTH OF SAID STRUCTURES AND FACILITIES.

29. PRIOR TO TAKING WATER FROM A FIRE HYDRANT, THE CONTRACTOR SHALL MAKE ARRANGEMENTS TO OBTAIN A HYDRANT WATER METER FROM THE RESPONSIBLE WATER DISTRICT.

30. IF UTILITIES OR OTHER FACILITIES CONFLICT WITH THE PROPOSED IMPROVEMENTS, WORK SHALL STOP AND THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE SHALL BE NOTIFIED IMMEDIATELY.

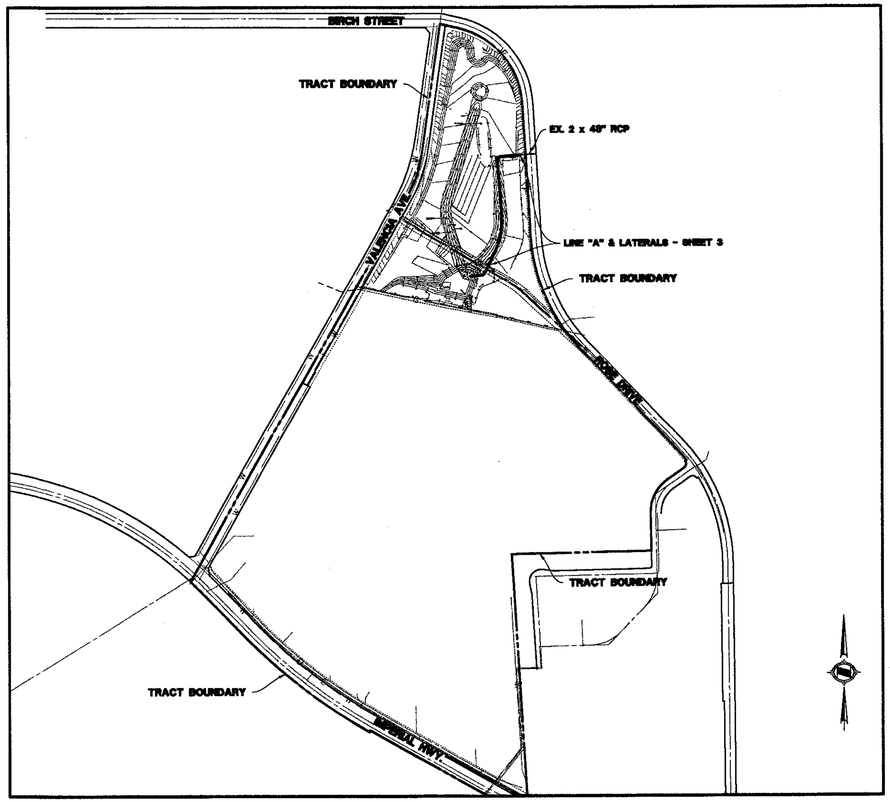
31. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED OR ALTERED EXISTING IMPROVEMENTS WITHIN THE PUBLIC RIGHT-OF-WAY AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

32. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL AT ALL TIMES.

33. SURVEY MONUMENTS SHALL BE PROTECTED AND PERPETUATED IN PLACE. DISTURBED OR COVERED MONUMENTS SHALL BE RESET BY A REGISTERED CIVIL ENGINEER WHO IS AUTHORIZED TO PRACTICE LAND SURVEYING, OR A LICENSED LAND SURVEYOR.

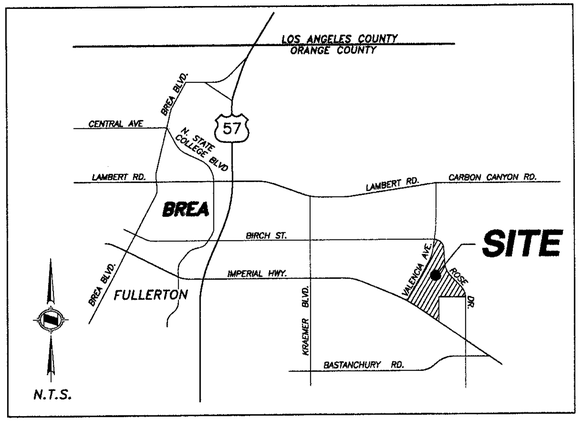
34. IRRIGATION LINES SHALL BE REMOVED, RELOCATED OR RECONSTRUCTED AS SHOWN OR AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE, IN THE FIELD.

35. NEW AND EXISTING MANHOLES AND WATER VALVES SHALL BE ADJUSTED TO FINISHED GRADE.



INDEX MAP
NO SCALE

VICINITY MAP



UTILITIES

CITY OF BREA -----	1 CIVIC CENTER CIRCLE, BREA CA 92821	(714) 990-7600
SEWER & WATER ---	CITY OF BREA	(714) 990-7600
STORM DRAIN ------	COUNTY OF ORANGE	(714) 834-4643
ELECTRIC ---------	SOUTHERN CALIFORNIA EDISON	(714) 870-3231
TELEPHONE -------	PACIFIC BELL TELEPHONE	(714) 666-5588
CABLE T.V. -------	ADELPHIA CABLE	(714) 338-2000
GAS -------------	SOUTHERN CALIFORNIA GAS COMPANY	(714) 422-4133

SHEET INDEX

1- TITLE SHEET, INDEX MAP, NOTES
2- ESTIMATE OF QUANTITIES, DETAILS
3- LINE "A", STA. 10+00.00 TO 18+22.06

STORM DRAIN NOTES: (CONTINUED)

36. PRIOR TO PAVING OF STREET, ALL UTILITIES SHALL BE INSTALLED, TESTED AND APPROVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE APPROPRIATE SERVING UTILITY COMPANY AND VERIFYING THAT THE UTILITY FACILITY IS IN PLACE BEFORE PAVING.

37. TRENCH BACKFILL SHALL BE PROVIDED IN ACCORDANCE WITH THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT OR IN ACCORDANCE WITH APWA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION, AND PER RECOMMENDATION OF THE SOILS ENGINEER.

38. THE CONTRACTOR SHALL NOT ORDER OR PLACE ANY CONCRETE OR ASPHALT CONCRETE PAVING UNTIL THE FORMS AND SUBGRADE OR AGGREGATE BASE HAS BEEN INSPECTED AND APPROVED IN THE FIELD BY THE CITY'S INSPECTOR.

39. THE CONTRACTOR SHALL REMOVE AND REPLACE, IN KIND, A MINIMUM OF ONE FOOT OF EXISTING ASPHALT CONCRETE AND AGGREGATE BASE ADJACENT TO NEWLY CONSTRUCTED CURB AND GUTTER.

40. THE FINAL OR SURFACE LAYER OF ASPHALT CONCRETE SHALL NOT BE PLACED UNTIL ALL ON-SITE IMPROVEMENTS, INCLUDING GRADING HAVE BEEN COMPLETED AND ALL UNACCEPTABLE WORK HAS BEEN CORRECTED, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

41. "AS-BUILT" RECORD DRAWINGS SHALL BE FURNISHED TO THE CITY UPON COMPLETION OF CONSTRUCTION.

42. APPROVAL OF THESE PLANS BY THE CITY OR IT'S AGENTS SHALL NOT RELIEVE THE CONTRACTOR OR THE APPLICANT FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE REVISIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.

UNDERGROUND SERVICE ALERT

CALL BEFORE YOU DIG

Call:Toll FREE
1-800-422-4133
TWO WORKING DAYS
BEFORE YOU DIG

"CAUTION": Remember that the USA Center notifies only those utilities belonging to the center. There could be other utilities present at the work site. The center will inform you of whom they will notify.

MAP DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
10/18/06 BY: RRW
DATE OF THIS PLOT
10/30/06

LEGEND & ABBREVIATIONS

FIRE HYDRANT
STREET LIGHT
FUTURE
EXISTING
S.D. LINE
RIGHT-OF-WAY
SEWER (S)
WATER (W)
STREET NAME SIGN
BUTTERFLY VALVE
TRACT BOUNDARY
TRENCH LIMITS

FS	FINISH SURFACE
TC	TOP OF CURB
FL	FLOW LINE
CL	CENTER LINE
BC	BEGIN CURVE
EC	END CURVE
BCR	BEGIN CURB RETURN
ECR	END CURB RETURN
BVC	BEGIN VERTICAL CURVE
EVC	END VERTICAL CURVE
CB	CATCH BASIN
LF	LINEAR FEET
LS	LUMP SUM
CY	CUBIC YARD
EA	EACH
MH	MANHOLE
JS	JUNCTION STRUCTURE
SF	SQUARE FEET

NOTICE TO CONTRACTOR:

1. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. NO CERTIFICATION IS MADE TO THE ACCURACY OR THOROUGHNESS OF THESE RECORDS. APPROVAL OF THIS PLAN BY THE CITY OF BREA DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF LOCATION OR THE EXISTENCE OF ANY UNDERGROUND UTILITY PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THE OWNER BY ACCEPTING THESE PLANS OR PRECEDING WITH THE IMPROVEMENTS PURSUANT THERETO AGREES TO ASSUME THE LIABILITY AND THE ENGINEER HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED. THE CONTRACTOR IS REQUIRED TO TAKE ALL DUE PRECAUTIONARY MEANS TO PROTECT ALL UTILITY LINES AND STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITY OR STRUCTURES CONCERNED BEFORE STARTING WORK.

2. PURSUANT TO ASSEMBLY BILL 3019, NO EXCAVATION PERMIT IS VALID UNLESS UNDERGROUND SERVICE ALERT HAS BEEN CONTACTED AND HAS PROVIDED INQUIRY I.D. NUMBER.

3. CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

4. PRIOR TO THE CONSTRUCTION OF ANY CONCRETE STRUCTURE, THE CONTRACTOR SHALL VERIFY WITH THE SOILS ENGINEER THE TYPE OF CONCRETE RECOMMENDED.

5. UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, ANY UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

6. CONTRACTOR AGREES THAT IN ACCORDANCE WITH THE GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL ASSUME THE SOLE AND COMPLETE RESPONSIBILITY FOR SITE CONDITIONS DURING THE COURSE AND CONSTRUCTION OF THIS PROJECT, INCLUDING THE SAFETY OF ALL PERSON AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, ENGINEER AND THE CITY OF BREA HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT. EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, ENGINEERING OR CITY OF BREA.

BENCHMARK: OCS BM: 2C - 88 - 70
150 FT. SOUTHWEST ALONG VALENCIA AVENUE FROM THE CROSSING OF THE SOUTHERN PACIFIC RAILWAY TO THE INTERSECTION OF DATE STREET; 81 FT. SOUTHEAST OF THE CENTERLINE OF VALENCIA AVENUE, 21 FT. NORTHEAST OF THE CENTERLINE OF DATE STREET, SET IN THE TOP OF THE SOUTHWEST CORNER OF A 5 FT. BY 5 FT. CONCRETE CATCH BASIN, LEVEL WITH THE SIDEWALK.
ELEVATION = 377.210 NGVD 29 / 1995 OCS ADJUSTMENT

BASIS OF BEARINGS:
THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN OCS HORIZONTAL CONTROL STATION CPS NO. 517081 AND STATION CPS NO. 517841, BEING N24°02'56"E PER RECORDS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

OWNER/DEVELOPER:
CHEVRON LAND & DEVELOPMENT COMPANY
2929 Imperial Highway, Suite 200
Brea, California 92821
Phone:(714) 577-1372
Fax:(714) 577-1377

SOIL FIRM:
Alba-Keefe & Associates, Inc.
1403 N. BATAVIA STREET, SUITE 115
ORANGE, CA 92867
(714)755-1355 FAX (714)755-1366

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
PH: (949) 583-1010 FX: (949) 583-0759

EDWARD A. MANDICH
R.C.E. 59089
11-8-06
DATE
EXP. DATE 06/30/07

REGISTERED PROFESSIONAL ENGINEER
EDWARD A. MANDICH
No. 59089
Exp. 06/30/07
CIVIL
STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
CITY ENGINEER TONY OLMOS
RCE 56814
11/8/06
DATE

PLAN SCALE
1"=40'
(OR AS SHOWN)
PROFILE SCALE
1"=40' HORIZ.
1"=8' VERT.
(OR AS SHOWN)
DRAWN BY: T.T.
DESIGN BY: T.T.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT PLANS - LA FLORESTA
T.T. 16934 - REMEDIAL GRADING
TITLE SHEET, INDEX MAP, NOTES
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO.
1 OF 3

K-1389

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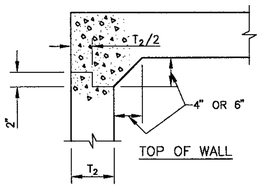
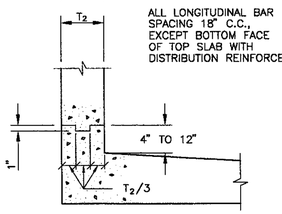
W.O. 0433-357 DW DOC. NO. 70959
STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA TRACT 16934 CITY OF BREA

BOX SECTION		A	B	Upstream T.S. C-C
Design Cover		10'	18'	8'
Width	W	8'-0"	8'-0"	10'-0"
Height	H	5'-0"	5'-0"	4'-0"
Top Slab Thickness	T_1	10"	13.25"	10.50"
Side Wall Thickness	T_2	8"	9.5"	9"
Bottom Slab Thickness	T_3	10.5"	14"	11.25"
B Bars	Bar No. & Spacing	#9@20"	#9@15"	#9@20"
	Length	9'-1"	9'-4"	11'-3"
B_1 Bars	Bar No. & Spacing	#5@20"	#4@15"	#6@20"
	Length	5'-3"	5'-6"	6'-6"
C Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Horiz. Length	3'-8.5"	3'-10"	4'-4"
	Vert. Length	5'-3"	5'-7"	4'-4"
C_1 Bars	Bar No. & Spacing	#4@14"	#4@13"	#5@13"
	Horiz. Length	1'-5"	3'-10"	1'-10"
	Vert. Length	2'-11"	1'-10"	4'-4"
C_2 Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Horiz. Length	3'-9"	3'-10"	4'-4"
	Vert. Length	3'-0"	3'-4"	3'-1"
C_3 Bars	Bar No. & Spacing	#4@14"	#4@13"	#5@13"
	Horiz. Length	1'-4"	3'-10"	1'-10"
	Vert. Length	2'-7"	2'-7"	2'-8"
D Bars	Bar No. & Spacing	#4@18"	#4@18"	#4@18"
	Length	6'-6"	7'-0"	5'-7"
F Bars	Bar No. & Spacing	#8@14"	#8@11"	#9@16"
	Length	9'-1"	9'-4"	11'-3"
F_1 Bars	Bar No. & Spacing	#4@14"	#4@11"	#4@16"
	Length	5'-4"	5'-9"	5'-8"
G Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Length	4'-0"	4'-0"	5'-0"
H Bars	Bar No. & Spacing	#4@14"	#4@13"	#4@13"
	Length	4'-0"	4'-0"	5'-0"

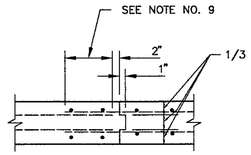
NUMBER OF LONGITUDINAL REINFORCEMENT #4 BARS			
Top Slab (Includes Distrb.)	15	15	17
Bottom Slab	15	15	17
Side Walls	12	12	8
TOTAL	42	42	42



TOP OF WALL



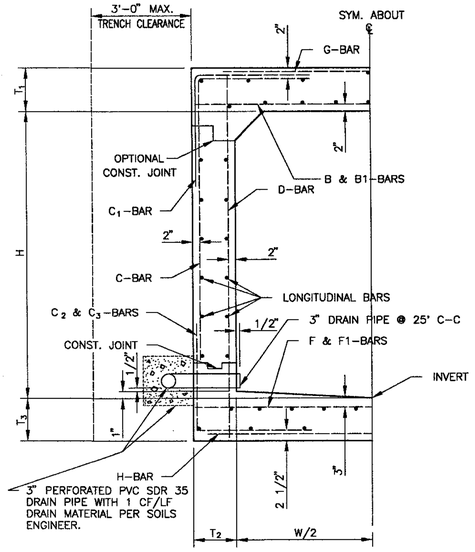
BASE OF WALL



TRANSVERSE JOINT

CONSTRUCTION JOINT DETAILS

NO SCALE



TYPICAL R.C. BOX SECTION

NO SCALE

DESIGN DATA:

LIVE LOAD:
HS20-44 UNLESS OTHERWISE NOTED

DEAD LOAD:
EARTH LOAD PER MARSTON'S FORMULA: W = 130 p.c.f.
Ku = Ku' = 0.150
Bd = OUTSIDE WIDTH OF BOX PLUS 3 FEET
SIDE EARTH 36 p.s.f. PER FOOT OF DEPTH
INTERNAL WATER PRESSURE : 62.4 p.s.f. PER FOOT OF DEPTH
WEIGHT OF CONCRETE : 150 p.s.f.

ALLOWABLE STRESSES:
f'_c = 3250 p.s.i. AT 28 DAYS
f_c = 1462 p.s.i.
f_s = 24,000 p.s.i.
n = 8
SHEAR AND BOND STRESSES PER CURRENT A.C.I. 318-05

R.C. BOX STRUCTURE

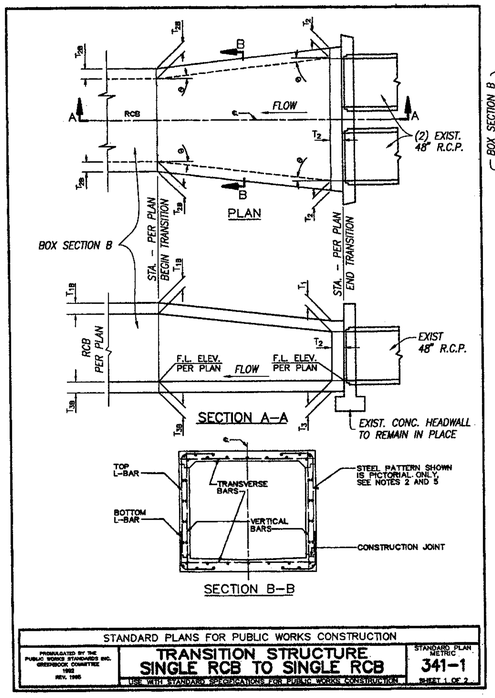
R.C. BOX STRUCTURAL NOTES

1. DIMENSIONS FROM FACE OF CONCRETE TO STEEL SHALL BE 2" CLEAR, UNLESS OTHERWISE SHOWN.
2. CONCRETE DIMENSIONS SHALL BE MEASURED HORIZONTALLY OR VERTICALLY ON THE PROFILE, AND PARALLEL TO OR AT RIGHT ANGLES (OR RADIALLY) TO CENTERLINE OF CONDUIT ON THE PLAN EXCEPT AS OTHERWISE SHOWN.
3. ALL BAR BENDS AND HOOKS SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", 1971 EDITION, SECTION 7.1.
4. PLACING OF REINFORCEMENT SHALL CONFORM TO THE AMERICAN CONCRETE INSTITUTE'S "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", 1971 EDITION, SECTION 7.3.
5. TRANSVERSE CONSTRUCTION JOINTS SHALL NOT BE PLACED WITHIN 30 INCHES OF MANHOLE OR JUNCTION STRUCTURE OPENINGS.
6. TRANSVERSE CONSTRUCTION JOINTS IN WALLS AND SLABS SHALL BE IN THE SAME PLANE. NO STAGGERING OF JOINTS WILL BE PERMITTED. TRANSVERSE CONSTRUCTION JOINTS SHALL BE NORMAL OR RADIAL TO THE CENTERLINE OF CONSTRUCTION.
7. THE TRANSVERSE REINFORCING STEEL SHALL TERMINATE ONE AND ONE HALF INCHES FROM THE CONCRETE SURFACES UNLESS OTHERWISE SHOWN ON THE STRUCTURAL DETAILS.
8. EXPOSED EDGES OF CONCRETE MEMBERS SHALL BE ROUNDED OR BEVELED.
9. NO SPLICES IN TRANSVERSE STEEL REINFORCEMENT WILL BE PERMITTED OTHER THAN SHOWN ON THE DRAWING WITHOUT APPROVAL OF THE ENGINEER. NO MORE THAN TWO SPLICES WILL BE PERMITTED IN ANY LONGITUDINAL BAR BETWEEN TRANSVERSE JOINTS. SPLICES SHALL BE STAGGERED.
10. REINFORCING BARS #8 OR SMALLER SHALL BE LAPPED AT LEAST 45 BAR DIAMETERS OF THE SMALLER BAR, #9 OR LARGER SHALL BE LAPPED 60 BAR DIAMETERS AT SPLICES.
11. LONGITUDINAL STEEL SHALL BE CONTINUOUS AND EXTEND THROUGH ALL TRANSVERSE CONSTRUCTION JOINTS.
12. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, TRANSVERSE CONSTRUCTION JOINTS (IN SLABS AND WALLS), SHALL BE PLACED AT THE END OF EACH POUR, BUT THE SPACING THEREOF SHALL NOT EXCEED 50 FEET OR BE LESS THAN 10 FEET.
13. UNLESS OTHERWISE SHOWN ON THE DETAILS, IN CURVED SECTIONS TRANSVERSE BARS SHALL BE PLACED RADIALLY. THE SPACING OF STRAIGHT TRANSVERSE BARS IN THE TOP AND BOTTOM SLABS SHALL BE MEASURED AT THE CENTERLINE OF CONSTRUCTION. THE SPACING OF STRAIGHT BARS AND L-BARS IN WALLS SHALL BE MEASURED BETWEEN THE VERTICAL LEGS OF BARS.
14. AT THE BEGINNING AND ENDING OF ALL POURS, A CURTAIN OF REINFORCEMENT COMPOSED OF B, C, C2, D, F, G AND H BARS SHALL BE PLACED THREE INCHES FROM THE TRANSVERSE CONSTRUCTION JOINT.
15. D-BARS MAY BE SPLICED 45 BAR DIAMETERS AT THE LOWER LONGITUDINAL CONSTRUCTION JOINT, AT CONTRACTOR'S OPTION, AND PER NOTE 10 ABOVE.
16. IN ALL SECTIONS LAP C AND C2 BARS. THE VERTICAL LENGTH OF C AND C2 HAS BEEN CALCULATED FOR A FOUR INCH STARTER WALL. IF THE HEIGHT OF THE STARTER WALL IS VARIED, THE VERTICAL LENGTH OF THE C AND C2 BARS SHALL BE VARIED CORRESPONDINGLY SO AS TO MAINTAIN A 45 DIAMETER LAP BETWEEN THE TWO BARS. THE LAPS SHALL BE BASED ON THE SMALLER BAR.

NOTES

1. THE HORIZONTAL ANGLE OF DIVERGENCE OR CONVERGENCE, θ, SHALL NOT EXCEED 5° 45'.
2. THE REINFORCING STEEL BAR SIZE, SPACING AND COVER OVER THE STEEL OF STRAIGHT TRANSVERSE BARS IN TOP AND BOTTOM SLABS, OF L-BARS IN TOP AND BOTTOM CORNERS, OF STRAIGHT VERTICAL BARS IN SIDEWALLS AND/OR LONGITUDINAL DISTRIBUTION AND TIE BARS IN TOP OR BOTTOM SLABS OR SIDE WALLS SHALL BE THOSE OF WHICHEVER ADJOINING RCB SECTION PROVIDES THE GREATER STEEL AREA FOR EACH TYPE OF BAR AND GREATEST COVER. THE BAR LENGTHS SHALL VARY UNIFORMLY THROUGHOUT THE TRANSITION.
3. THE THICKNESS OF THE WALLS AND SLABS SHALL BE THOSE OF THE ADJOINING RCB SECTION AT EACH END OF THE TRANSITION AND SHALL VARY UNIFORMLY BETWEEN THE TWO ENDS.
4. f'_c = 28 MPa (4000 PSI) AT 28 DAYS AND THE CONCRETE SHALL BE THE SAME MIX AS THE ADJACENT RCB.
5. ALL STEEL EXCEPT LONGITUDINAL STEEL SHALL BE GRADE 400 (60) BILLET STEEL CONFORMING TO ASTM A 615 M (A 615) AND SHALL TERMINATE 40 mm (1 1/2") CLEAR OF CONCRETE SURFACE UNLESS OTHERWISE SHOWN.
6. THE TRANSITION STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STRUCTURAL NOTES APPLYING TO RCB STRUCTURES SHOWN ON THE PLANS.
7. DETAILS OF CONSTRUCTION JOINTS AND KEYWAYS SHALL BE AS SHOWN ON THE PLANS FOR SINGLE RCB STRUCTURES.

STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION
TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB
STANDARD PLAN METRIC 341-1 SHEET 2 OF 2



STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION
PROMULGATED BY THE PUBLIC WORKS STANDARDS INC. GREENBOOK COMMITTEE REV. 1995
TRANSITION STRUCTURE SINGLE RCB TO SINGLE RCB
STANDARD PLAN METRIC 341-1 SHEET 1 OF 2
USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

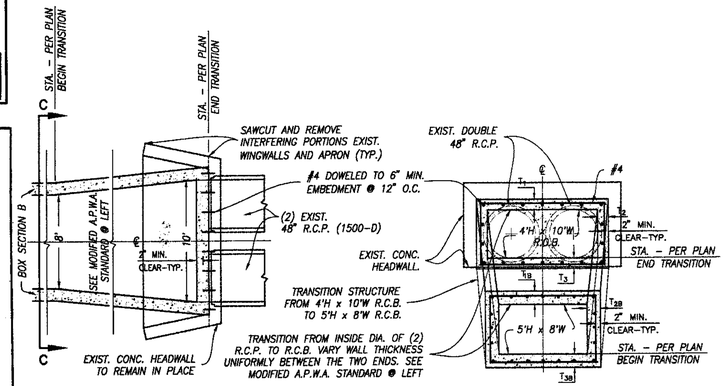
102 MODIFIED A.P.W.A. STANDARD PLAN
N.T.S.

ESTIMATE OF QUANTITIES

NO.	DESCRIPTION	QUANTITIES TOTAL	UNITS
79	INST. 90° C.S.P. 16 GA. 5"X1" CORRUGATIONS	89	L.F.
81	INST. 24" R.C.P. (SEE PROFILE FOR D-LOAD)	12	L.F.
93	CONST. J.S. TYPE V PER RDMD STD. PLAN 1314	3	EA.
99	CONST. BRICK & MORTAR PLUG	3	EA
100	INST. 5'H X 8'W REINFORCED CONCRETE BOX STRUCTURE PER DETAIL ON SHEET NO. 2	785	L.F.
101	CONST. TRANSITION STRUCTURE PER APWA 342-1	1	EA.
102	CONST. TRANSITION STRUCTURE PER APWA 341-1 MODIFIED – PER DETAILS ON SHEET NO. 2	1	EA.
103	CONST. REINFORCED CONCRETE BOX MANHOLE PER RDMD STD. PLAN 1506	2	EA.

QUANTITIES BASED ON PLANS DATED 08/07/06

QUANTITIES SHOWN ARE FOR BONDING PURPOSES ONLY. THE CONTRACTORS SHALL BE RESPONSIBLE FOR THEIR OWN ESTIMATE FOR BIDDING PURPOSES AND SHALL BID THE JOB COMPLETE. THE CONTRACTORS SHALL ALSO ADVISE THE OWNER AND ENGINEER OF ANY APPARENT DISCREPANCIES IN THE ESTIMATE.



SECT. C–C

Ø = 5°42'38"
T_{1B} = 13.25" T_1 = 10.50"
T_{2B} = 9.50" T_2 = 9.00"
T_{3B} = 14.00" T_3 = 11.25"

CONCRETE REMOVAL NOTES:
1) *CONCRETE SHALL BE REMOVED USING HAND OPERATED EQUIPMENT TAKING CARE NOT TO DAMAGE THE REMAINING PORTION OF THE EXISTING STRUCTURE, THE CITY INSPECTOR SHALL BE THE SOLE JUDGE OF THE KIND OF EQUIPMENT USED IN THE CONCRETE REMOVAL OPERATION.*
2) *ANY SAWCUTS OR IRREGULARITIES IN THE SURFACES OF THE REMAINING WALL OR JOINT SHALL BE FILLED WITH AN EPOXY GROUT MIXTURE TO OBTAIN A SMOOTH PLANE SURFACE.*
3) *ALL EPOXY USED SHALL BE A COMMERCIAL QUALITY, TWO COMPONENT MIXTURE, SPECIALLY MANUFACTURED FOR THE INTENDED PURPOSES AND APPLIED PER MANUFACTURER'S DIRECTIONS.*

102 MODIFIED TRANSITION STRUCTURE
N.T.S.

MAP DATE IDENTIFIER
DATE OF LATEST CHANGE TO THIS MAP
11/07/06 BY: HTC
DATE OF THIS PLOT
11/07/06

BENCHMARK: *OCS BM: 2C – 88 – 70*
150 FT. SOUTHWEST ALONG VALENCIA AVENUE FROM THE CROSSING OF THE SOUTHERN PACIFIC RAILWAY TO THE INTERSECTION OF DATE STREET; 81 FT. SOUTHEAST OF THE CENTERLINE OF VALENCIA AVENUE, 21 FT. NORTHEAST OF THE CENTERLINE OF DATE STREET, SET IN THE TOP OF THE SOUTHWEST CORNER OF A 5 FT. BY 6 FT. CONCRETE CATCH BASIN, LEVEL WITH THE SIDEWALK.
ELEVATION = 377.210 NGVD 29 / 1995 OCS ADJUSTMENT

BASIS OF BEARINGS:
THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN OCS HORIZONTAL CONTROL STATION OPS NO. 517B81 AND STATION OPS NO. 517B91, BEING N24° 07'56"E PER RECORDS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

OWNER/DEVELOPER:
CHEVRON LAND & DEVELOPMENT COMPANY
2929 Imperial Highway, Suite 200
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Phone:(714) 577-1372
Fax:(714) 577-1377

SOIL FIRM:
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Three Hughes • Irvine, CA 92618
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EDWARD A. MANOUCH R.C.E. 59089 DATE
11-8-06
EXP. DATE 06/30/07

REGISTERED PROFESSIONAL ENGINEER EDWARD A. MANOUCH No. 59089 Exp. 06/30/07 CIVIL STATE OF CALIFORNIA

REVISIONS			
DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
CITY ENGINEER RCE 56214 11/7/06 DATE
TONY OLMOS

PLAN SCALE
1"=40' (OR AS SHOWN)
PROFILE SCALE
1"=40' HORIZ.
1"=8' VERT. (OR AS SHOWN)
DRAWN BY: T.T.
DESIGN BY: T.T.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT PLANS - LA FLORESTA
T.T. 16934 - REMEDIAL GRADING
ESTIMATE OF QUANTITIES, DETAILS
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.
SHEET NO. 2 OF 3

K-1390

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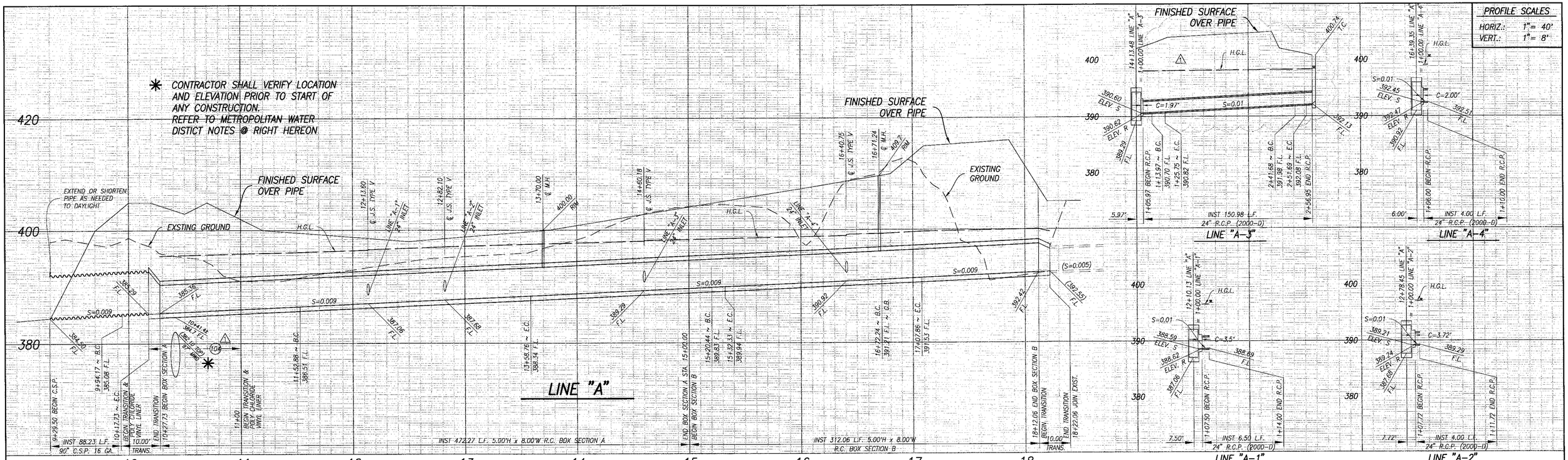
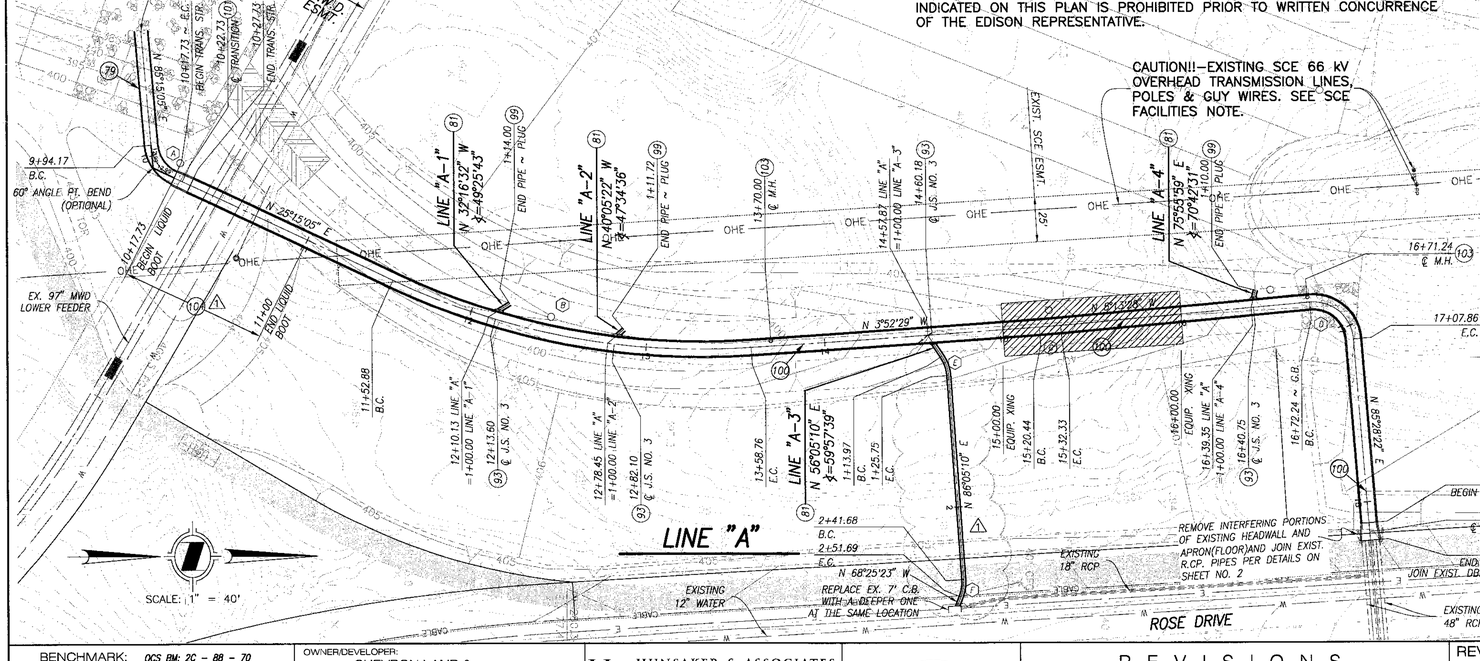
DOC. NO. 70959
RM
W.O. 0433-351 BIN
STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA TRACT 16934 CITY OF BREA





SOUTHERN CALIFORNIA EDISON FACILITIES NOTE:

ALL GRADING AND\OR STORM DRAIN CONSTRUCTION OPERATIONS WITHIN 25' FEET OF ANY EXISTING SOUTHERN CALIFORNIA EDISON OVERHEAD LINE INDICATED ON THIS PLAN IS PROHIBITED PRIOR TO WRITTEN CONCURRENCE OF THE EDISON REPRESENTATIVE.

METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA NOTES:

A. A LIST OF ALL SPECIFICATIONS FOR ALL CONSTRUCTION EQUIPTMENT TO BE USED OVER M.W.D. PIPELINES MUST BE SUBMITTED TO M.W.D. FOR REVIEW AND APPROVAL AT LEAST TWO WEEKS PRIOR TO THEIR USE.

B. NOTIFY MR. RICK BICKER OR MR. TIM HATCH OF M.W.D. OPERATIONS MAINTENANCE BRANCH, TELEPHONE (714) 577-5084, AT LEAST TWO WORKING DAYS (MONDAY-THURSDAY) PRIOR TO STARTING ANY WORK IN THE VICINITY OF ANY M.W.D. FACILITIES.

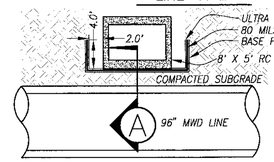
CONSTRUCTION NOTES

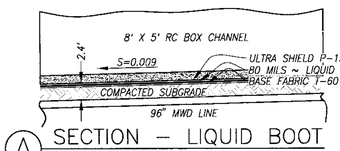
(79) INST. 90" CSP 16 GA. 5"X1" CORRUGATIONS
(81) INST. 24" R.C.P. (SEE PROFILE FOR D-LOAD)
(93) CONST. J.S. TYPE V PER RDMD STD. PLAN 1314
(99) CONST. BRICK AND MORTAR PLUG
(100) INST. 5.00'H x 8.00'W R.C. BOX PER DETAIL ON SHEET NO. 2
(101) CONST. TRANSITION STRUCTURE PER APWA 342-1
(102) CONST. TRANSITION STRUCTURE PER APWA 341-1 (MODIFIED) JOIN RCB TO EXIST. DOUBLE PIPE PER DETAIL - SHEET NO. 2
(103) CONST. REINFORCED CONCRETE BOX MANHOLE PER RDMD STD. PLAN 1506
(104) INSTALL "LIQUID BOOT" WATERPROOF MEMBRANE OR APPROVED EQUAL - TO THE SATISFACTION OF M.W.D.

CURVE DATA

	BEARING/DELTA	RADIUS	LENGTH	TANGENT
(A)	60°00'00"	22.50'	23.56'	12.99'
(B)	29°07'34"	405.00'	205.88'	105.21'
(C)	01°20'59"	505.00'	11.90'	5.95'
(D)	90°41'51"	22.50'	35.61'	22.77'
(E)	30°00'00"	22.50'	11.78'	6.03'
(F)	25°29'27"	22.50'	10.01'	5.09'

NOTE TO CONTRACTOR:
EQUIPMENT CROSSING SHALL OCCUR ONLY AT THIS LOCATION WITH MIN. SOIL COVER OF 3'





(A) SECTION - LIQUID BOOT
NTS

(104) DETAIL - LIQUID BOOT
NTS

HYDRAULIC DATA

LINE	STA to STA	Q_{100}	DIA	So	n	Fr	Dn	Vn
"A"	9+29.50 10+17.73	401.9	90"	0.0090	0.024	---	FULL	---
			WIDTH					
"A"	10+27.73 12+13.60	401.9	8'	0.0090	0.014	1.45	3.35	15.02
"A"	12+13.60 12+82.10	393.8	8'	0.0090	0.014	1.45	3.30	14.94
"A"	12+82.10 14+60.18	391.7	8'	0.0090	0.014	1.45	3.28	14.92
"A"	14+60.18 16+40.75	383.3	8'	0.0090	0.014	1.45	3.23	14.83
"A"	16+40.75 18+12.06	365.1	8'	0.0090	0.014	1.46	3.12	14.63
			DIA					
"A-1"	---	12.5	24"	0.0100	0.013	---	1.06	7.38
"A-2"	---	3.3	24"	0.0100	0.013	---	0.52	5.14
"A-3"	---	8.7	24"	0.0100	0.013	---	0.86	6.73
"A-4"	---	26.6	24"	0.0100	0.013	---	FULL	---

BENCHMARK: OCS BM: 2C - 88 - 70
150 FT. SOUTHWEST ALONG VALENCIA AVENUE FROM THE CROSSING OF THE SOUTHERN PACIFIC RAILWAY TO THE INTERSECTION OF DATE STREET; 81 FT. SOUTHEAST OF THE CENTERLINE OF VALENCIA AVENUE, 21 FT. NORTHEAST OF THE CENTERLINE OF DATE STREET, SET IN THE TOP OF THE SOUTHWEST CORNER OF A 5 FT. BY 6 FT. CONCRETE CATCH BASIN, LEVEL WITH THE SIDEWALK.
ELEVATION = 377.210 NGVD 29 / 1995 OCS ADJUSTMENT

BASIS OF BEARINGS:
THE BEARINGS SHOWN HEREON ARE BASED ON THE BEARING BETWEEN OCS HORIZONTAL CONTROL STATION CPS NO. 517861 AND STATION CPS NO. 517681, BEING N24°02'54"E PER RECORDS ON FILE IN THE OFFICE OF THE ORANGE COUNTY SURVEYOR.

OWNER/DEVELOPER:
CHEVRON LAND & DEVELOPMENT COMPANY
145 S. State College Blvd., 4th Floor
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Phone:(714) 671-3534
Fax:(714) 671-3446

SOIL FIRM:
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REGISTERED PROFESSIONAL ENGINEER EDWARD A. MANOICH No. 59089 Exp. 06/30/07 CIVIL STATE OF CALIFORNIA

EDWARD A. MANOICH R.C.E. 59089 DATE EXP. DATE 06/30/07

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
1	T.T.	REVISED LINE 'A-3', ADDED CB IN ROSE DR.	
2		LIQUID BOOT LINER - CONST. NOTE NO. 104	

REVIEWED BY:

CITY ENGINEER TONY OLMOS RCE NO. EXP. 6/30/07 DATE

PLAN SCALE 1"=40' (OR AS SHOWN)
PROFILE SCALE 1"=40' HORIZ. 1"=8' VERT. (OR AS SHOWN)
DRAWN BY: T.T.
DESIGN BY: T.T.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT PLANS - LA FLORESTA

T.T. 16934 - REMEDIAL GRADING

LINE "A" FROM STA. 10+00.00 TO 18+21.47 & LATERALS

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO. 3 OF 3

W.O. 0433-1ST
BM: RM
DOC. NO. 7045
STORM DRAIN IMPROVEMENT PLANS FOR LA FLORESTA TRACT 16934 CITY OF BREA

K-1391

2/20/2007

14 May 1958
Prev. edition is obsolete

Army C of E – Los Angeles

Project: Carbon Canyon Channel	HYDRAULIC DESIGN SUMMARY OF PERTINENT DATA	Sheet 1 of 2	Date 4 Nov. 1963
Locality: Orange Co., Calif.	Referenced Drawings	By E.G.C.	Checked by

Station	Hydraulic elements	℄ slope	D_n	D_c	V	℄ Invert Elev.	Wall ht.-ft.	S.E. ft.	F.B. ft.	REMARKS
7+64 =	4.75 rect.									End of outlet conduit and
389+05.70	Transition		Varies	7.14	30.1	400.56	9.00		1.86	beginning of open channel
388+25.70				3.31	31.8		5.50		2.19	
387+69.20				5.48	29.9		5.59		2.11	
387+26				3.59	28.8		5.66		2.07	℄ Foot bridge
387+04.10				3.65	25.3		5.70		2.05	
386+86				3.70	27.9		5.73		2.03	Gaging station (right wall)
386+64.14				3.76	27.5		5.76		2.00	S.T.
386+19				3.88	26.6		5.83	.18	1.86	
386+14.14				3.89	26.5		5.84	.20	1.85	C.S. – R = 948.00'
385+70±		.010000	5.09	3.99	25.8		5.91	.20	1.82	30" gas line (over channel)
384+98				4.15	24.6		6.03	.20	1.78	
383+80				4.38	23.3		6.22	.20	1.74	Overflow apron (right wall)
382+95				4.55	22.4		6.36	.20	1.71	
381+60.35	10			4.70	21.7		6.58	.20	1.78	S.C. – R = 948.00'
381+45.83				4.72	21.6		6.60	.14	1.61	℄ Rose Drive
381+10.35	Q = 1,000			4.76	21.5		6.60		1.84	T.S.
380+00±	n = .014			4.88	20.8		6.84		1.96	3" waste water line (over ch.)
379+65±	d_c = 6.75			4.92	20.6		6.89		1.97	96" M.W.D. water line (under ch.)
379+00		Varies	Varies	4.99	20.3	390.50	7.00		2.01	E.V.C. Grade Change
378+95.09		.500000	1.59	4.44	22.9	381.75	6.81±		2.41±	B.V.C.
378+90.88		Varies	Varies	3.91	26.3	387.14	6.6±		2.71±	E.V.C.
378+77.04				3.44	30.3	383.70	6.00		2.56	B.V.C. Grade Change
378+43.19				3.51	29.6		6.07		2.56	S.T.
377+93.19				3.62	28.7		6.18	.28	2.42	C.S. – R = 767.00'
377+90.20			4.48	3.63	28.6		6.18	.28	2.41	
376+64.40				3.86	26.7		6.45	.28	2.45	
375+00		.014000		4.11	24.9		6.79	.28	2.54	Pipe lines – 2" and 8" (over ch.)
373+00				4.11	24.7		6.77	.28	2.34	
375+00				4.63	24.3		6.79	.28	2.02	Equal energy
374+40±	10			4.67	24.1		6.92	.28	2.11	1" pipe line (over channel)
373+95±	Q = 1100		4.82	4.69	24.0		7.02	.28	2.19	4' Foot bridge
373+60.13	n = .014			4.71	23.9		7.13	.28	2.28	S.C. – R = 767.00'
373+10.13	d_c = 7.2			4.74	23.7		7.30		2.56	T.S.
372+50				4.78	25.5	374.97	7.50		2.72	Grade Change
372+25	Transition	.008000	Varies	4.03	24.2		7.50		3.47	

K-1392

SPL Form 38
14 May 1958
Army C of E - Los Angeles
Previous edition is obsolete.

Project: Carbon Canyon Channel | HYDRAULIC DESIGN SUMMARY OF PERTINENT DATA | Sheet 2 of 2 | Date 6 Nov. 1963
Locality: Orange Co., Calif. | Referenced Drawings | By E.G.C. | Checked by

Station	Hydraulic elements	℄ slope	D_n	D_1	V	℄ Invert Elev.	Wall ht.-ft.	S.E. ft.	F.B. ft.	REMARKS
372+25				4.03	24.2		7.50		3.47	
371+62.56	11.5			4.18	23.4		7.50		3.32	S.T.
371+12.56				4.30	22.8		7.50	.18	3.11	C.S. - R= 948.00'
370+77	Q=1100			4.38	22.3		7.50	.18	3.03	
370+70	n=.014	.008000	5.14	4.39	22.2		7.50	.18	3.02	Overflow apron (right wall)
369+18.22	dc=6.55			4.65	21.0		7.50	.18	2.76	S.C. - R= 948.00'
368+68.22				4.73	20.6		7.50		2.77	T.S.
367+97				4.85	20.0		7.50		2.65	
365+00	Transition		Varies	5.10	19.0	368.79	7.00		1.90	Grade change
364+60	14.0 rect, n=.014			3.78	21.2		6.50		2.72	
364+00	Q=1100 dc=5.73		3.71	3.79	21.2		7.00		3.21	Equal energy Q=1100 c.f.s.
364+00	See		3.95	4.26	20.4		7.00		2.74	dc=6.08, 14.0' rect, Q=1200 c.f.s.
363+00	Remarks		4.19	4.66	20.2		8.00		3.34	dc=6.42, 14.0' rect, Q=1300 c.f.s.
361+00				5.41	20.0		8.62		3.21	
359+79	14.0' rect			4.58	20.2		9.00		4.42	Overflow apron (right wall)
359+61.18	Q=1500		4.62	4.46	20.2		9.05		4.59	S.T.
359+11.18	n=.014	.012000		4.12	20.3		9.21	.42	4.88	C.S. - R= 450.00'
359+00	dc=7.06			4.04	20.3		9.24	.42	4.99	
357+80	14.0 rect, n=.014		5.07	5.57	20.6		9.61	.42	3.83	Overflow apron (left wall)
357+00	Q=1700 dc=7.70			6.60	20.8		9.86	.42	3.05	
356+09.47	14.0 rect, n=.014		5.50	6.81	21.1		10.00	.42	2.98	℄ Imperial Hwy.
356+00	Q=1900 dc=8.28			6.83	21.1		10.00	.42	2.96	Q=2000 c.f.s.
355+83.31				6.78	21.3		10.00	.42	3.01	S.C. - R= 450.00'
355+73.08			5.71	6.75	21.4		10.00	.33	3.08	℄ P.E. R.R.
355+33.31	14'			6.63	21.8		10.00		3.37	T.S.
354+75				6.46	22.4	356.69	10.00		3.54	Grade change
353+56	Q=2000			6.52	22.2		9.47		2.95	
353+30	n=.014			6.52	22.2		7.26		2.67	Overflow apron (left wall)
350+44	dc=8.60			6.53	22.0		9.00		2.42	
348+80		.002280		6.53	22.0		9.00		2.42	5" pipe line (over channel)
348+60			6.54	6.58	22.0		9.00		2.42	3" pipe line (over channel)
348+55				6.58	22.0		9.00		2.42	4" pipe line (over channel)
348+55				6.58	22.0		9.00		2.42	Overflow apron (left wall)
348+26.16				6.58	22.0		9.00		2.42	℄ Golden Ave.
347+80				6.58	22.0	350.93	9.00		2.42	Downstream end of project.

K-1393

CORPS OF ENGINEERS

Construct fence across channel

Fence To run continously

Equation Sta 71+64 (Outlet Works) Sta 389+05.70

End transition HT = 9.0'

Sta 388+25.70 HT=5.5' Begin transition

El 409.56

El 400.56

Transition

Top of wall

Existing 36"CMP Line

for fence details See Plan & Detail No.4 Sht.82

Approx. existing ground surface

Invert

S = 0.01

Drop Structure

Sta 378+93 EVC 379+00 HT = 7.0'

Sta 378+95.08 BVC

Sta 378+50.28 EVC

Sta 378+72.04 BVC HT = 6.0'

See detail hereon

Construct fence across channel

Fence to run continously

℄ ROSE DRIVE Relocation 1 on 2 slope normal to ℄ road

Approx. existing ground surface

36" C.M.P. S = 0.014

Sta 376+38

Match Line to Sta. 376+38

Sta 377+76.94

Existing 3" pipe

Place here after construction

18"CMP MWD Blowoff Sta 379+50

El 390.50

El 389.25

El 387.14

El 383.76

Existing M.W.D 96" Water line

Note: For continuation of access road profile see Sheet 92

60' V.C.

-10.00%

Approx existing ground surface

Channel excavation -0.838%

Finish grade

Fill Channel (19)

Excavation road (13)

50' V.C.

0.00%

+6.68%

50' V.C.

Sta 5+77 End Access Rd. El 404.17

Sta 5+45 El 404.17

Sta 5+89.34 ℄ Rose Dr. Reloc.

Pi Sta 4+70 El 399.16

Pi Sta 0+40 El 402.76

PROFILE OF ACCESS ROAD

SCALE HORIZ 1 IN=40 FT

SCALE VERT 1 IN=10 FT

PROFILE

HORIZ SCALE 1 IN = 40 FT

VERT SCALE 1 IN = 10 FT.

℄ Channel

℄ Access Road

Approx. exist. ground surface

Channel Excavation (12)

2% Slope

Fill channel (19)

2" Plant mix surfacing (80) (81) (82)

6" Untreated rock base (79)

SECTION STA 382+50

SCALE HORIZ & VERT 1 IN = 10 FT

SOURCE OF INFORMATION

Field Books CA-N17-10, 119, ℄120 Corps of Engineers Topographic Surveys, 1941, 1949, 1950, 1956. Plane Table Sheets C2-9-12-13-℄28 Alignment Data Sheets, Bridge Drawings, State of California, Division of Highways, Carbon Canyon Creek Bridge No. 5-48 (Imperial Highway) Coordinates, Lambert Zone 6, California.

Origin S = 0.01000

Equation: Y = -(0.01X + 0.04985X²)

El 390.50

EVC Sta 378+00.88

PI VC

Sta 378+94.34

El 389.25 S = 0.500

El 387.14

Sta 378+95.08

R = 30

T = 7.30

Sta 378+72.04 BVC

S = 0.01400

El 383.76

Sta 379+00 EVC

El 383.88

PROFILE OF DROP STRUCTURE

SCALE HORIZ & VERT 1 IN = 5 FT

CHANNEL DIMENSIONS			
STATION TO STATION		WIDTH	SLOPE
389+05.70	388+25.70	Excl. Trans.	0.0100
388+25.70	379+00	10.0'	0.0100
379+00	378+77.04	10.0'	Varies
378+77.04	375+00	10.0'	0.01400

Fill existing channel from Sta. 386+00 to toe of Dam. See Sheet 83

Fill existing channel to drain on a 0.5% grade to culvert. This fill to be paid for as miscellaneous fill.

Existing 3" waste water line supported by 1" cable. To remain in place, protect during construction. Supporting cable to be modified as required to keep pipe below road fill.

Pipe to be temporarily supported above work during construction. To be laid over the top of channel walls after construction

℄ Existing M.W.D. 96" water line

N 639,400

E 1,517,200

N 639,370.13

E 1,517,132.33

N 639,000

E 1,517,000

Existing wire fence revament to be removed

12' Berm

2% Slope

Match Line to Sta. 376+50

Curve Data

Simple Curve: Δ = 27° 25' 35" R = 948.00' T = 231.33' L = 453.79

Spiral No. 340: Δs = 01° 30' 40" Ts = 283.03' Ls = 50.0'

Sta 386+64.14

Sta 386+64.14

Sta 387+26 ℄ Roof Bridge #6

Sta 386+86 Gating Station

Sta 388+25.70 D = 4.12°

Transition

End Conduit

Equation: Sta 71+64 (Outlet works) Sta 389+05.70 D = 4.12°

N 23° 16' 26" E

Existing 30"CMP Line

Sta 382+49

Sta 381+60.36

Sta 381+10.36

Sta 380+56

Flow

N 07° 10' 28" W

Blow-Off Valve

℄ Channel

12' Berm

℄ Access Road

R/W

Limit of contractors Work area

Sta 377+79 ℄ Access Road

Sta 14+98.5 on Road

Sta 5+89.34 Access Road Sta 11+45.85 Rose Drive

Sta 377+00

Sta 17+55

Simple Curve: Δ = 32° 21' 00" R = 767.00' T = 222.47' L = 433.06'

Spiral No. 420: Δs = 01° 52' 00" Ts = 274.89' Ls = 50.00'

Curve Data

Δ = 27° 00' 00" R = 200.00' T = 66.92' L = 129.15'

Sta 390+01.77

N 638,965.84 E 1,516,985.84

Sta 390+01 ℄ Access Rd.

Sta 387+00 ℄ Access Rd.

Δ = 58° 06' 53" R = 100.00' T = 55.62' L = 101.52'

P.C. Sta 384+47.29

E.C. Sta 385+48.75

℄ ROSE DRIVE Relocation N 49° 15' 51" W

E.C. Sta 18+89.88

30" Gas line to remain in place and be protected during construction. The portion of this pipe under the dam will be relocated by others.

Limits of contractors work area.

Note: For continuation of access road see Sheet 92

PLAN

SCALE 1 IN = 40 FT

REFERENCE DRAWINGS

For Channel Cross Sections See Sheet 85 & 84.

RECORD DRAWING - AS CONSTRUCTED

CONT. No. 69-126 REV. B DATE 12-7-61 BY P.C.B

CONT. No. ____ REV. ____ DATE ____ BY ____

CONT. No. ____ REV. ____ DATE ____ BY ____

REV NO	DATE	REVISION	REV	CHK	APP
A	5-20-60	ROSE DRIVE relocation changed. Access Road PLAN, PROFILE & SECTION added.	W.A.B.		
B	12-7-61	Moved Blow-off Valve	P.C.B.		

DATUM IS MEAN SEA LEVEL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L.
DRAWN BY: K.E.E.
CHECKED BY: C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
PLAN AND PROFILE NO.1
STA 389+05.70 TO STA 376+50

APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

APPROVED: COLONEL, C.E., DISTRICT ENGINEER

SCALE: AS SHOWN

DATE: MAY 1958

TO ACCOMPANY SPECIFICATIONS DACW09-59-C-0025

SHEET 79 OF 102

FILE NO. (D. O. SERIES) 126/79 REV "B"

H&A DOC. # 64809

CARBON CANYON CREEK

K-1394

MATCH LINE TO STA 376+50 Ht = 6.48'

Sta 372+50 Grade Change Ht = 7.5'

Sta 374+00 Ht = 7.0'

3" Pipe @ 2" Pipe @ 1' Pipe

S = 0.014

Invert

Approx existing ground surface

S = 0.014

El 374.99

For fence details see Plan and Profile No. 4 Sheet 82

Fence to run continuously

Sta 368+12 Bridge Sta 368+00

Fence

Construct fence across channel B

Sta 366+50 Bridge Sta 366+34

Fence to run continuously

Construct fence across channel A

Sta 366+00 Ht = 7.5'

Sta 365+00 Grade change Ht = 7.0'

Transition

Sta 364+40 Ht = 6.5'

Sta 364+00 Ht = 7.0'

Top Of Wall

Approx existing ground surface

Invert

S = 0.008

S = 0.012

El 368.99

MATCH LINE TO STA 364+00

420 410 400 390 380 370 360 350 340

377+00 376+00 375+00 374+00 373+00 372+00 371+00 370+00 369+00 368+00 367+00 366+00 365+00 364+00 363+00

Construct barricade see detail on sheet 82 C

Duffen-Mujica property line

Access Road paved with 2" plant mix surfacing

Prepare sub-grade in accordance with specification section 5-08 sub-paragraph d.

12.0' 6.0' 6.0'

Approx existing ground surface

2" Plant mix surfacing

Duffen-Mujica property line

C

SECTION B-B

SCALE: 1 IN = 5 FT

Support this portion of bridge on top of channel walls. Provide anchors in walls for bridge stringers.

Remove this portion

Remove this portion

Timber foot bridge 6" x 8" stringers

10.0'

Approx. exist. ground surface

PROFILE

HORIZ SCALE 1 IN = 40 FT

50 0 50 100

VERT SCALE 1 IN = 10 FT

10 0 10 20

℄ Rose Drive

N 637,600 E 1,517,000

B B

12'

10.0'

7'-6"

1'-3"

2'-0"

1'-3"

2"

Const. Jt.

#4@12"c.c.

#5@12"c.c.

#6@12"c.c.

Symmetrical about ℄

Note: All longitudinal reinforcement #4 @ 12" c.c.

Const. Jt.

1'-9"

#5@12"c.c.

#6@12"c.c

#4@12"c.c

2'-9" 5'-9" 2'-0"

7'-3"

TYPICAL HALF SECTION OF BRIDGE AT STA 366+50 AND STA 368+00 A B

SCALE: 1 1/2 IN = 1 FT

Sta 366+34 Sta 368+00

Symmetrical about ℄

#5@12"c.c.

#4@12"c.c.

#6@12"c.c.

#4@12"c.c.

#4 #6

SECTION A-A

SCALE: 1 1/2 IN = 1 FT

MODIFICATION OF FOOT BRIDGE (91)

Scale 10 0 10 20 30

Note: Stop channel fence on each side of foot bridge

CHANNEL DIMENSIONS			
STATION	TO STATION	WIDTH	SLOPE
376+50	375+00	10.0'	0.014
375+00	372+50	10.0'	0.01400
372+50	372+25	Transition	0.00800
372+25	366+00	11.5	0.00800
366+00	365+00	11.5	0.00800
365+00	364+60	Transition	0.01200
364+60	364+00	14.0'	0.01200

Limit of Contractor's work area

℄ Rose Drive relocation

Remove Existing ½" cable pipe support (no pipe)

Sta 374+00

Existing 3' wide foot-bridge 63.8' long to be removed during construction of channel and replaced over top of channel wall after completion of work See sketch above

Existing wire fence revetment to be removed

N 637,647.97 E 1,516,813.19

Transition

N 28° 54' 31" E

N 638,147.22 E 1,517,688.89

MATCH LINE TO STA 376+50

Existing 1" pipe line

Existing Pipe lines 1-2" Pipe ℄ 1-3" Pipe Supported by pipes. Pipes to remain in place, but protected during construction of channel and road fill.

Existing pipe line crossing channel to be temporarily supported above the channel during its construction. When construction of channel walls is completed, pipe shall be left on the ground but will span the channel over the top of the channel walls.

℄ Curve Data

Simple Curve
Δ = 32°21'00"
R = 767.00'
T = 222.47'
L = 433.06'

Spiral No 420
Δs = 01°52'00"
Ts = 274.89'
Ls = 50.00'

Sta 369+50

Limit of contractor's work area A

Existing 3' wide foot-bridge 63.8' long to be removed during construction of channel and replaced over top of channel wall after completion of work See sketch above

Sta 369+19.22 SC Sta 368+68.22 CS

Sta 370+70 Construct overflow apron for details see Plan and Profile No. 4

Sta 372+50 TS Sta 372+25 Construct Transition

Sta 371+62.56 ST Sta 371+12.56 CS

Sta 369+00 TS Sta 368+50 SC

Sta 365+50

Transition

Sta 365+00

Sta 364+60

MATCH LINE TO STA 364+00

N 43° 40' 38" E

Bridge (see detail here on) A B

2" Plant mix surfacing C

Limit of contractors work area

℄ Curve Data

Simple Curve
Δ = 11°44'45"
R = 948.00'
T = 97.51'
L = 194.34'

Spiral No. 340
Δs = 01°30'40"
Ts = 147.85'
Ls = 50.00'

PLAN

SCALE 1 IN = 40 FT

E 1,516,600 N 637,800

GENERAL NOTES

Figures in circles denote contract item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

REFERENCE DRAWINGS

For Channel Cross Sections see sheets 83 and 84.

RECORD DRAWING - AS CONSTRUCTED

CONT. No. 59-126 REV. D DATE 12-7-61 BY P.C.B

CONT. No. n.i. DATE BY

CONT. No. REV. DATE BY

REV. NO.	DATE	REVISION	REV.	CHK.	APP.
A	4 Aug. 59	Added Bridge Section	C.W.L.	[illegible]	[illegible]
B	1 Oct. 59	Added Bridge Section	C.W.L.	[illegible]	[illegible]
C	6 Dec. 60	Added pavement for berm, turnaround and access road. Added barricade	C.W.L.	[illegible]	[illegible]
D	12-7-61	Extended 2" Plant mix surfacing "As Constructed"	P.C.B.		

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L.-R.K.M.
DRAWN BY: K.E.E.
CHECKED BY: C.W.L.-R.H.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA

CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
PLAN AND PROFILE NO. 2
STA 376+50 TO STA 364+00

APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION

APPROVED: COLONEL, C. E., DISTRICT ENGINEER

SCALE: AS SHOWN

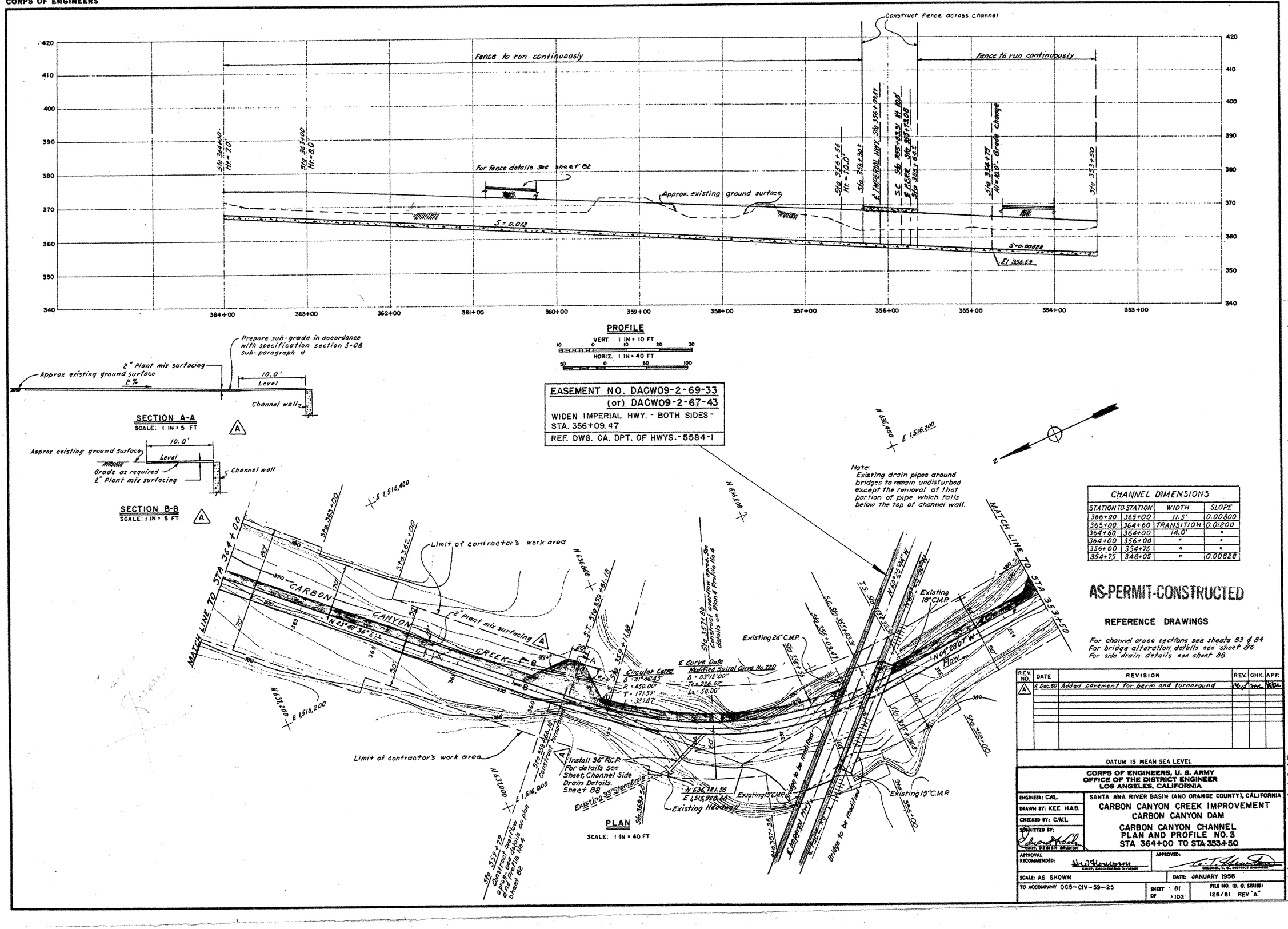
DATE: MAY 1958

TO ACCOMPANY OCS-CIV-59-25

SHEET 80 OF 102

FILE NO. (D. O. SERIES) 126/80 REV. "D"

H&A DOC # 64809



CHANNEL DIMENSIONS			
STATION TO STATION		WIDTH	SLOPE
366+00	365+00	11.5'	0.00800
365+00	364+60	TRANSITION	0.01200
364+60	364+00	14.0'	"
364+00	356+00	"	"
356+00	354+75	"	"
354+75	348+05	"	0.00828

AS-PERMIT-CONSTRUCTED

REFERENCE DRAWINGS

For channel cross sections see sheets 83 & 84
For bridge alteration details see sheet 86
For side drain details see sheet 88

REV. NO.	DATE	REVISION	REV.	CHK.	APP.
A	6 Dec. 60	Added pavement for berm and turnaround	[illegible]	[illegible]	[illegible]

DATUM IS MEAN SEA LEVEL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

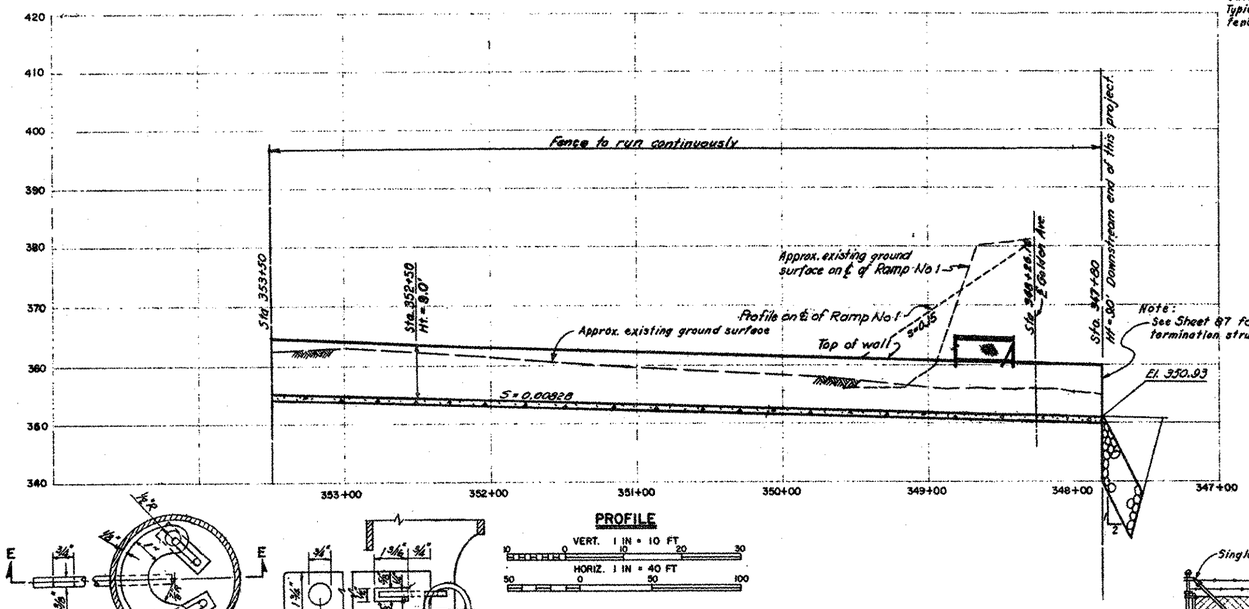
ENGINEER: C.W.L.
DRAWN BY: K.E.E. H.A.B.
CHECKED BY: C.W.L.
SUBMITTED BY: [signature] CHIEF, DESIGN BRANCH

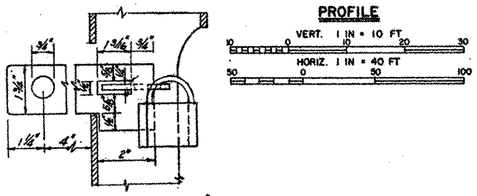
SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
PLAN AND PROFILE NO. 3
STA 364+00 TO STA 353+50

APPROVAL RECOMMENDED: [signature] CHIEF, ENGINEERING DIVISION
APPROVED: [signature] COLONEL, C. E., DISTRICT ENGINEER

SCALE: AS SHOWN
DATE: JANUARY 1958
TO ACCOMPANY OCS-CIV-59-25
SHEET 81 OF 102
FILE NO. (D. O. SERIES) 126/81 REV "A"

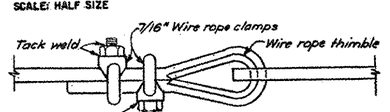
H&A DOC # 64809





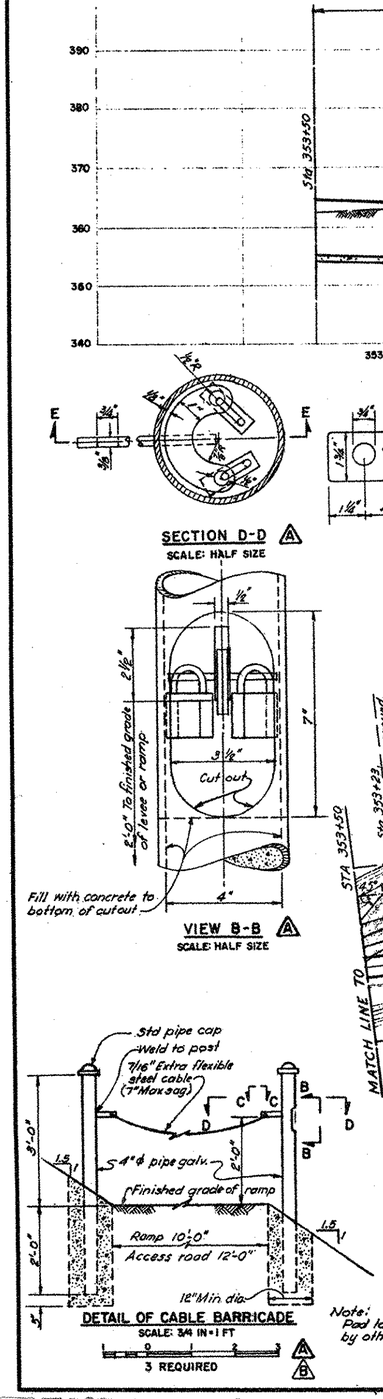
SECTION D-D
SCALE: HALF SIZE

SECTION E-E
SCALE: HALF SIZE



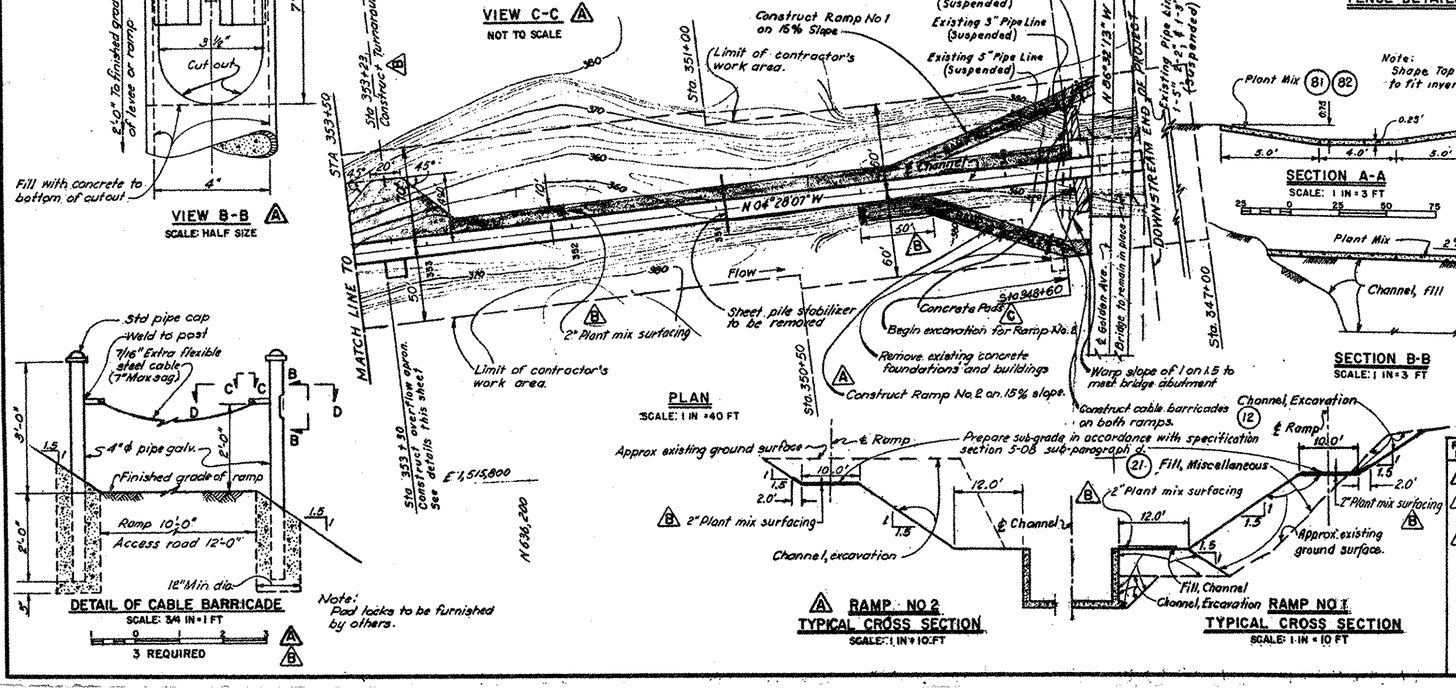
VIEW C-C
NOT TO SCALE

VIEW B-B
SCALE: HALF SIZE



DETAIL OF CABLE BARRICADE
SCALE: 3/4 IN = 1 FT
3 REQUIRED

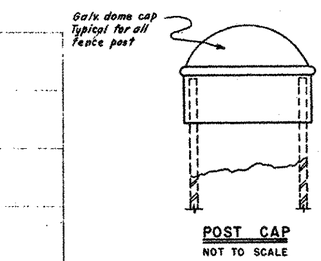
Note: Pad locks to be furnished by others.



PLAN
SCALE: 1 IN = 40 FT

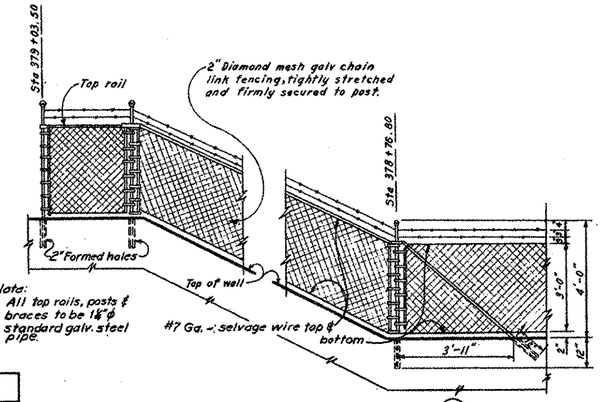
A RAMP NO 2
TYPICAL CROSS SECTION
SCALE: 1 IN = 10 FT

RAMP NO 1
TYPICAL CROSS SECTION
SCALE: 1 IN = 10 FT

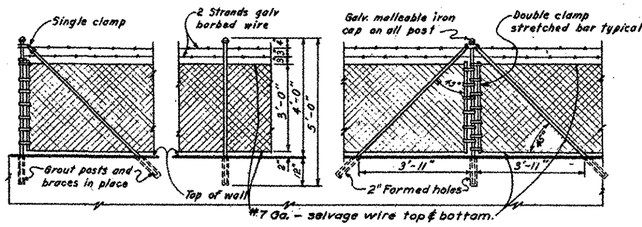


POST CAP
NOT TO SCALE

CHANNEL DIMENSIONS			
STATION TO	STATION	WIDTH	SLOPE
366+00	365+00	11.5	0.00800
365+00	364+60	TRANSITION	0.01200
364+60	364+00	14.0'	"
364+00	356+00	"	"
356+00	354+75	"	"
354+75	347+80	"	0.00828



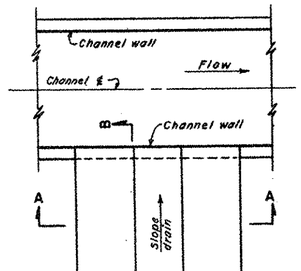
FENCE DETAILS FOR SPECIAL CHANNEL WALL (77)
SCALE: 1 IN = 2 FT



END POST | TYPICAL FENCE POST APPROX. 10 FT. C.C. | DOUBLE BRACE POST APPROX. 400 FT. INTERVALS

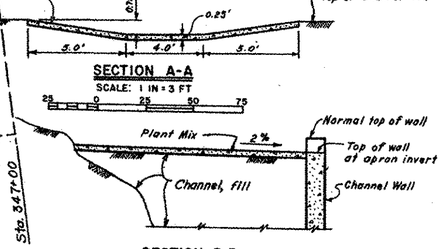
Note: All fence posts & braces to be 1½" ϕ standard galv. steel pipe.

FENCE DETAILS FOR REGULAR CHANNEL WALL (77)
SCALE: 1 IN = 2 FT

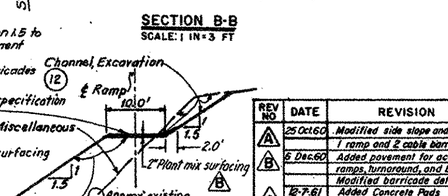


(81) (82) PLANT MIX OVERFLOW APRON
PLAN
SCALE: 1 IN = 5 FT

Note: Shape Top of Channel Wall to fit invert of overflow apron.



SECTION A-A
SCALE: 1 IN = 3 FT



SECTION B-B
SCALE: 1 IN = 3 FT

GENERAL NOTES

Figures in circles denote contract item numbers under which payment will be made.

REFERENCE DRAWINGS

For channel cross sections see Sheets 83 and 84.
For modification of Golden Ave. Bridge details see Sheet 85
For details of Termination Structure see Sheet 87

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 59-126 REV. C DATE 12-7-61 BY P.C.B.
CONT. No. REV. DATE BY
CONT. No. REV. DATE BY

DATUM IS MEAN SEA LEVEL

REV NO	DATE	REVISION	REV.	CHK.	APP.
A	25 Oct 60	Modified side slope and added 1 ramp and 2 cable barricades			
B	6 Dec 60	Added pavement for access ramps, turnaround, and berm. Modified barricade detail			
C	12-7-61	Added Concrete Pads "As Constructed"	P.C.B.		

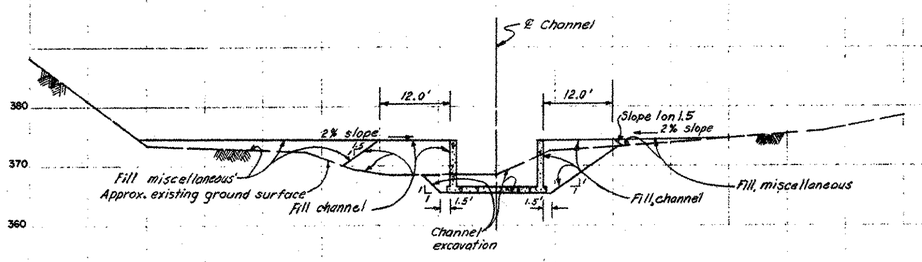
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L.
DRAWN BY: K.E.E. H.A.B. B.O.H.
CHECKED BY: C.W.L.
SUBMITTED BY: CHIEF, DE SIGN BRANCH

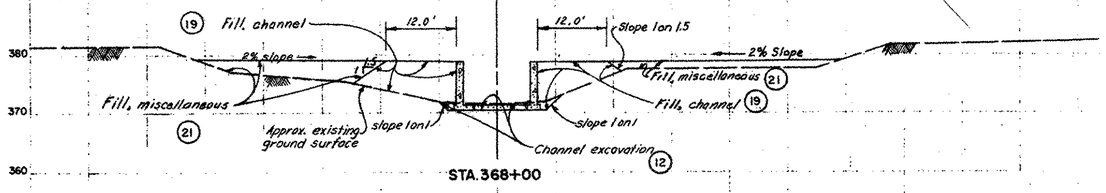
SANTA ANA RIVER BASIN (AND ORANGE COUNTY) CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
PLAN AND PROFILE NO. 4
STA 353+50 TO STA 347+80

APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C. E., DISTRICT ENGINEER
SCALE: AS SHOWN
DATE: MAY 1958
TO ACCOMPANY OCS-CIV-59-25
SHEET 82 OF 102
FILE NO. (D. O. SERIES) 126/82 "REV C"

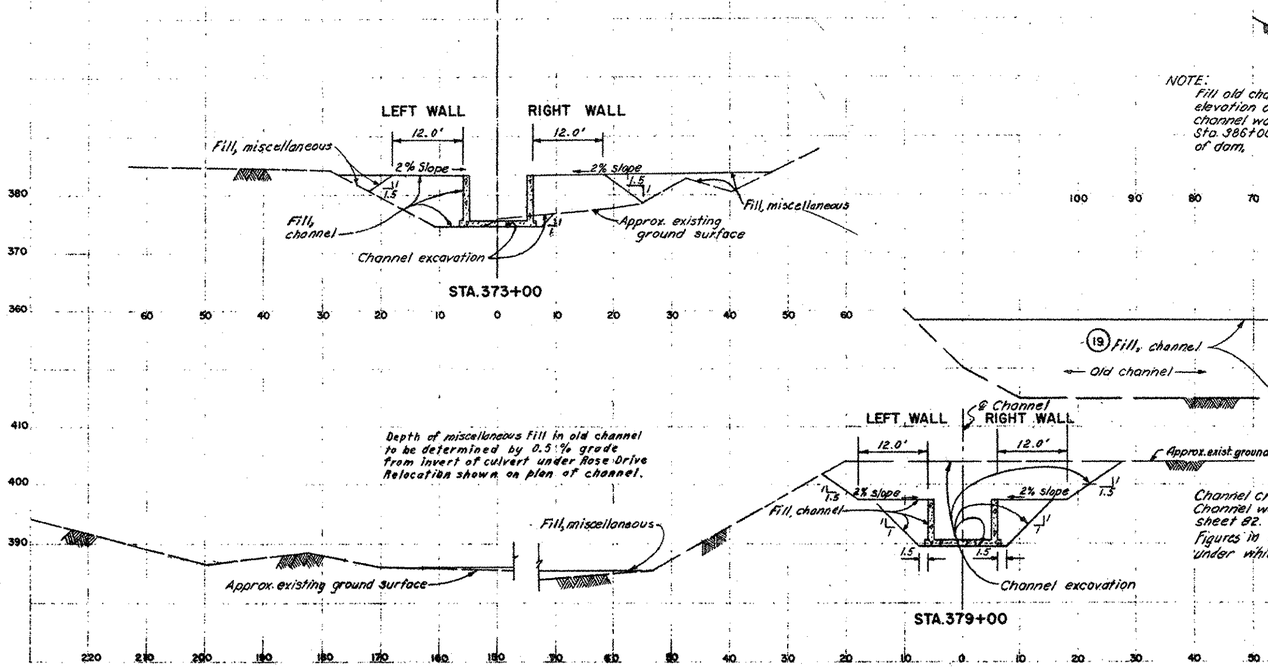
H&A DOC # 64809



STA.363+00

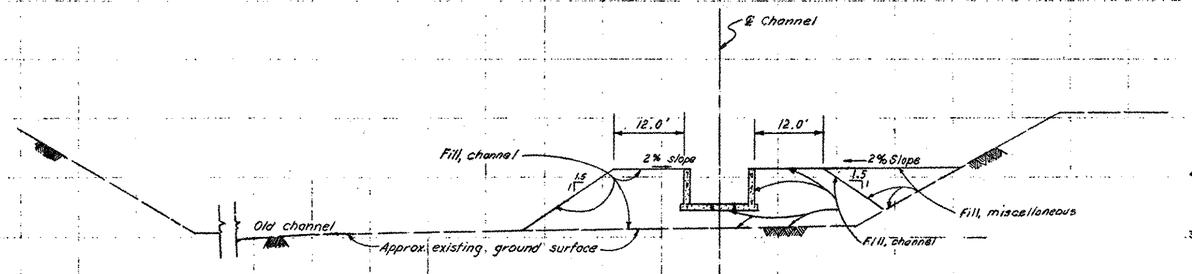


STA.368+00

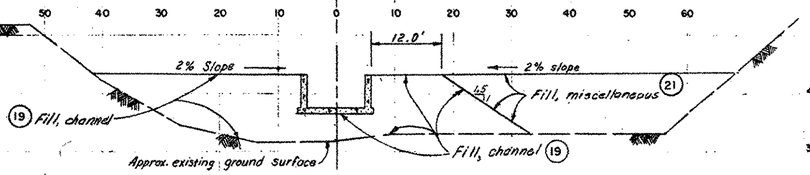


STA.373+00

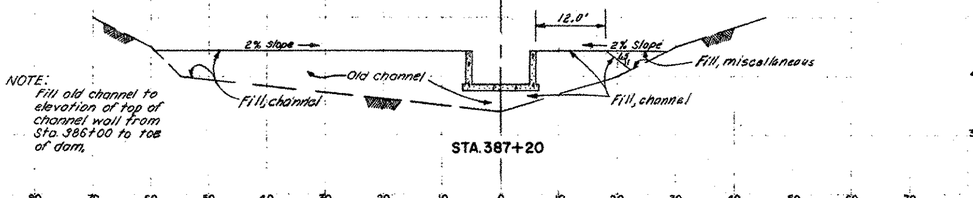
STA.379+00



STA. 384+00

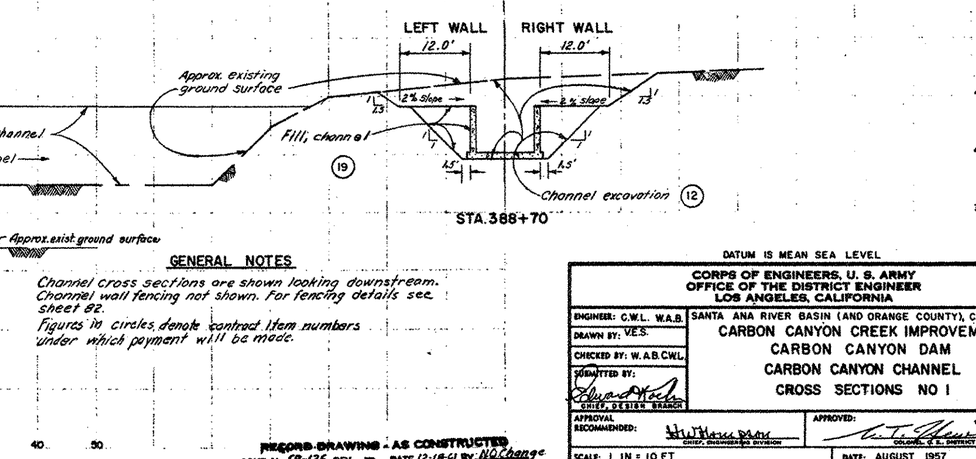


STA. 386+00



STA.387+20

NOTE:
Fill old channel to elevation of top of channel wall from Sta. 386+00 to toe of dam.



STA.388+70

GENERAL NOTES

Channel cross sections are shown looking downstream.
Channel wall fencing not shown. For fencing details see sheet 82.
Figures in circles denote contract Item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 59-126 REV. — DATE 12-18-61 BY NO Change
CONT. No. — REV. — DATE — BY —
CONT. No. — REV. — DATE — BY —

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

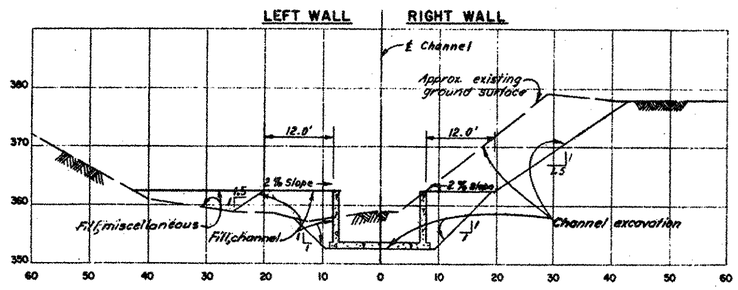
ENGINEER: C.W.L. W.A.B.
DRAWN BY: V.E.S.
CHECKED BY: W. A.B. C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
CROSS SECTIONS NO I

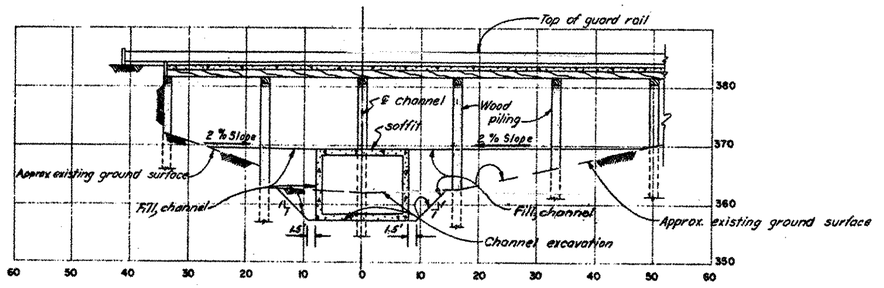
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C.E., DISTRICT ENGINEER

SCALE: 1 IN = 10 FT
DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25
SHEET 83 OF 102
FILE NO. (D. O. SERIES) 126/83

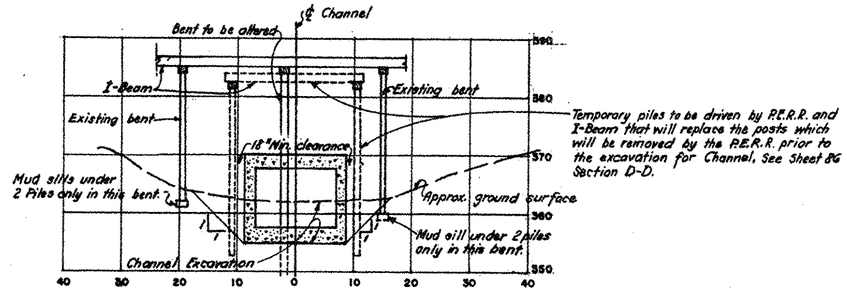
H&A DOC # 64809



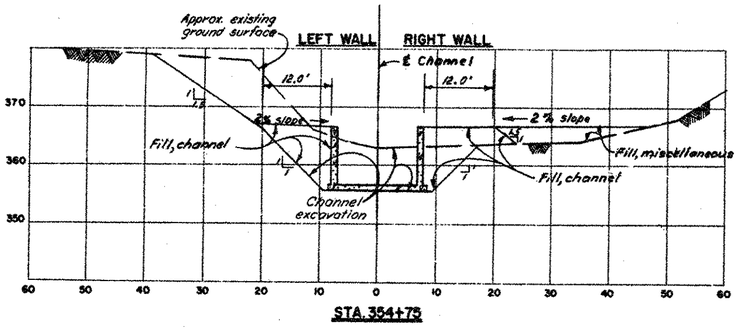
STA. 351+00



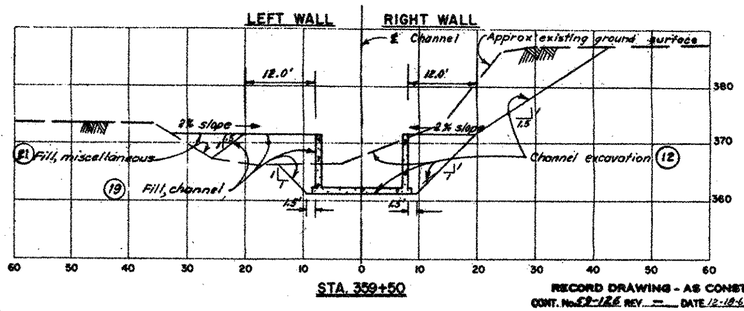
STA. 356+09.47



STA. 355+69
P.E.R.R. BENT ALTERATION



STA. 354+75



STA. 359+50

GENERAL NOTES

Channel Cross Sections are shown looking downstream.
Channel wall Fencing not shown. For fencing details see sheet 82
Figures in circles denote contract item numbers under which payment will be made.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 57-126 REV. — DATE 12-18-61 BY NO Change
CONT. No. ____ REV. ____ DATE ____ BY ____
CONT. No. ____ REV. ____ DATE ____ BY ____

DATUM IS MEAN SEA LEVEL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

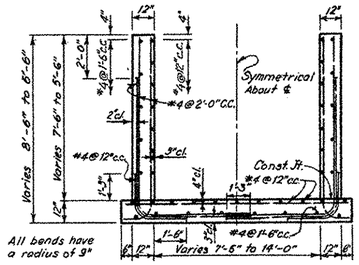
ENGINEER: C.W.L. W.A.B.
DRAWN BY: V.E.S.
CHECKED BY: W.A.B.-C.W.L.
SUBMITTED BY: Chief, Design Branch

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
CROSS SECTIONS NO. 2

APPROVAL RECOMMENDED: Chief, Engineering Division
APPROVED: Colonel, C.E., District Engineer

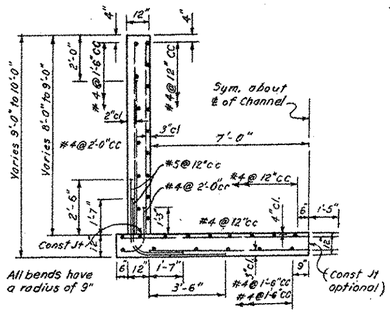
SCALE: 1 IN = 10 FT
DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIVENG -04-353-59-25
SHEET 85 OF 102
FILE NO. (D. O. SERIES) 126/84

H&A # 64809



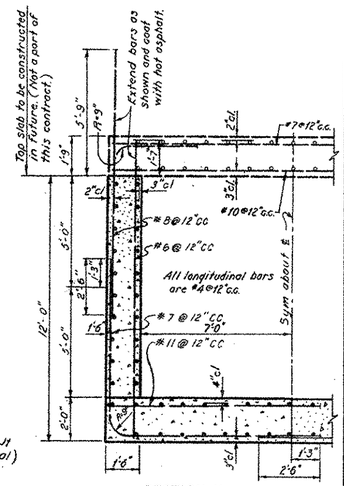
SECTION U_2

SCALE: 3/8 IN=1 FT



SECTION U_4

SCALE: 3/8 IN=1 FT

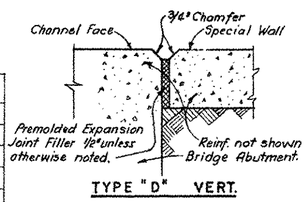


SECTION U_7

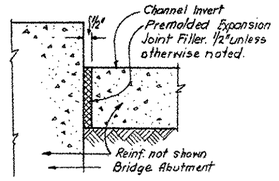
SCALE: 3/8 IN=1 FT

CARBON CANYON CHANNEL SECTIONS

FROM STATION	TO STATION	SECTION	HEIGHT OF WALL	WIDTH OF CHANNEL
389+05.70	388+65.70	U_1	VARIES 9'-0" TO 7'-3"	VARIES 8'-9" TO 7'-5"
388+65.70	388+25.70	U_2	VARIES 7'-3" TO 5'-6"	VARIES 7'-5" TO 10'-0"
388+25.70	382+49.00	U_2	VARIES 5'-6" TO 6'-5"	10'-0"
382+49.00	380+30.00	U_6 COVERED SEC.	6'-9"	10'-0"
380+30.00	379+00	U_2	VARIES 6'-9" TO 7'-0"	10'-0"
379+00	378+77.04	U_2	VARIES 7'-0" TO 6'-0"	10'-0"
378+77.04	374+00	U_2	VARIES 6'-0" TO 7'-0"	10'-0"
374+00	372+50	U_2	VARIES 7'-0" TO 7'-6"	10'-0"
372+50	372+25	U_2	7'-6"	VARIES 10'-0" TO 11'-6"
372+25	366+00	U_2	7'-6"	11'-6"
366+00	365+00	U_2	VARIES 7'-6" TO 7'-0"	11'-6"
365+00	364+60	U_2	VARIES 7'-0" TO 6'-6"	VARIES 11'-6" TO 14'-0"
364+60	364+00	U_2	VARIES 6'-6" TO 7'-0"	14'-0"
364+00	363+00	U_3	VARIES 7'-0" TO 8'-0"	14'-0"
363+00	359+78	U_4	VARIES 8'-0" TO 9'-0"	14'-0"
359+78	357+30	U_5	VARIES 9'-0" TO 10'-0"	14'-0"
357+30	356+30	U_7	10'-0"	14'-0"
356+30	355+64	COVERED SEC SEE SHEET 86	10'-0"	14'-0"
355+64	354+75	U_5	10'-0"	14'-0"
354+75	352+50	U_5	VARIES 10'-0" TO 9'-0"	14'-0"
352+50	347+82	U_4	9'-0"	14'-0"
347+82	347+80	SHEET PILING	9'-0"	14'-0"



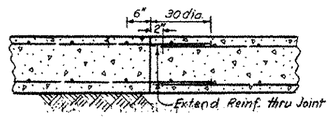
TYPE "D" VERT.



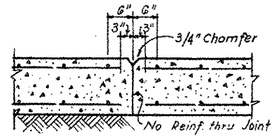
TYPE "D" HORIZ.

DETAILS OF EXPANSION JOINTS

NOT TO SCALE



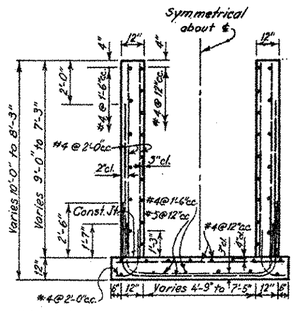
TYPE "J"



TYPE "B"

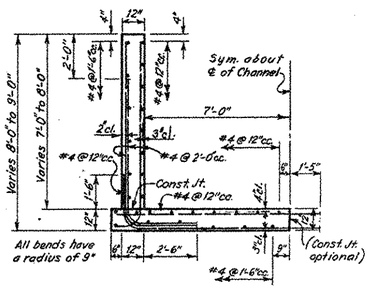
DETAILS OF CONSTRUCTION JOINTS

NOT TO SCALE



SECTION U_1

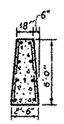
SCALE: 3/8 IN=1 FT



SECTION U_3

SCALE: 3/8 IN=1 FT

1 0 5 10

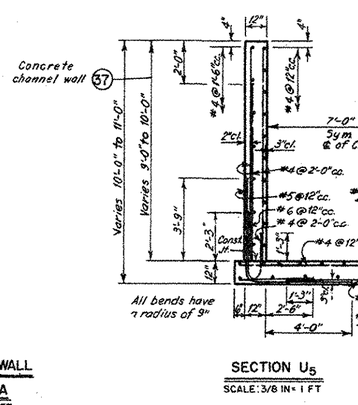


EXISTING TOE WALL

SECTION A-A

SCALE: 3/16 IN=1 FT

1 0 5 10 15



SECTION U_5

SCALE: 3/8 IN=1 FT

GENERAL NOTES

Steel reinforcement sizes are indicated by numbers, see hook detail.

All main steel reinforcement to be placed 3" clear from face of concrete, unless otherwise noted.

Dimensions from face of concrete to steel indicate clear cover unless otherwise noted.

Bar spacing are center to center of bars.

All exposed edges of concrete shall be chamfered 3/4" unless otherwise noted.

Splices in reinforcement shall be lapped 30 diameters of smaller bar, or as shown and approved.

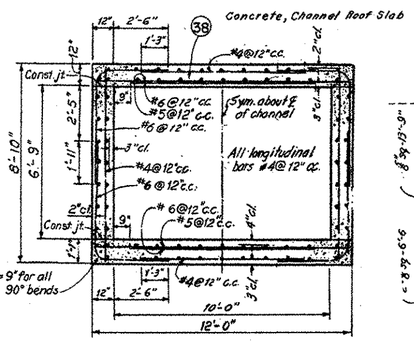
Splices in longitudinal reinforcement shall be staggered at 4 feet.

All steel reinforcement to be deformed bars conforming to Federal Spec. QQ-S-632 (See specifications)

Figures in circles denote contract item numbers under which payment will be made.

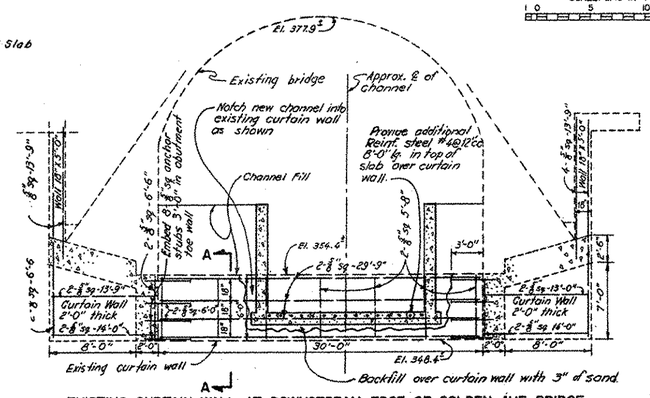
REFERENCE DRAWINGS

Plan and Profile No. 1 to No. 4 sheets 79 to 82



SECTION U_6

SCALE: 3/8 IN.=1 FT.

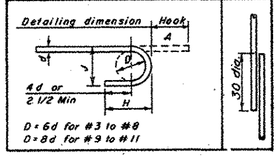


EXISTING CURTAIN WALL AT DOWNSTREAM EDGE OF GOLDEN AVE BRIDGE

ALTERATION OF GOLDEN AVENUE BRIDGE

SCALE: 3/16 IN=1 FT

DIMENSIONS FOR 180° HOOKS					SPLICES
BAR NO.	BAR SIZES d-INCHES	HOOK A	J	APPROX H	30 DIA
#3	0.375	5"	3"	4"	12"
#4	0.500	6"	4"	4 1/2"	1'-3"
#5	0.625	7"	5"	5"	1'-7"
#6	0.750	8"	6"	6"	1'-11"
#7	0.875	10"	7"	7"	2'-3"
#8	1.000	11"	8"	8"	2'-6"
#9	1.128	1'-3"	11 1/4"	10 1/8"	2'-10"
#10	1.270	1'-5	1'-01/2	11 1/4"	3'-2"
#11	1.410	1'-7"	1'-2"	1'-03/4"	3'-6"

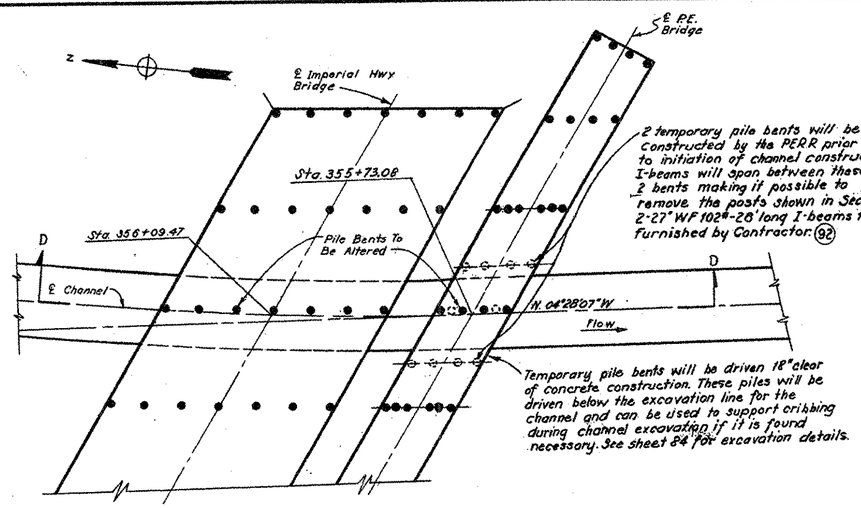


HOOK & SPLICE DETAIL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: N.A.W.	SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
DRAWN BY: J.E.L. H.A.B.	CARBON CANYON CREEK IMPROVEMENT
CHECKED BY: P.H.L. F.D.S.	CARBON CANYON DAM
SUBMITTED BY: CHIEF, DESIGN BRANCH	CARBON CANYON CHANNEL REINFORCEMENT AND STRUCTURAL DETAILS
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION	APPROVED: COLONEL, C.E., DISTRICT ENGINEER
SCALE: 3/8 IN = 1 FT.	DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIV ENG - 04-353-59-25	SHEET 86 OF 102 — FILE NO. (D. O. SERIES) 126/85

H&A DOC # 64809

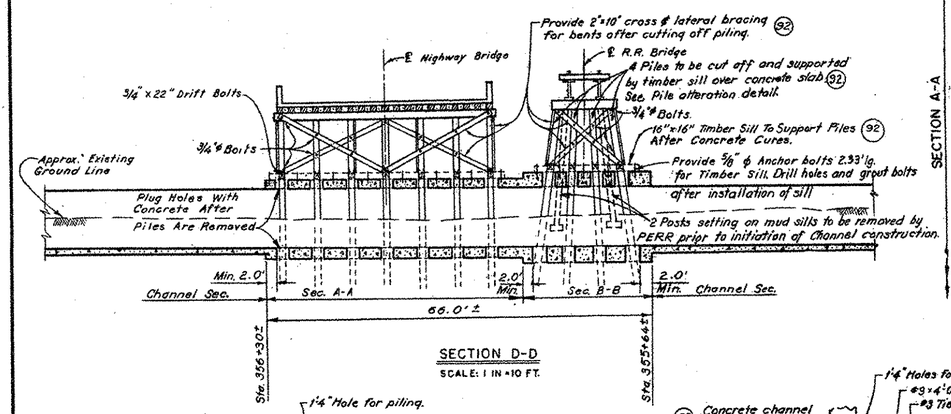


2 temporary pile bents will be constructed by the PERR prior to initiation of channel construction. I-beams will span between these 2 bents making it possible to remove the posts shown in Sect. D-D. 2-27" WF 102#-28' long I-beams to be furnished by Contractor. (92)

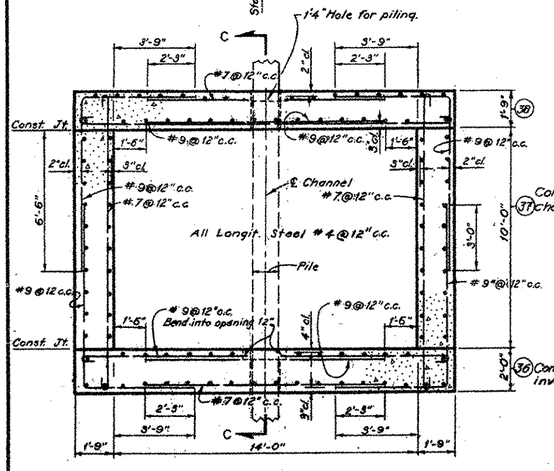
Temporary pile bents will be driven 18" clear of concrete construction. These piles will be driven below the excavation line for the channel and can be used to support cribbing during channel excavation if it is found necessary. See sheet 84 for excavation details.

IMPERIAL HWY. BRIDGE & P.E. RR. BRIDGE
PLAN OF PILE BENT TO BE REMOVED

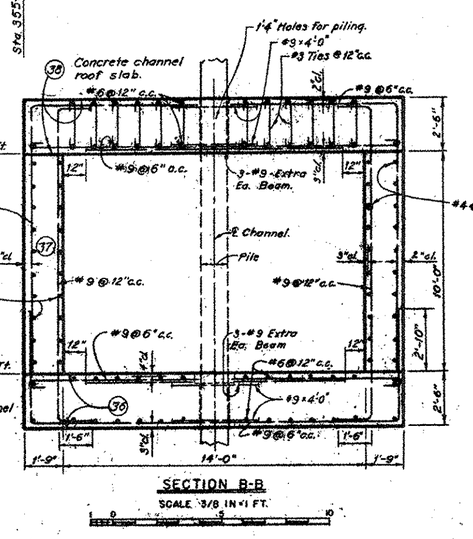
SCALE: 1 IN = 10 FT.



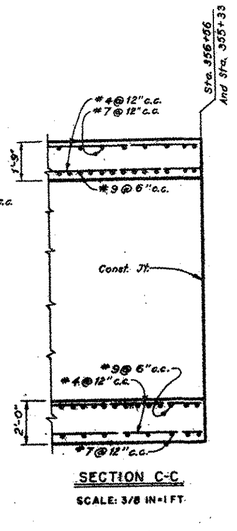
SECTION D-D
SCALE: 1 IN = 10 FT.



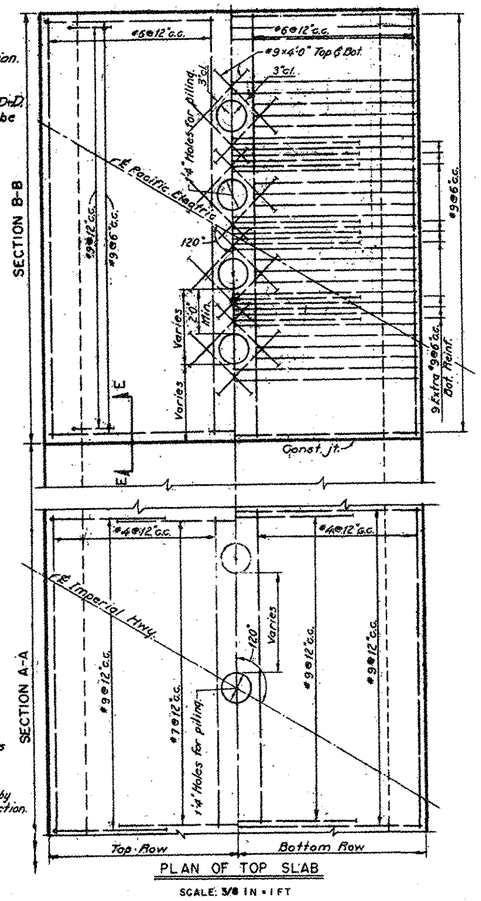
SECTION A-A
SCALE: 3/8 IN = 1 FT.



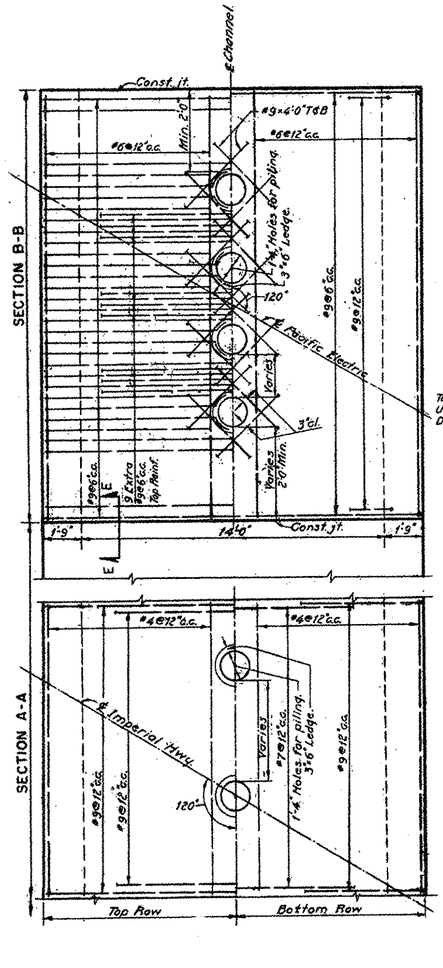
SECTION B-B
SCALE: 3/8 IN = 1 FT.



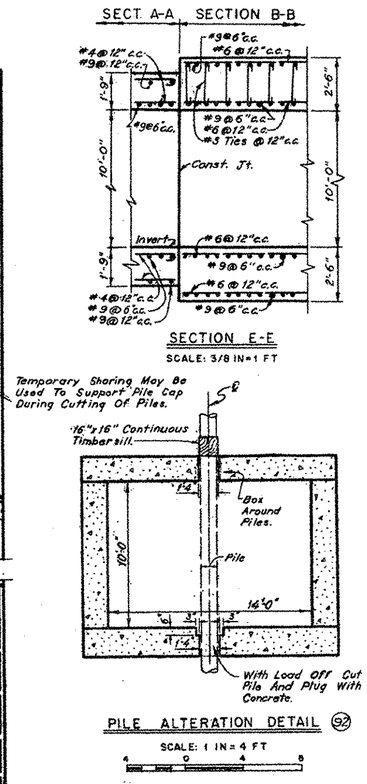
SECTION C-C
SCALE: 3/8 IN = 1 FT.



PLAN OF TOP SLAB
SCALE: 3/8 IN = 1 FT



PLAN OF BOTTOM SLAB
SCALE: 3/8 IN = 1 FT



SECTION E-E
SCALE: 3/8 IN = 1 FT

PILE ALTERATION DETAIL (92)
SCALE: 1 IN = 4 FT

GENERAL NOTES

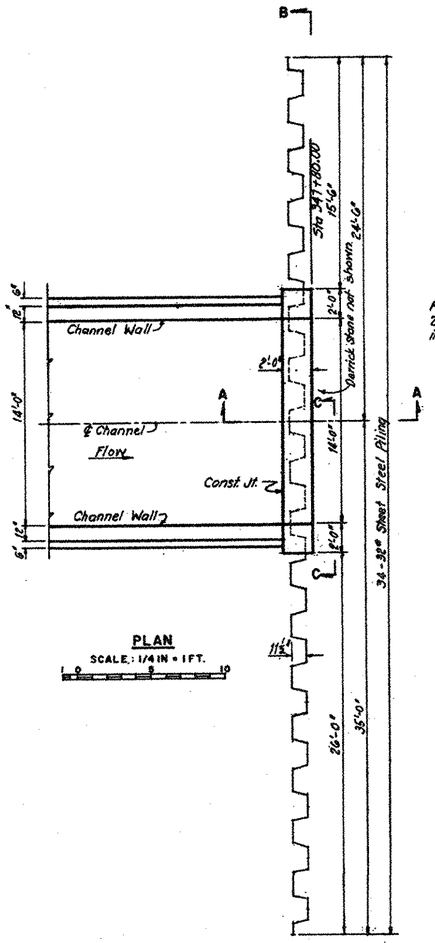
Figures in circles denote contract item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

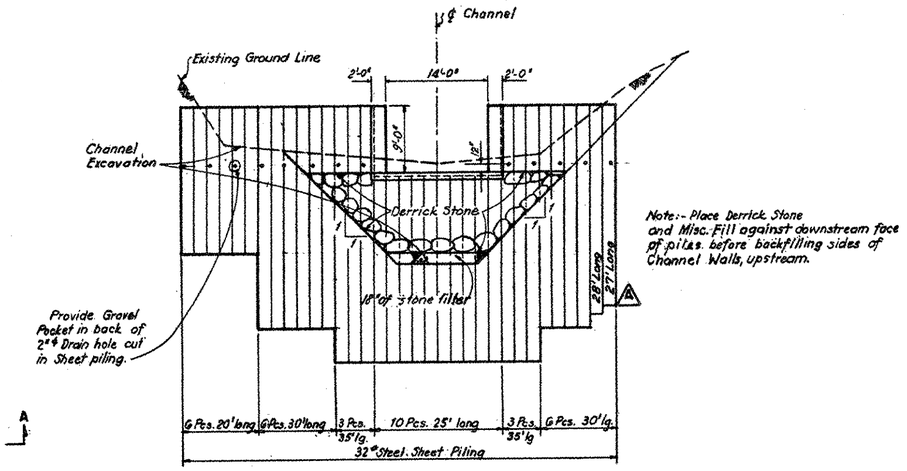
ENGINEER: F.D.S. C.W.L.	SANTA ANA RIVER BASIN (AND ORANGE COUNTY) CALIFORNIA
DRAWN BY: K.E.E. H.A.B.	CARBON CANYON CREEK IMPROVEMENT
CHECKED BY: F.D.S.	CARBON CANYON DAM
SUBMITTED BY: CHIEF, DESIGN BRANCH	CARBON CANYON CHANNEL
	IMPERIAL HIGHWAY AND PACIFIC ELECTRIC RY. BRIDGE ALTERATIONS
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION	APPROVED: COLONEL, C. E., DISTRICT ENGINEER
SCALE: AS SHOWN	DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25	SHEET 86 OF 102 — FILE NO. (D.O. SERIES) 126/86

H & A DOC. # 64809



PLAN

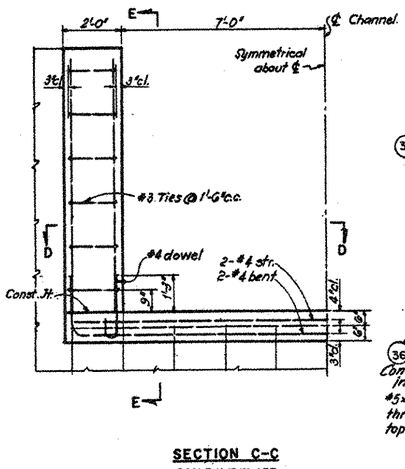
SCALE: 1/4 IN = 1 FT.



Note:- Place Derrick Stone and Misc. Fill against downstream face of piles before backfilling sides of Channel Walls, upstream.

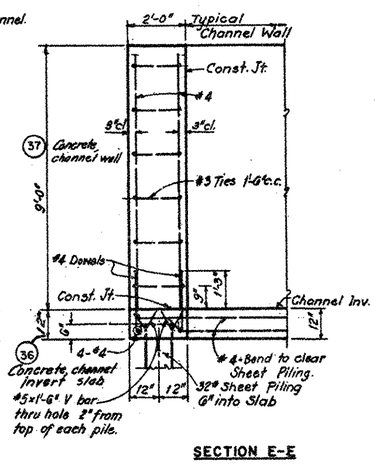
SECTION B-B

SCALE: 1/8 IN = 1 FT.



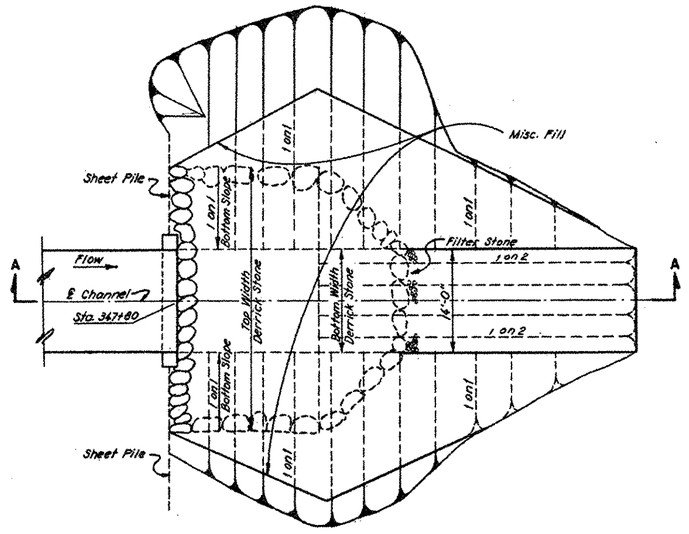
SECTION C-C

SCALE: 1/2 IN = 1 FT.



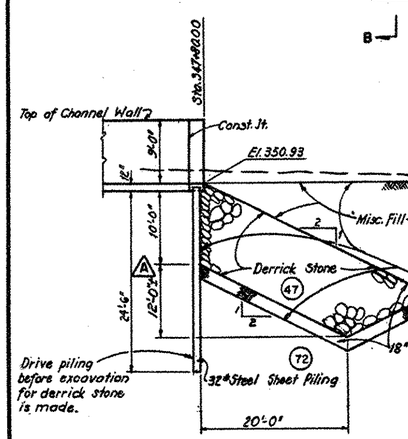
SECTION E-E

SCALE: 1/2 IN = 1 FT



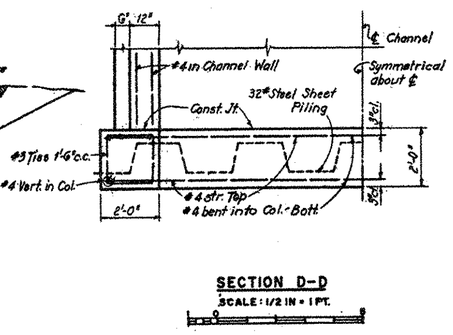
PLAN OF DERRICK STONE

SCALE 1/8 IN = 1 FT



SECTION A-A

SCALE: 1/8 IN = 1 FT.



SECTION D-D

SCALE: 1/2 IN = 1 FT.

GENERAL NOTES.

Figures in circles denote contract item numbers under which payment will be made.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 53-126 REV. A DATE 11-22-61 BY P.C.B.
CONT. No. REV. DATE BY
CONT. No. REV. DATE BY

DATUM IS MEAN SEA LEVEL

REV. NO.	DATE	REVISION	REV.	CHK.	APP.
A	11-22-61	Changed Dimensions And Shortened Piles As Constructed	PCB		

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: R.K.M. C.W.L.
DRAWN BY: H.L.
CHECKED BY: F.D.S.
SUBMITTED BY:
CHIEF, DESIGN BRANCH

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
TERMINATION STRUCTURAL DETAILS

APPROVAL RECOMMENDED:
CHIEF, ENGINEERING DIVISION

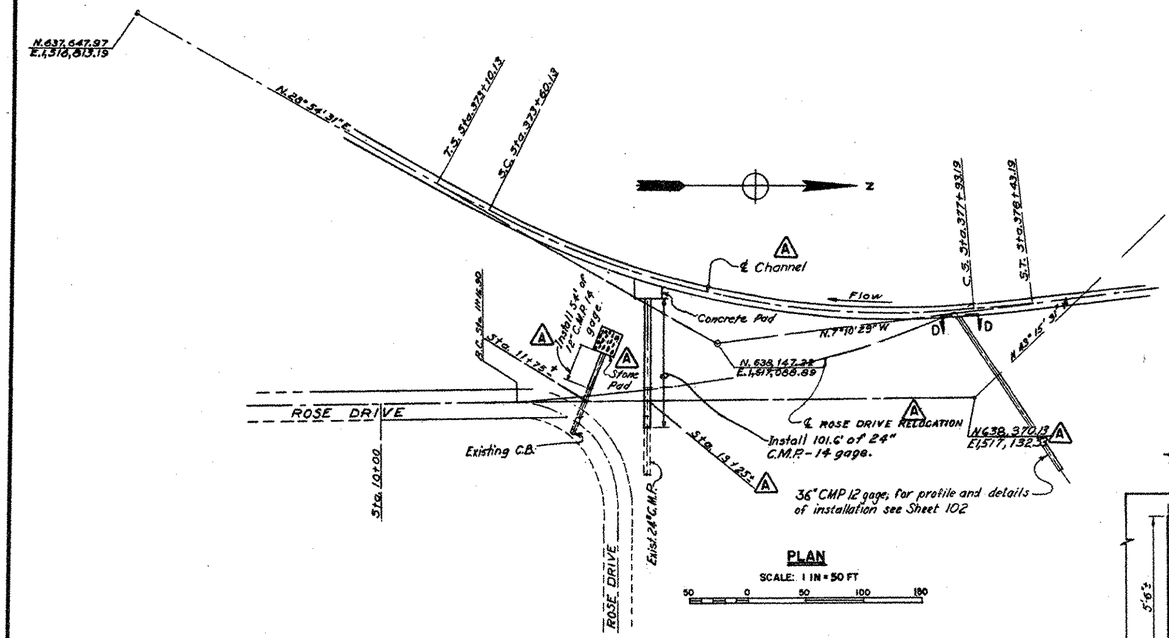
APPROVED:
COLONEL, C.E., DISTRICT ENGINEER

SCALE: AS SHOWN
DATE: MAY 1958

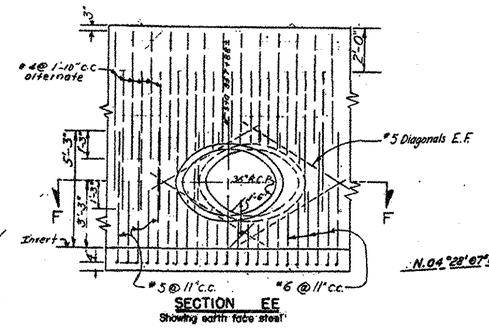
TO ACCOMPANY SPECIFICATIONS CIVENG -04-353-59-25
SHEET 87 OF 102
FILE NO. (D. O. SERIES) 126/87 REV. "A"

H-A DOC # 64809

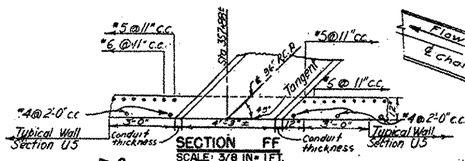
U.S. ARMY

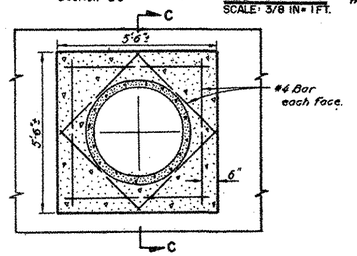


PLAN
SCALE: 1 IN = 50 FT

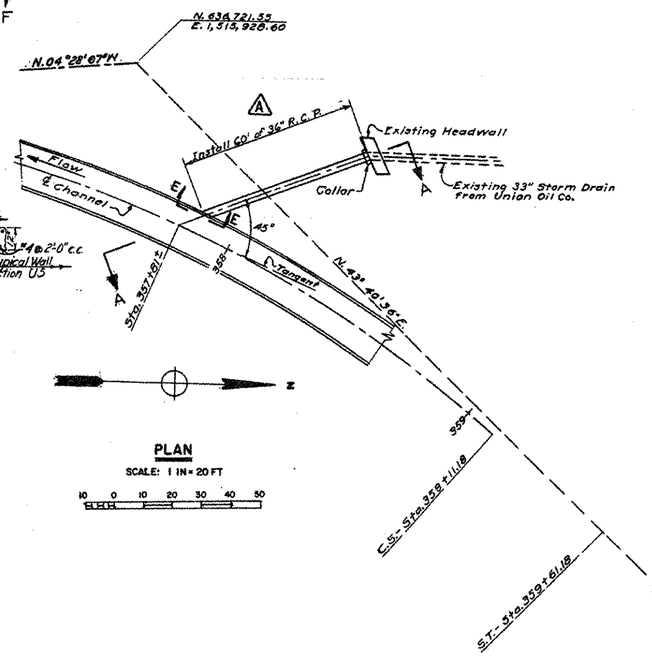


SECTION EE
Showing earth face steel

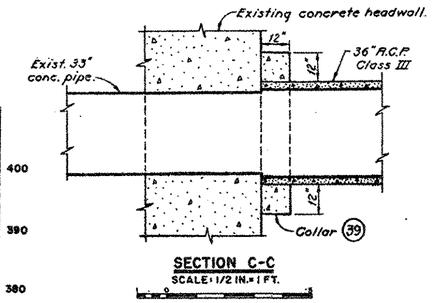




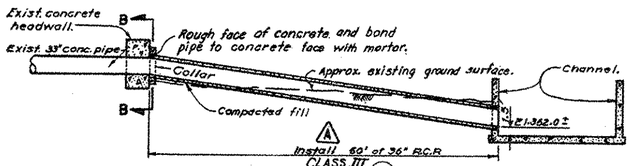
SECTION B-B
SCALE: 1/2 IN. = 1 FT.



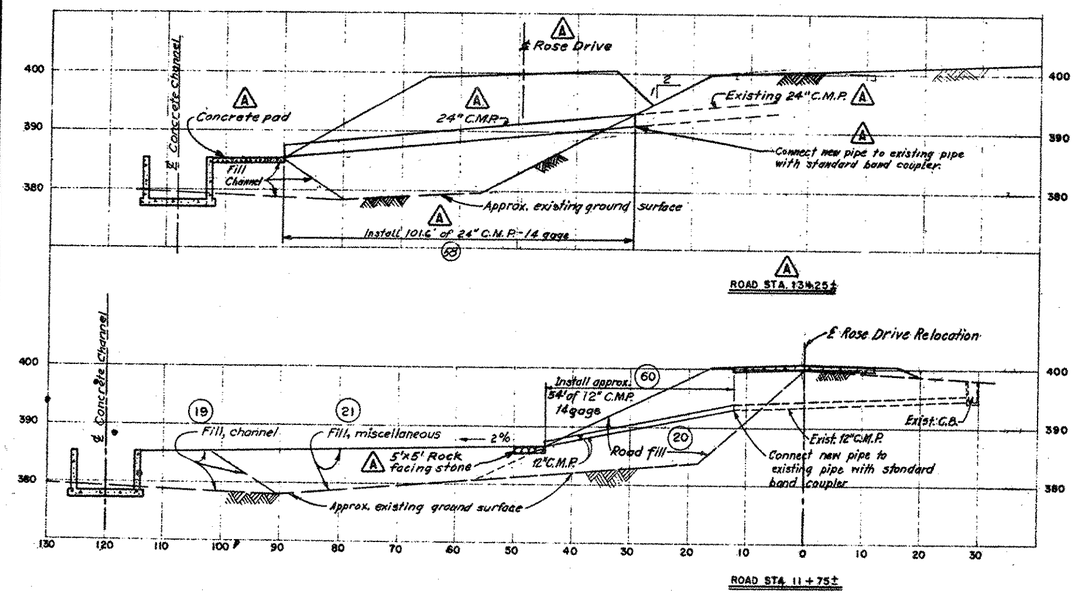
PLAN
SCALE: 1 IN = 20 FT



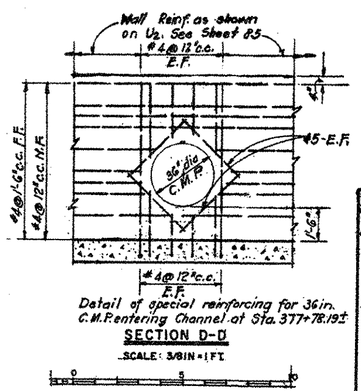
SECTION C-C
SCALE: 1/2 IN. = 1 FT.



SECTION A-A
SCALE: 1 IN = 10 FT



SECTIONS SHOWING EXTENSIONS OF EXISTING DRAINS
SCALE: 1 IN. = 10 FT



Detail of special reinforcing for 36 in. C.M.P. entering Channel at Sta. 377+78.19±
SECTION D-D
SCALE: 3/8 IN = 1 FT.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 57-126 REV. A DATE 11-23-61 BY P.C.B.
CONT. No. REV. DATE BY
CONT. No. REV. DATE BY

GENERAL NOTES
Figures in circles denote contract item numbers under which payment will be made.

DATUM IS MEAN SEA LEVEL

REV. No.	DATE	REVISION	REV.	CHK.	APP.
A	11-23-61	Changed Road Relocation			
		Revised Dimensions & Stationing			
		Added Concrete & Stone			
		Work "As Constructed"	PCB		

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

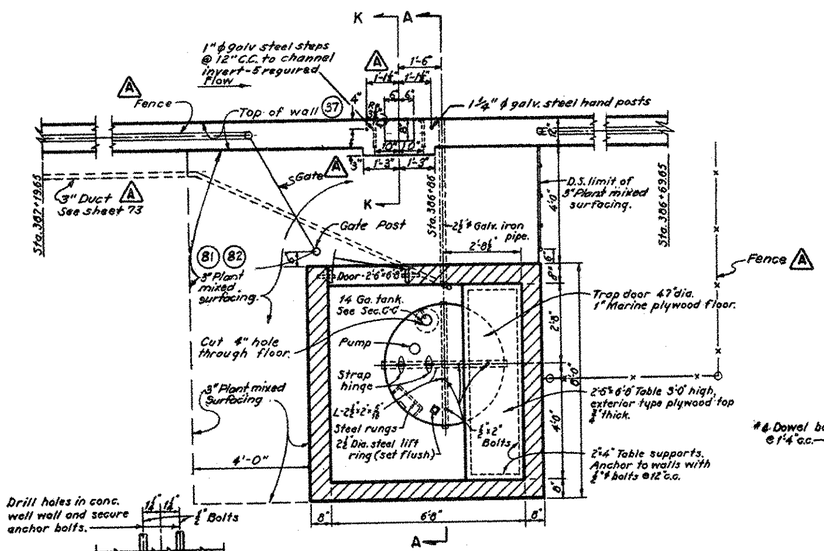
ENGINEER: C.W.L. W.A.B.
DRAWN BY: H.A.B.
CHECKED BY: W.A.B. C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, CE, DISTRICT ENGINEER

SANTA ANA RIVER BASIN (AND ORANGE COUNTY) CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
CHANNEL SIDE DRAIN DETAILS

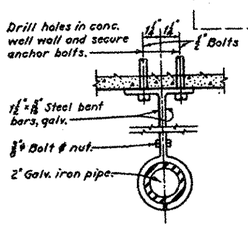
SCALE: AS SHOWN
DATE: AUGUST 1957
TO ACCOMPANY SPECIFICATIONS CIVENG-04-353-59-25
SHEET 86 OF 102
FILE NO. (D. O. SERIES) 126/88 REV. "A"

H & A DOC # 64809

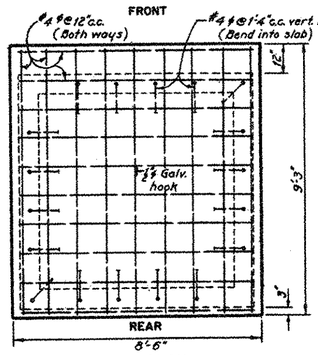
K-1402



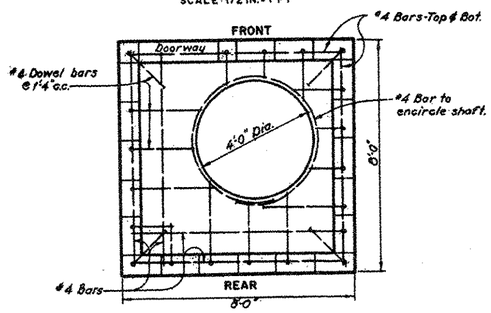
PLAN OF GAGING STATION
SCALE: 1/2 IN. = 1 FT.



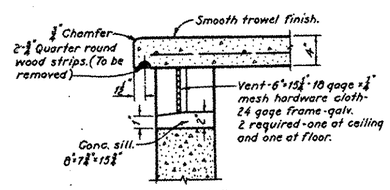
FLUSHING TANK SUPPORT
SCALE: 3 IN. = 1 FT.



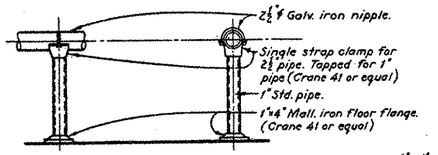
ROOF PLAN
SCALE: 1/2 IN. = 1 FT.



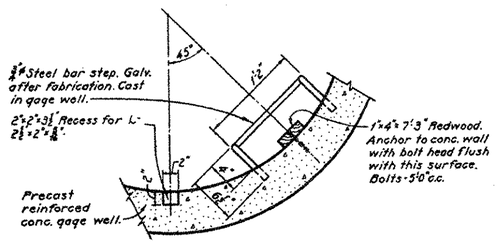
FLOOR PLAN
SCALE: 1/2 IN. = 1 FT.



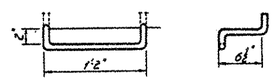
DETAIL "X"
SCALE: 1-1/2 IN. = 1 FT.



PIPE SUPPORT DETAIL
NOT TO SCALE

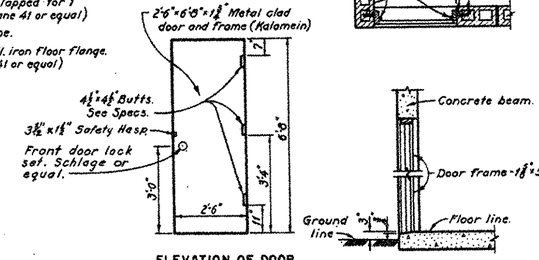


PLAN



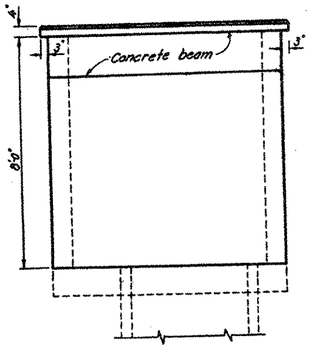
ELEVATION END VIEW

STEP DETAIL
SCALE: 1-1/2 IN. = 1 FT.

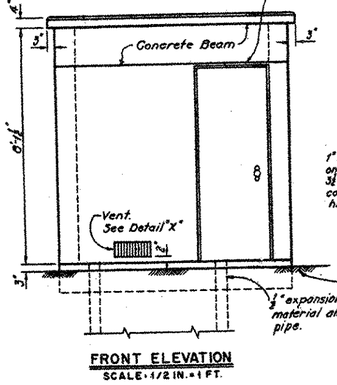


ELEVATION OF DOOR
SECTION THRU SILL

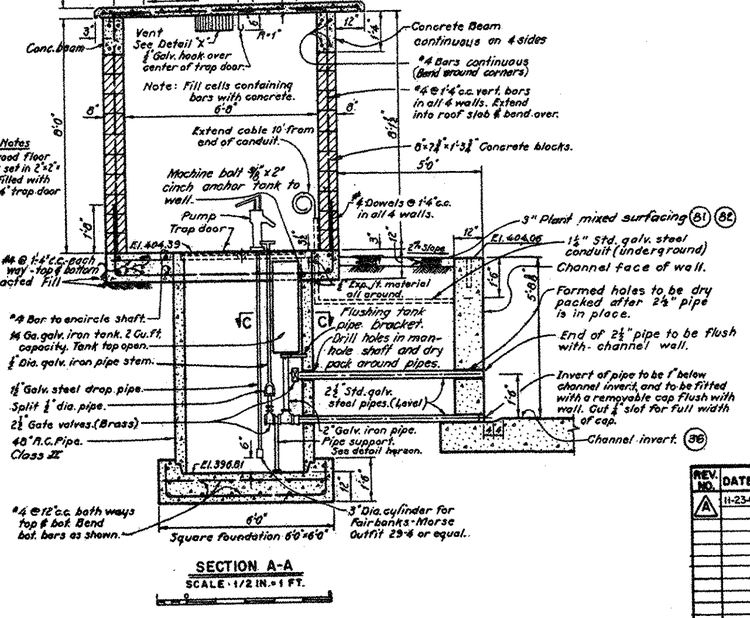
DOOR DETAILS
SCALE: 1/2 IN. = 1 FT.



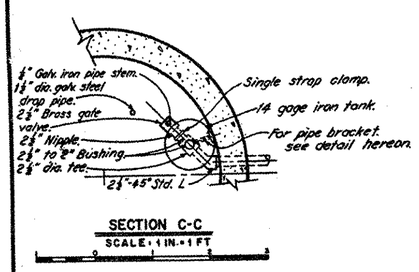
REAR ELEVATION
SCALE: 1/2 IN. = 1 FT.



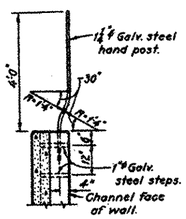
FRONT ELEVATION
SCALE: 1/2 IN. = 1 FT.



SECTION A-A
SCALE: 1/2 IN. = 1 FT.



SECTION C-C
SCALE: 1 IN. = 1 FT



SECTION K-K
SCALE: 1/2 IN. = 1 FT

GENERAL NOTES

For details of bridge across channel - See sheet 90
Payment for all work shown hereon, except Plant mixed surfacing, channel wall, channel invert, 1/4" Galv. conduit and Pace shall be made under contract item number (78) Gaging Station.

RECORD DRAWING - AS CONSTRUCTED
CONT. No. 58-126 REV. A DATE 11-23-61 BY P.C.B.
CONT. No. ... REV. ... DATE ... BY ...
CONT. No. ... REV. ... DATE ... BY ...

DATUM IS MEAN SEA LEVEL

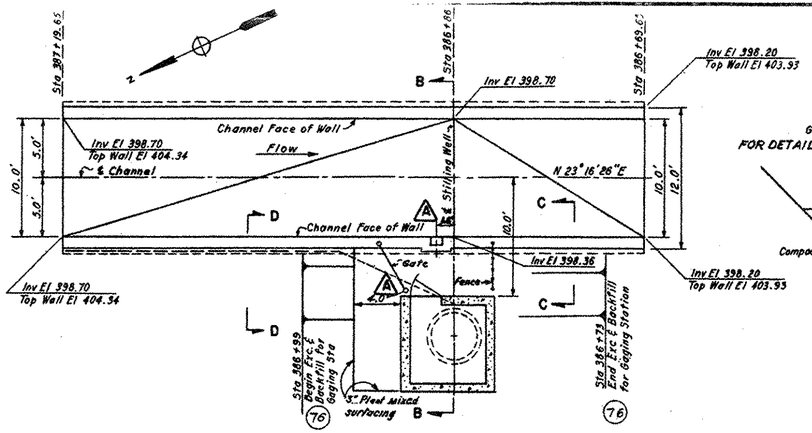
REV. NO.	DATE	REVISION	REV. CHK.	APP.
A	11-23-61	Added Fence & 3" Duct Moved		
		Gate & Gaging Station		
		Ladder "As Constructed"	PCB	

CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

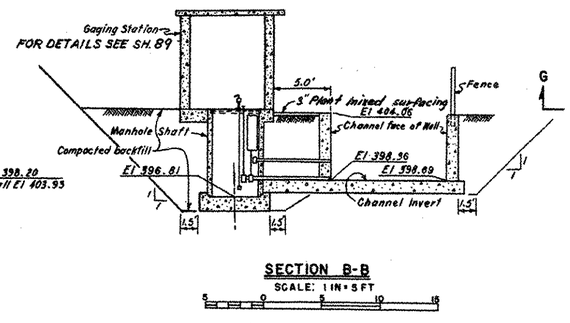
ENGINEER: C.W.L. F.D.S.
DRAWN BY: R.H.S.
CHECKED BY: F.D.S. C.W.L. W.A.B.
SUBMITTED BY: Chief, Design Branch
APPROVAL RECOMMENDED: Chief, Engineering Division
APPROVED: Colonel, C.E., District Engineer
SCALE: AS SHOWN
DATE: MAY 1958
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25
SHEET 89 OF 102
FILE NO. (O. O. 588185) 126/89 REV. "A"

SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
GAGING STATION

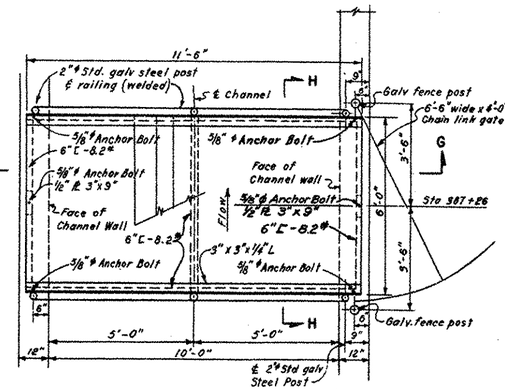
H-4 DOC # 648091



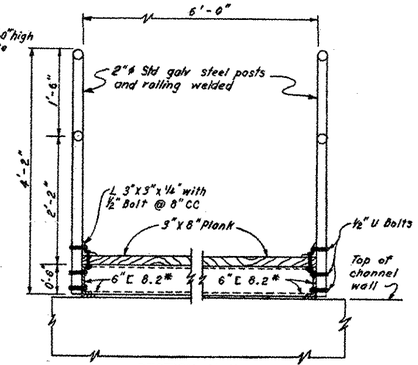
LOCATION PLAN
SCALE: 1 IN = 5 FT



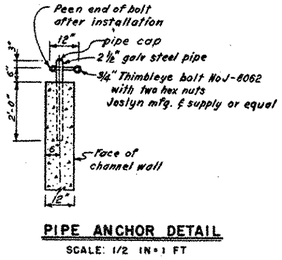
SECTION B-B
SCALE: 1 IN = 5 FT



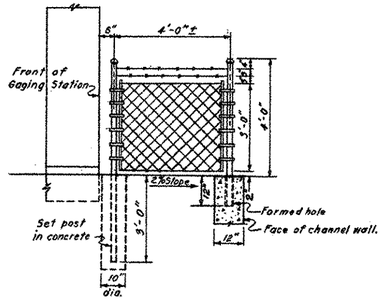
PLAN OF BRIDGE
SCALE: 1/2 IN = 1 FT



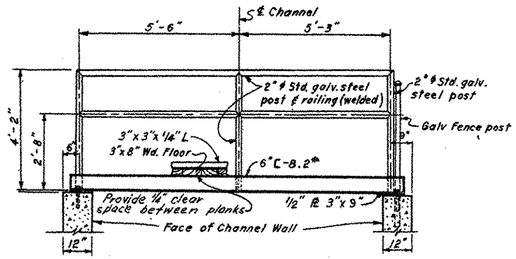
SECTION H-H
SCALE: 1 IN = 1 FT



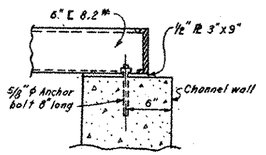
PIPE ANCHOR DETAIL
SCALE: 1/2 IN = 1 FT



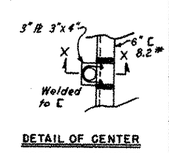
ELEVATION C-C
SCALE: 1/2 IN = 1 FT.



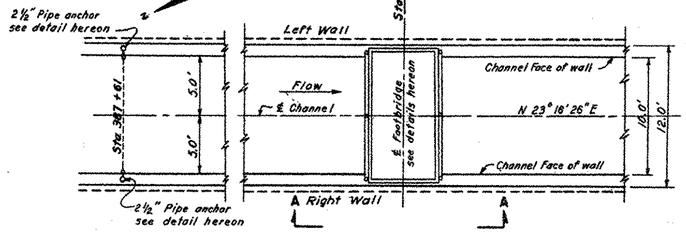
SECTION G-G
SCALE: 1/2 IN = 1 FT



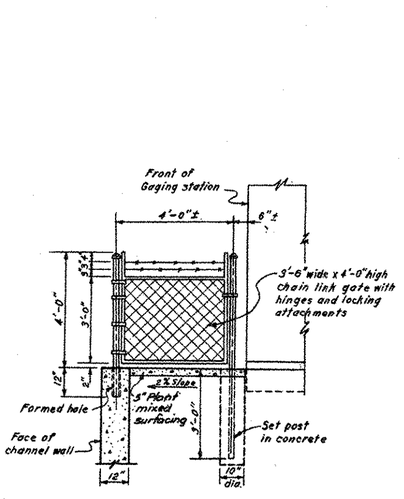
DETAIL OF ANCHOR AND BEARING PLATE
NOT TO SCALE



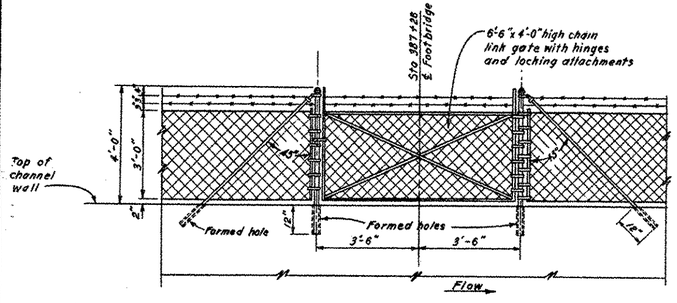
DETAIL OF CENTER POST ATTACHMENT
NOT TO SCALE



LOCATION PLAN
SCALE 1 IN = 5 FT

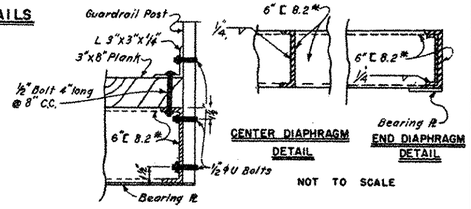


ELEVATION D-D
SCALE: 1/2 IN = 1 FT



ELEVATION A-A
SCALE: 1/2 IN = 1 FT
RIGHT WALL

FOOT BRIDGE DETAILS



RECORD DRAWING - AS CONSTRUCTED
CONT. No. 59-126 REV. A DATE 11-23-61 BY P.C.B.
CONT. No. ... REV. ... DATE ... BY ...
CONT. No. ... REV. ... DATE ... BY ...

GENERAL NOTES

Payment for gaging station and bridge shown hereon shall be made under contract item number (76) Gaging Station.

Payment for fence shown hereon shall be made under contract item number (77) Fencing.

DATUM IS MEAN SEA LEVEL

REV NO.	DATE	REVISION	REV.	CHK.	APP.
A	11-23-61	Moved Gate & Gaging Station Ladder "As Constructed"	PCB		

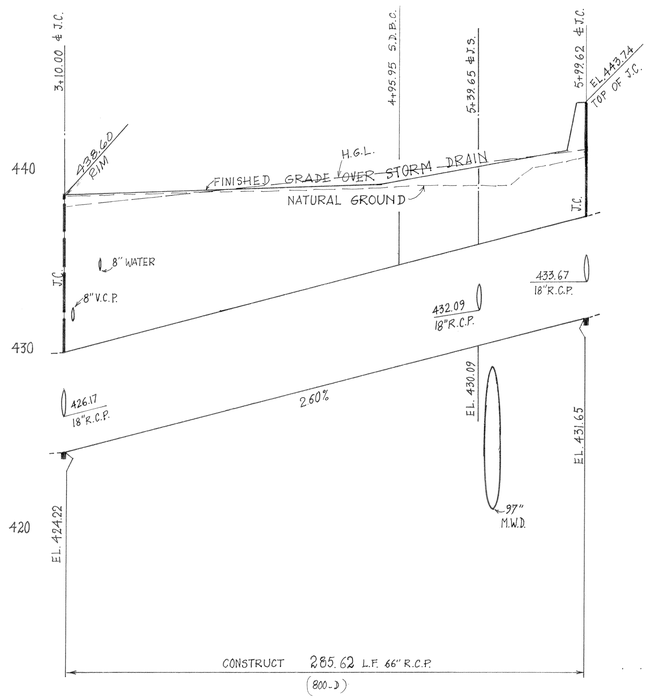
CORPS OF ENGINEERS, U. S. ARMY
OFFICE OF THE DISTRICT ENGINEER
LOS ANGELES, CALIFORNIA

ENGINEER: C.W.L. F.D.S.
DRAWN BY: B.O.H.
CHECKED BY: F.D.S. W.A.B. C.W.L.
SUBMITTED BY: CHIEF, DESIGN BRANCH
APPROVAL RECOMMENDED: CHIEF, ENGINEERING DIVISION
APPROVED: COLONEL, C. E. DISTRICT ENGINEER

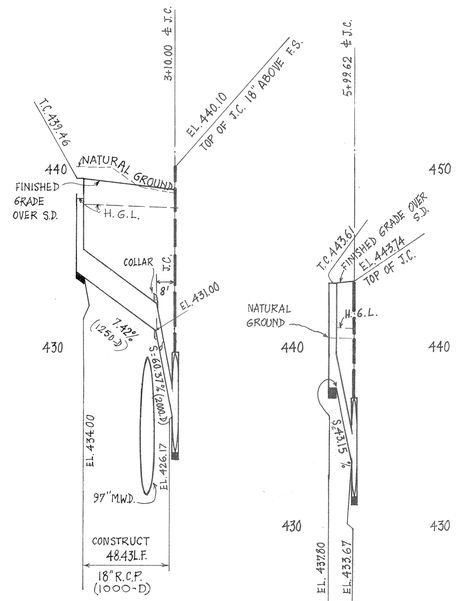
SANTA ANA RIVER BASIN (AND ORANGE COUNTY), CALIFORNIA
CARBON CANYON CREEK IMPROVEMENT
CARBON CANYON DAM
CARBON CANYON CHANNEL
GAGING STATION BRIDGE DETAILS

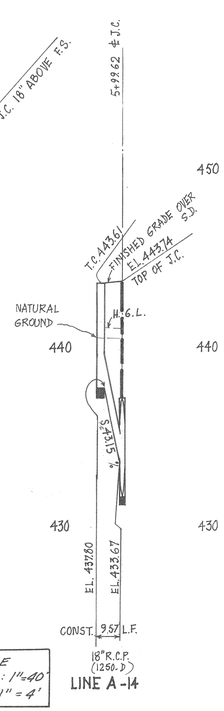
SCALE: AS SHOWN
DATE: MAY 1958
TO ACCOMPANY SPECIFICATIONS CIV ENG-04-353-59-25
SHEET 90 OF 102
FILE NO. (D. O. SERIES) 126/90 REV. "A"

H&A DOC # 64809



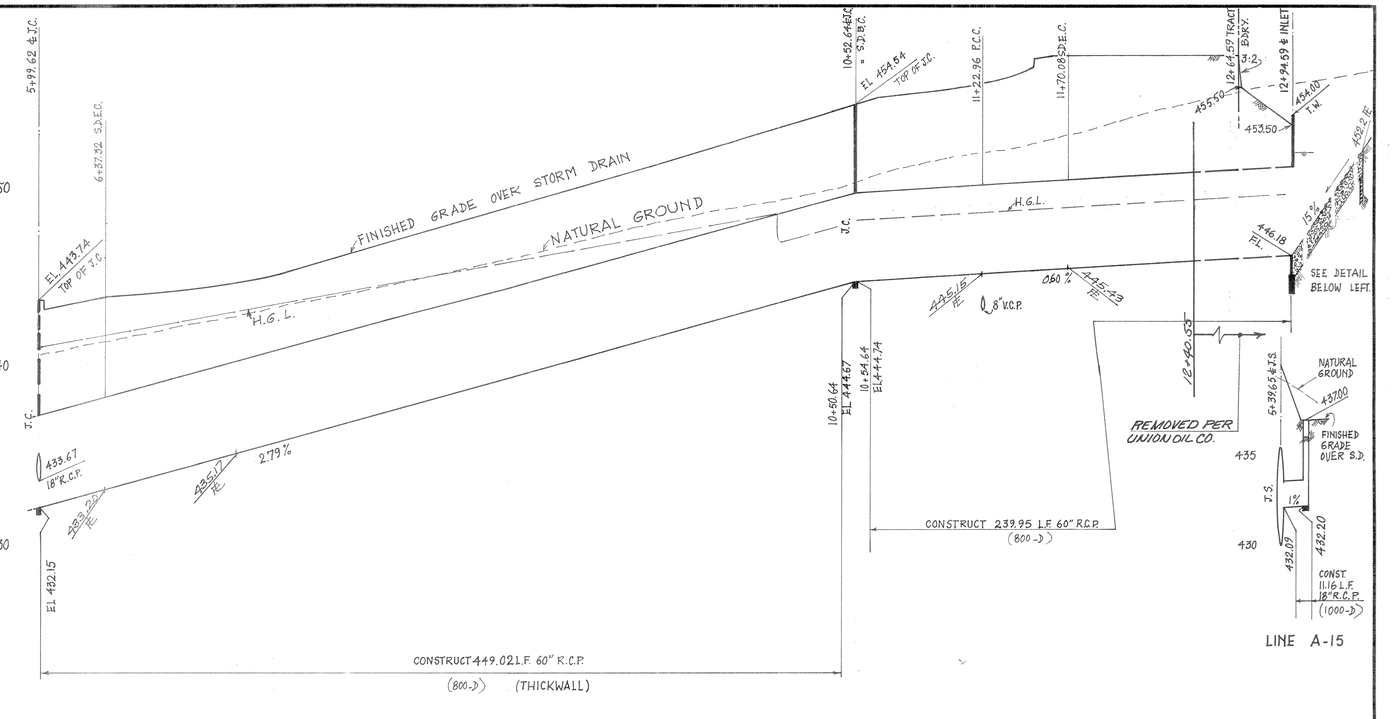
LINE A-13



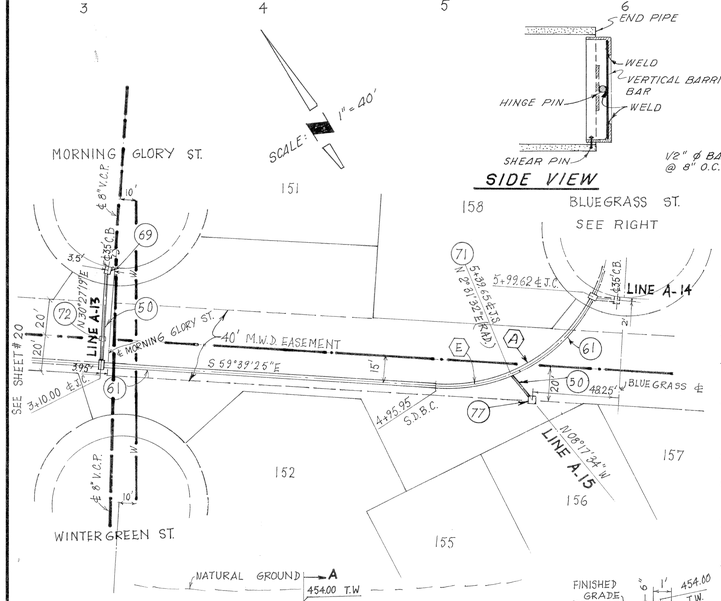


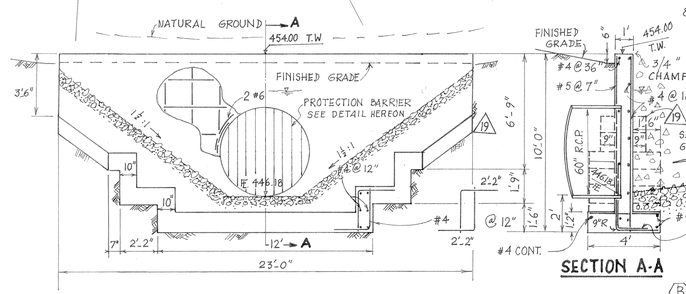
LINE A-14

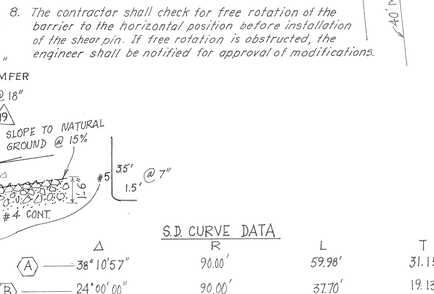
SCALE
HORIZ.: 1"=40'
VERT.: 1" = 4'



LINE A-15

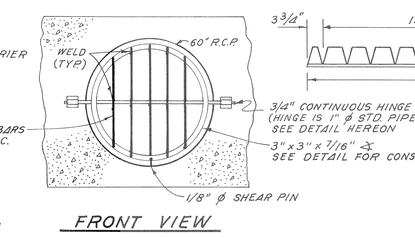




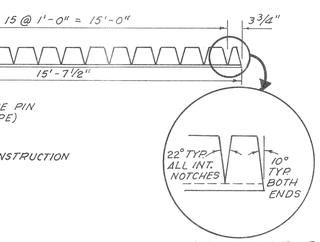


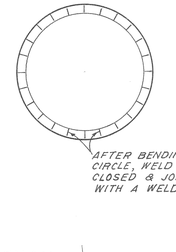
SECTION A-A

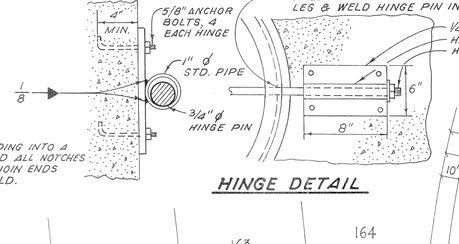
75 INLET STRUCTURE DETAILS

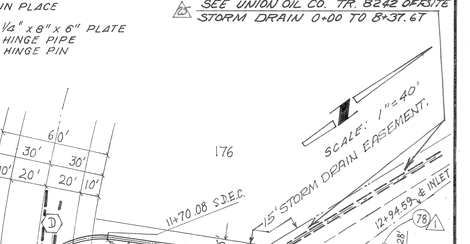


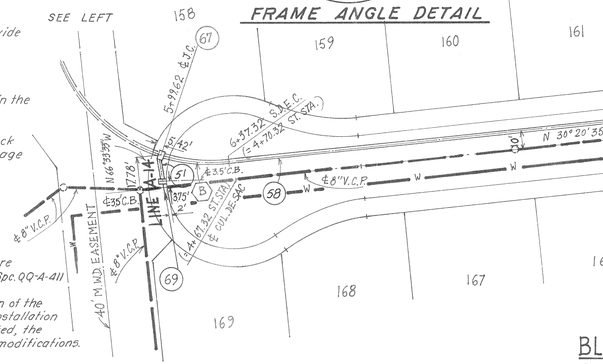
NOTES:
1. The shear pin holes shall be drilled to provide a tight fit with shear pins in place.
2. Peen shear pin after installation.
3. Frome shall have oustanding leg facing in the direction of flow.
4. Thread ends of hinge pin so that nuts & lock washers are flush with hinge plate. Damage threads beyond nut face.
5. Galvanize after fabrication.
6. Cover movable contact surfaces with waterproof grease prior to installation
7. Shear pin material shall be comercially pure aluminum wire, alloy 1100, temper O Fed. Spec. QQ-A-411
8. The contractor shall check for free rotation of the barrier to the horizontal position before installation of the shear pin. If free rotation is obstructed, the engineer shall be notified for approval of modifications.











BLUEGRASS ST.
(SEE SHEET #4)

CONSTRUCTION NOTES

(50) CONSTRUCT 18" R.C.P. (1000-D)
(51) CONSTRUCT 18" R.C.P. (1250-D)
(58) CONSTRUCT 60" R.C.P. (800-D)
(61) CONSTRUCT 66" R.C.P. (800-D)
(67) CONSTRUCT JUNCTION CHAMBER PER BREA STD. 517.
(69) CONSTRUCT INLET TYPE 0S PER BREA STD. 505.
(72) CONSTRUCT STORM DRAIN PIPE COLLAR PER BREA STD. 514.
(75) CONSTRUCT INLET STRUCTURE (TEMPORARY)
(71) CONSTRUCT JUNCTION STRUCTURE TYPE VI CASE I PER DETAIL SHEET 18
(77) CONSTRUCT AREA DRAIN PER DETAIL SHEET # 19.
(78) CONSTRUCT GROUTED RIP-RAP (18" THICK)

S.D. CURVE DATA	R	L	T
(A) Δ = 38° 10' 57"	90.00'	59.98'	31.15'
(B) Δ = 24° 00' 00"	90.00'	37.70'	19.13'
(C) Δ = 44° 46' 09"	90.00'	70.32'	37.07'
(D) Δ = 59° 59' 41"	45.00'	47.12'	25.98'
(E) Δ = 27° 49' 03"	90.00'	43.70'	22.29'

REVISIONS			
Nº	DESCRIPTION	APPROVED	DATE
1	INLET ALIGNMENT CORRECTED	Sam W. Peterson	1.31.78
2	REVISED INLET STRUCTURE DETAILS (75)	Sam W. Peterson 6/21/78	6.20.78
3	REVISED STM DRN ALIGN. PER UNION OIL CO. "AS-BUILT"		1-28-82

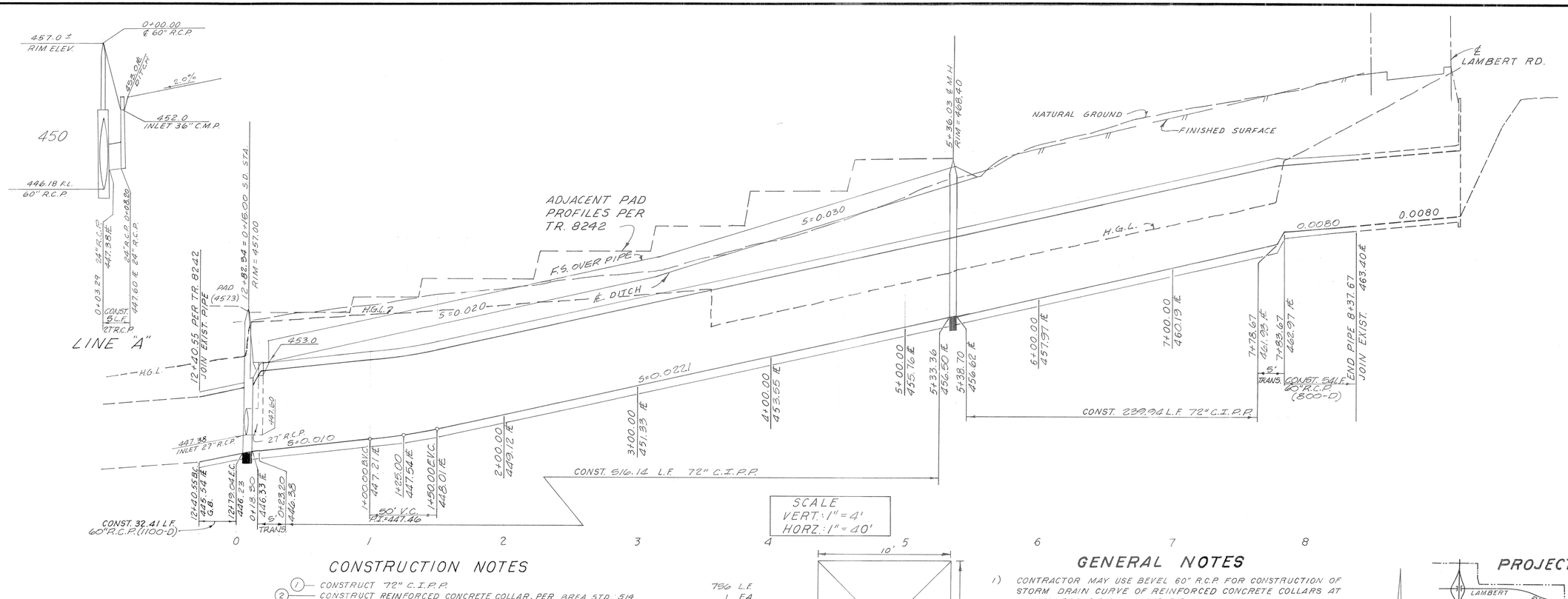
1756-21

ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

TRACT NO. 8242

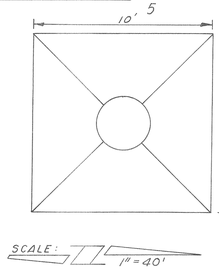
DRAWN BY: H.V.N.	APPROVED: Donald K. Keefe	SHEET 21 OF 27
CHECKED BY: L.R.W	CITY ENGINEER R.C.E. 9851	
DATE: 9/14/77	1-28-82	

J.H.H. JOB NO. 1785



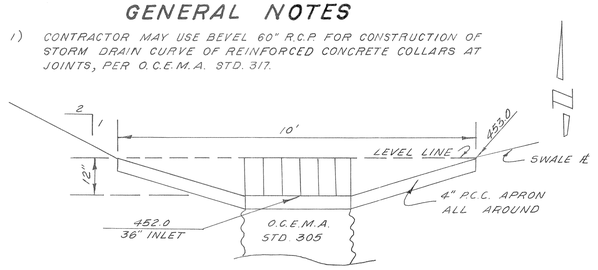
CONSTRUCTION NOTES

1	CONSTRUCT 72" C.I.P.P.	796 L.F.
2	CONSTRUCT REINFORCED CONCRETE COLLAR, PER BREA STD. 514	1 EA.
3	CONSTRUCT MANHOLE PER BREA STD. 519	1 EA.
4	CONSTRUCT INLET TYPE "I", WITH D_i = 36" C.M.P. PER O.C.E.M.A. STD. 305	1 EA.
5	CONSTRUCT 27" R.C.P. (1250 D)	8 L.F.
6	CONSTRUCT MANHOLE PER BREA STD. 517	1 EA.
7	CONSTRUCT 60" R.C.P. (1100-D)	32 L.F.
8	RELOCATE 60" R.C.P. (800-D)	54 L.F.



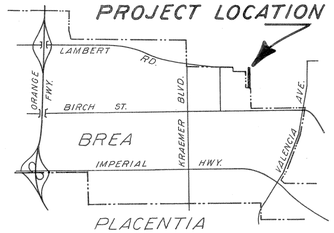
GENERAL NOTES

1) CONTRACTOR MAY USE BEVEL 60" R.C.P. FOR CONSTRUCTION OF STORM DRAIN CURVE OF REINFORCED CONCRETE COLLARS AT JOINTS, PER O.C.E.M.A. STD. 317.



DOWNDRAIN DETAIL

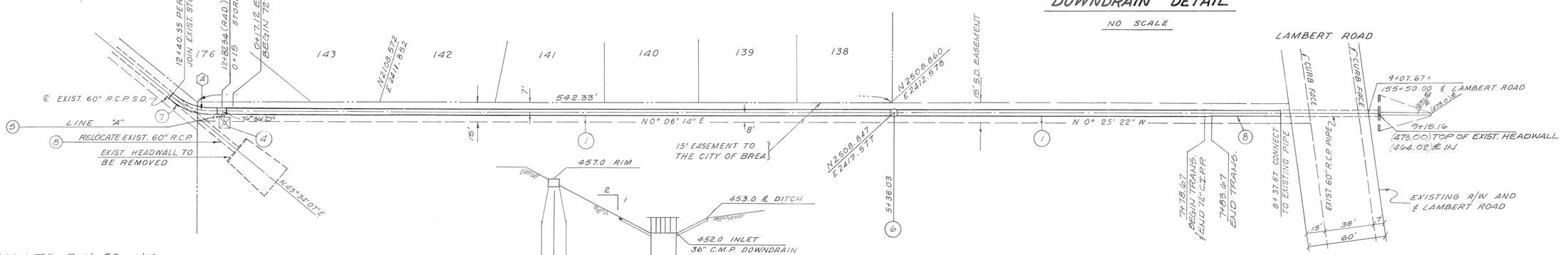
NO SCALE



LOCATION MAP

NO SCALE

TRACT 8242



"AS-BUILT" 7-11-80 WJG

REVISED PIPE SIZE AND TYPE	5/27/80 WJG	Supp 6/25/80

CURVE DATA

	Δ	R	L	T
4	45° 27' 53"	45.00'	37.71'	18.85

AS BUILT 9-12-80

1756-36

PRIVATE ENGINEERS NOTICE TO CONTRACTORS

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE THERE ARE NO EXISTING UTILITIES EXCEPT AS SHOWN ON THESE PLANS.

THE CONTRACTOR IS REQUIRED TO TAKE DUE PRECAUTIONARY MEASURES TO PROTECT THE UTILITY LINES AND ANY OTHER LINES NOT OF RECORD OR NOT SHOWN ON THESE PLANS. THE CONTRACTOR SHALL OBTAIN AND HAVE AVAILABLE ON JOB SITE, COPIES OF APPLICABLE STANDARDS SHOWN ON PLANS AND BE FAMILIAR WITH THEIR CONSTRUCTION.

Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this Project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineer harmless from any and all liability, real or alleged, in connection with the performance of work on this Project, excepting for liability arising from the sole negligence of the Owner or the Engineer.

CCEELS CALIFORNIA COUNCIL OF CIVIL ENGINEERS AND LAND SURVEYORS

BENCH MARK:

O.C.S. 2C-86-70 ELEV. = 382.74

ALUMINUM CAP IN THE NORTHWEST PART OF THE INTERSECTION OF KRAEMER BLVD. AND A FLOOD CONTROL CHANNEL; ABOUT 208 FT. NORTH ALONG THE EAST EDGE OF THE SOUTHERN PACIFIC R.R. CROSSING OF THE BLVD. (THE FIRST R.R. NORTH OF IMPERIAL HIGHWAY.) 36 FT. WEST OF THE CENTERLINE OF THE BLVD. SET IN THE TOP OF THE WEST END OF A CONCRETE RETAINING WALL WHERE IT JOINS A CONCRETE WINGWALL, ABOUT LEVEL WITH THE BLVD.

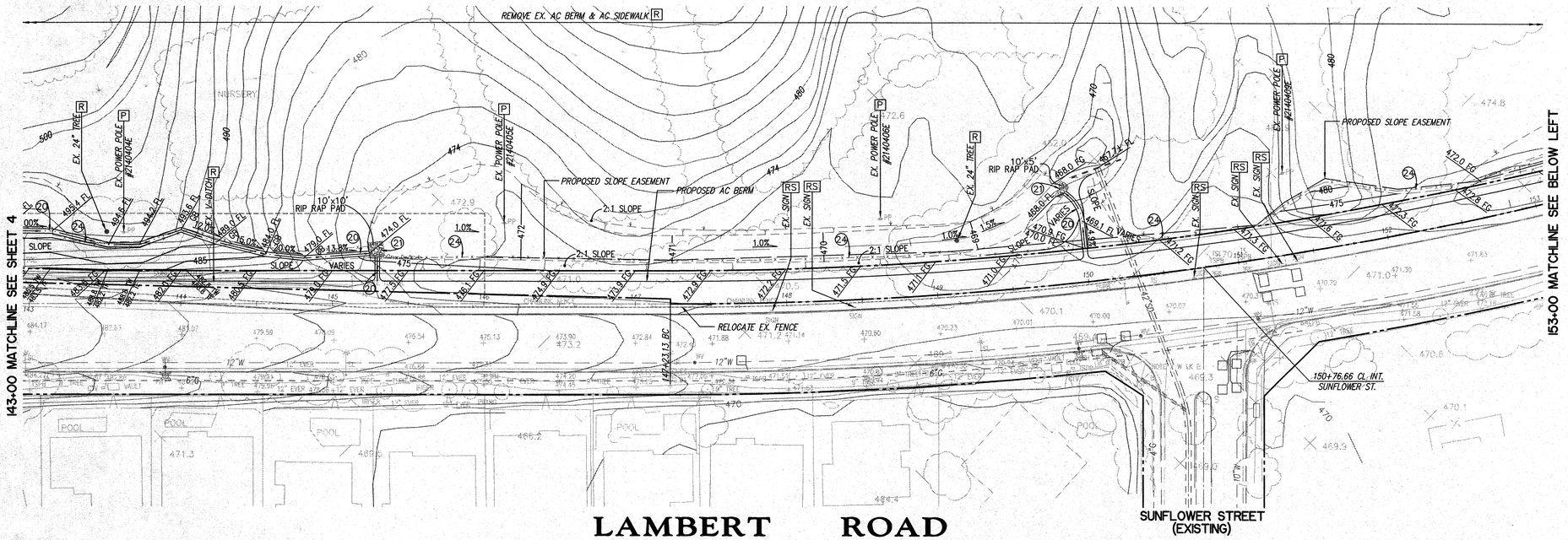
JENNINGS · HALDERMAN · HOOD
REGISTERED CIVIL ENGINEERS
540 NORTH GOLDEN CIRCLE DRIVE
SANTA ANA, CALIFORNIA (714) 835-3611
PREPARED UNDER THE SUPERVISION OF:
Lawrence R. Klein DATE: 4/18/80
RCE 19355

ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

UNION OIL COMPANY
TR. 8242 OFFSITE
STORM DRAIN 0+00.00 TO 8+37.67

Drawn by: R.R.A.	Approved: Melo K Keith, City Engineer R.C.E. 18811	Sheet 1 OF 1
Checked by: S.P.		
Date: 2-14-80		

J.H.H. Job 2005



GRADING CONSTRUCTION NOTES

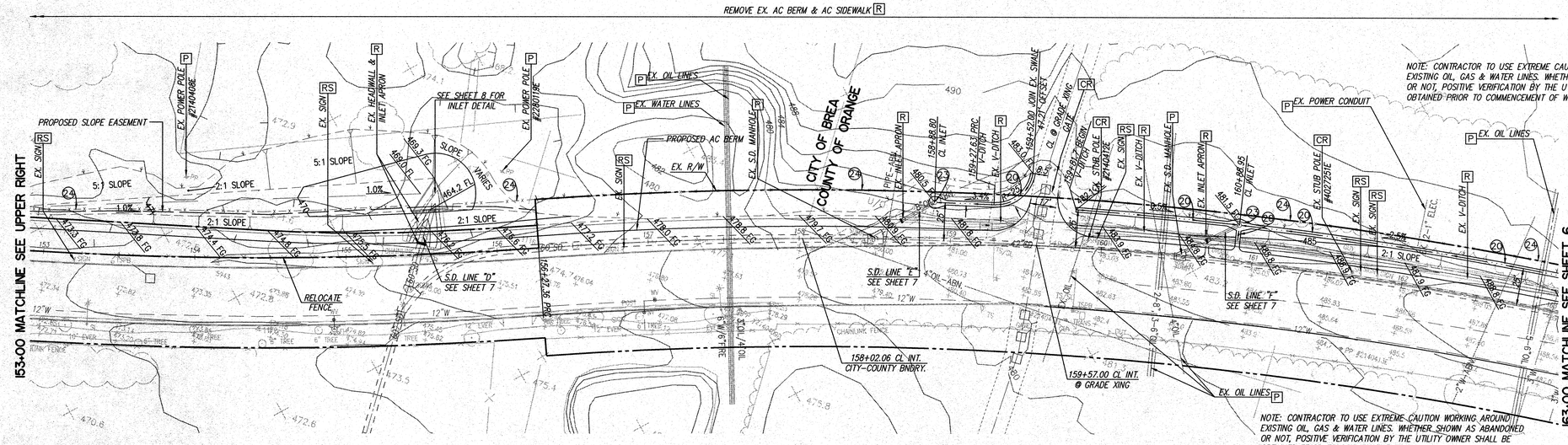
(20)—CONST. "V" DITCH PER DETAIL ON SHEET 8
(21)—CONST. RIP-RAP PER DETAIL ON SHEET 8

(23)—CONST. "V" DITCH DEPRESSION PER DETAIL ON SHEET 8
(24)—CONST. 6' HIGH CHAIN LINK FENCE

RELOCATION NOTES

(30)—RELOCATE EXISTING STREET LIGHT PER CITY STD. 820

NOTE: CONTRACTOR TO USE EXTREME CAUTION WORKING AROUND EXISTING OIL, GAS & WATER LINES. WHETHER SHOWN AS ABANDONED OR NOT, POSITIVE VERIFICATION BY THE UTILITY OWNER SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF WORK.



EXISTING FEATURES LEGEND

[P]—PROTECT IN PLACE
[R]—REMOVE EXISTING STRUCTURE
[CR]—COORDINATE RELOCATION WITH AFFECTED AGENCY
[RS]—REMOVE AND SALVAGE (TO CITY OR COUNTY YARD)

NOTE: ALL EXISTING STRUCTURES TO BE RELOCATED SHALL BE PLACED IN THE SAME RELATIVE LOCATION FROM THE EXISTING CURB TO THE PROPOSED CURB, UNLESS OTHERWISE SHOWN ON PLAN.

NOTE: TRAFFIC SIGNAL POLES, PULLBOXES CONTROLLERS & SENSORS TO BE RELOCATED PER TRAFFIC SIGNAL RELOCATION PLAN

NOTE: SEE STREET IMPROVEMENT SHEETS FOR SAWCUT LINES & PAVEMENT REMOVAL.

LANDSCAPE NOTE: ALL PROPOSED SLOPES SHALL BE HYDRO-SEEDED USING A DROUGHT-TOLERANT SEED MIX TO BE SPECIFIED BY THE LANDSCAPE ARCHITECT

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

RG 5/31/01

BENCHMARK: *No. 2L 13 70 ELEV. 490.778*

FROM THE INTERSECTION OF VALENCIA AVE. WITH ROSE DR. AND BIRCH ST. GO 0.2 MI. N'LY. ALONG VALENCIA AVE. TO ITS JUNCTION WITH AN A/C RD. GOING E'LY., 42.6 FT. E'LY. FROM THE CENTER OF THE A/C RD., 14 FT. E'LY OF SPUR POLE #788040H, 26.7 FT. NW'LY. OF POWER POLE (NO NUMBER), 2.5 FT. W'LY. OF A WITNESS POST WITH PADDLE, SET IN THE TOP OF A 6" X 6" CONCRETE POST W'LY. 1.5 FT. ABOVE THE GROUND SURFACE.

OWNER/DEVELOPER:
BREA OLINDA VENTURES, L.L.C.
c/o PLC LAND COMPANY
19 CORPORATE PLAZA
NEWPORT BEACH, CA. 92660

SOIL FIRM:
LEIGHTON & ASSOCIATES, INC.
659 S. BREA CANYON ROAD, SUITE 4
WALNUT, CA 91789
(909)869-6382

PREPARED BY:
PARDEE, CORNWELL & ASSOCIATES, INC.
Planning / Engineering / Surveying
151 KALMUS DRIVE BLDG. M, SUITE 2
COSTA MESA, CALIF. 92626
(714) 241-3800 241-3432 FAX

FRED CORNWELL R.C.E. 45591 — DATE 5.16.01 — EXP. DATE 12/31/02

REGISTERED PROFESSIONAL ENGINEER — FRED CORNWELL — No. 45591 Exp. 12/31/02 — CIVIL — STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

K-1408

REVIEWED BY:

PHIL A. WRAY — CITY ENGINEER — 38971 RCE — 5-31-01 DATE

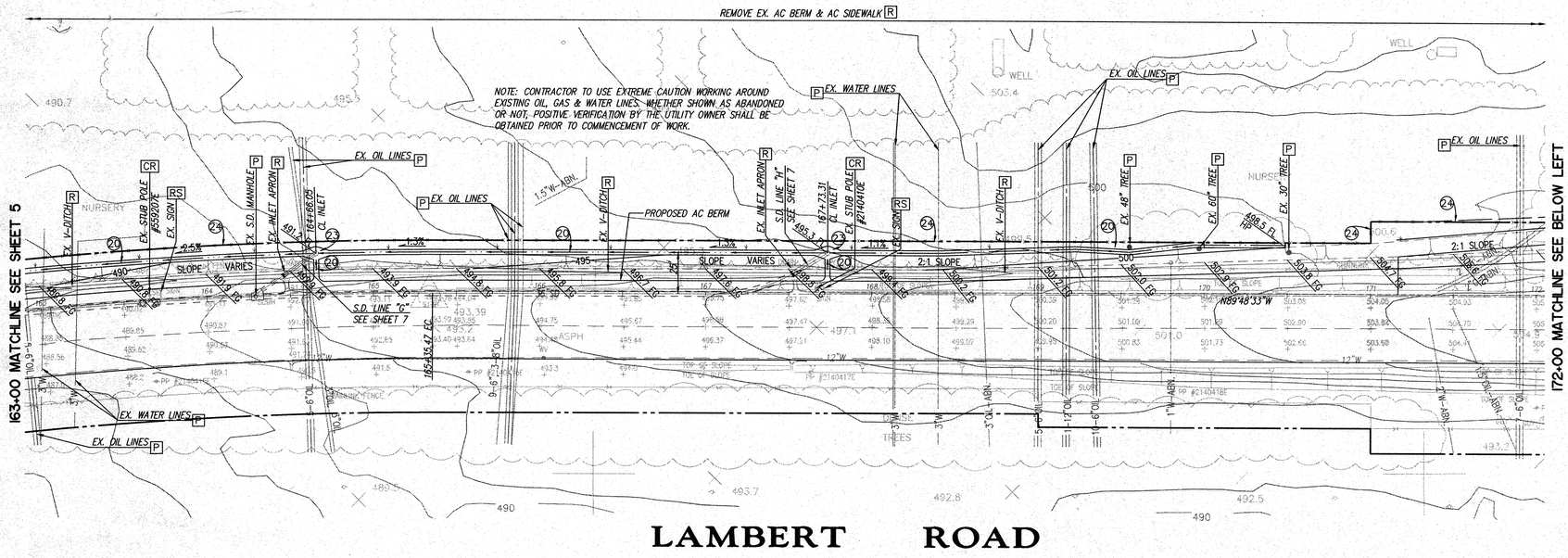
PLAN SCALE 1"=40'
PROFILE SCALE N/A
DRAWN BY: COM
DESIGN BY: RG
CHECKED BY: FKC

GRADING PLANS FOR:
LAMBERT ROAD
STA 143+00 – STA 163+00

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO.
5 OF 28



GRADING CONSTRUCTION NOTES

20—CONST. "V" DITCH PER DETAIL ON SHEET 8
21—CONST. RIP-RAP PER DETAIL ON SHEET 8
22—CONST. INLET APRON PER DETAIL ON SHEET 8
23—CONST. "V" DITCH DEPRESSION PER DETAIL ON SHEET 8
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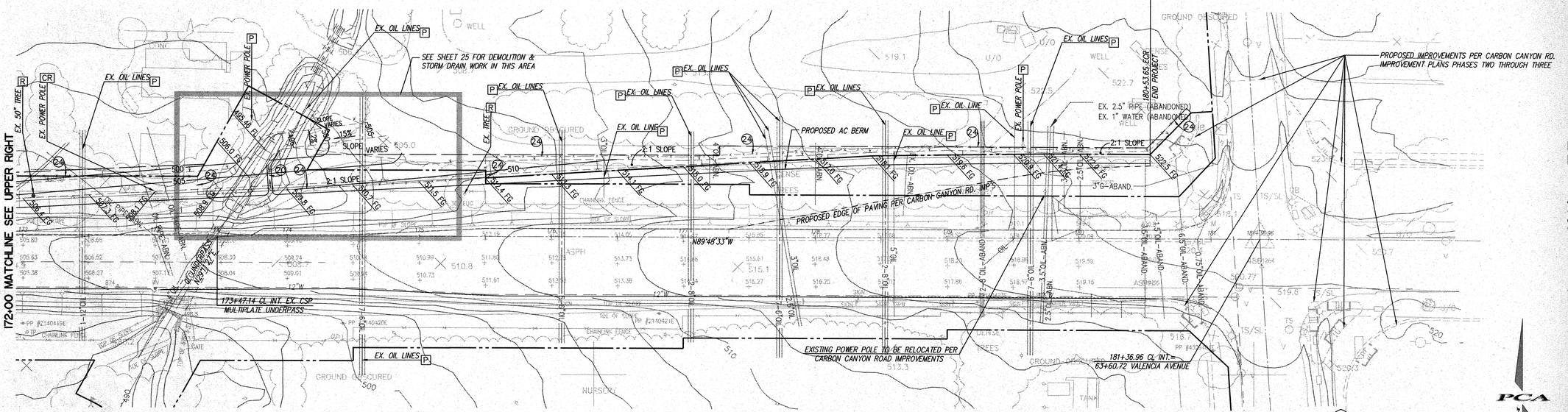

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GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

FKB 5/31/01

BENCHMARK: No. 2L 13 70 ELEV. 490.778
FROM THE INTERSECTION OF VALENCIA AVE. WITH ROSE DR. AND BIRCH ST. GO 0.2 MI. N'LY. ALONG VALENCIA AVE. TO ITS JUNCTION WITH AN A/C RD. GOING E'LY., 42.6 FT. E'LY. FROM THE CENTER OF THE A/C RD., 14 FT. E'LY. OF SPUR POLE #788040H; 26.7 FT. NW'LY. OF POWER POLE (NO NUMBER), 2.5 FT. W'LY. OF A WITNESS POST WITH PADDLE, SET IN THE TOP OF A 6" X 6" CONCRETE POST W'LY. 1.5 FT. ABOVE THE GROUND SURFACE.

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FRED CORNWELL
R.C.E. 45591
5/16/01
DATE
EXP. DATE 12/31/02

REGISTERED PROFESSIONAL ENGINEER
FRED CORNWELL
No. 45591
Exp. 12/31/02
CIVIL
STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
CITY ENGINEER — PHIL A. WRAY
38971 RCE
5-31-01 DATE

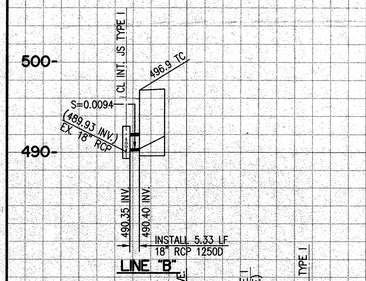
PLAN SCALE 1"=40'
PROFILE SCALE N/A
DRAWN BY: COM
DESIGN BY: RG
CHECKED BY: FKC

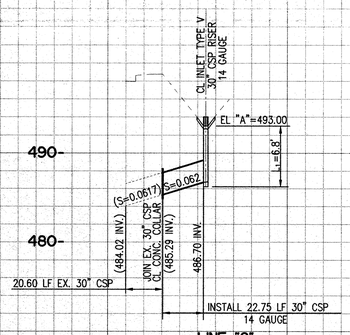
GRADING PLANS FOR:
LAMBERT ROAD
STA 163+00 – STA 180+53.65
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

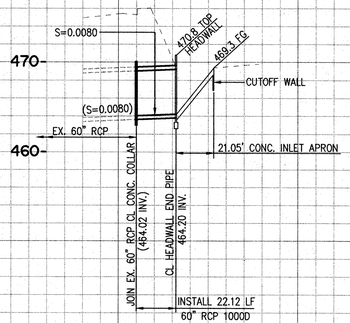
PROJECT NO.

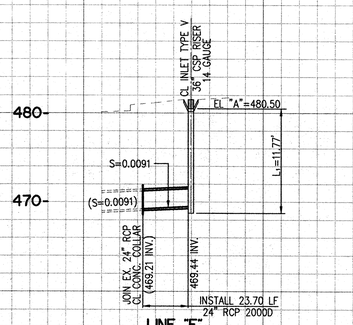
SHEET NO.
6 OF 28

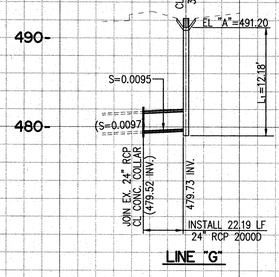
K-1429

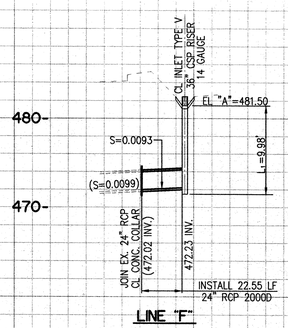


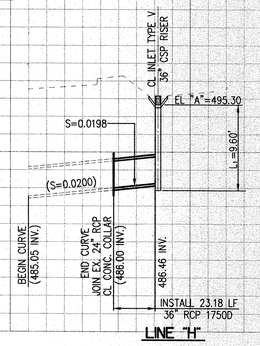


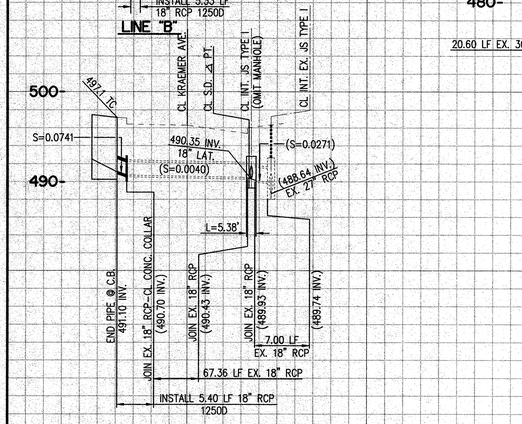




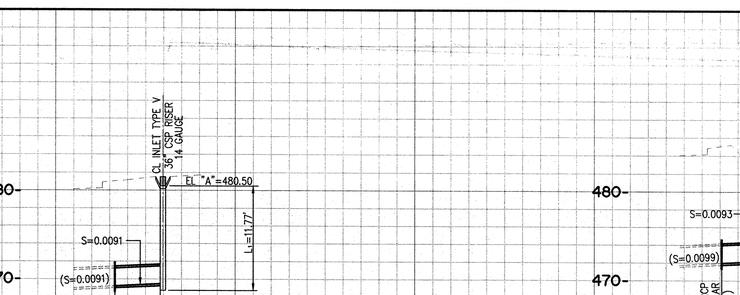




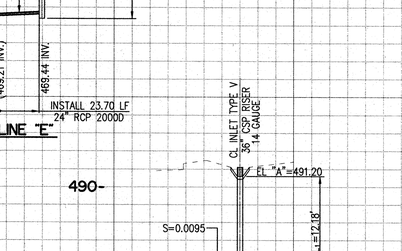




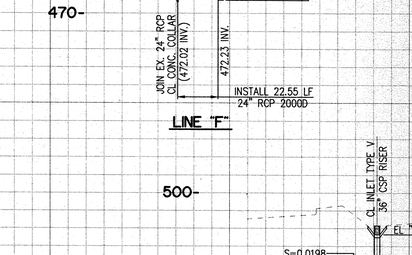
SEE GRADING SHEET 4



SEE GRADING SHEET 5

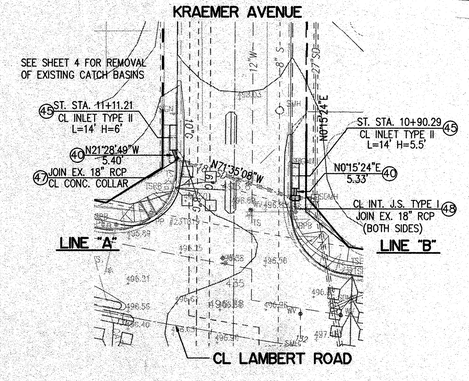


SEE GRADING SHEET 6

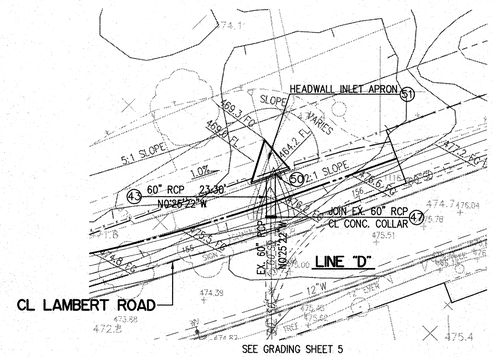


SEE GRADING SHEET 6

CONNECTOR PIPES JOIN SIDE OF CATCH BASINS @ 2' BEHIND CURB FACE (TYP.)



SEE GRADING SHEET 4



SEE GRADING SHEET 5

CONSTRUCTION NOTES

40. INSTALL 18" RCP (SEE PROFILE FOR D-LOAD)
41. INSTALL 24" RCP (SEE PROFILE FOR D-LOAD)
42. INSTALL 36" RCP (SEE PROFILE FOR D-LOAD)
43. INSTALL 60" RCP (SEE PROFILE FOR D-LOAD)
44. INSTALL 30" CSP (14 GAUGE)
45. CONST. INLET TYPE II PER O.C.P.F. & R.D. STD. 1302
46. CONST. INLET TYPE V PER O.C.P.F. & R.D. STD. 1305
47. CONST. CONCRETE COLLAR PER O.C.P.F. & R.D. STD. 1317
48. CONST. JUNCTION STRUCTURE TYPE I PER O.C.P.F. & R.D. STD. 1310
50. CONST. HEADWALL PER CALTRANS STD. D89
51. CONST. HEADWALL INLET APRON PER DETAIL ON SHEET 8

PROFILE SCALES
VERT. 1"= 8'
HORIZ. 1"=40'

PCA NORTH

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

BENCHMARK: No. 2L 13 70 ELEV. 490.778
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FRED CORNWELL R.C.E. 45591 — DATE 5/16/01
EXP. DATE 12/31/02

REGISTERED PROFESSIONAL ENGINEER
FRED CORNWELL
No. 45591
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CIVIL
STATE OF CALIFORNIA

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD

REVIEWED BY:
CITY ENGINEER PHIL A. WRAY — RCE 38971 — DATE 5-31-01

PLAN SCALE 1"=40'
PROFILE SCALE 1"=40' HORIZ. 1"=8' VERT.
DRAWN BY: COM
DESIGN BY: RG
CHECKED BY: FKC

STORM DRAIN IMPROVEMENT PLANS FOR:
LAMBERT ROAD
W/O KRAEMER AVENUE – VALENCIA AVENUE
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

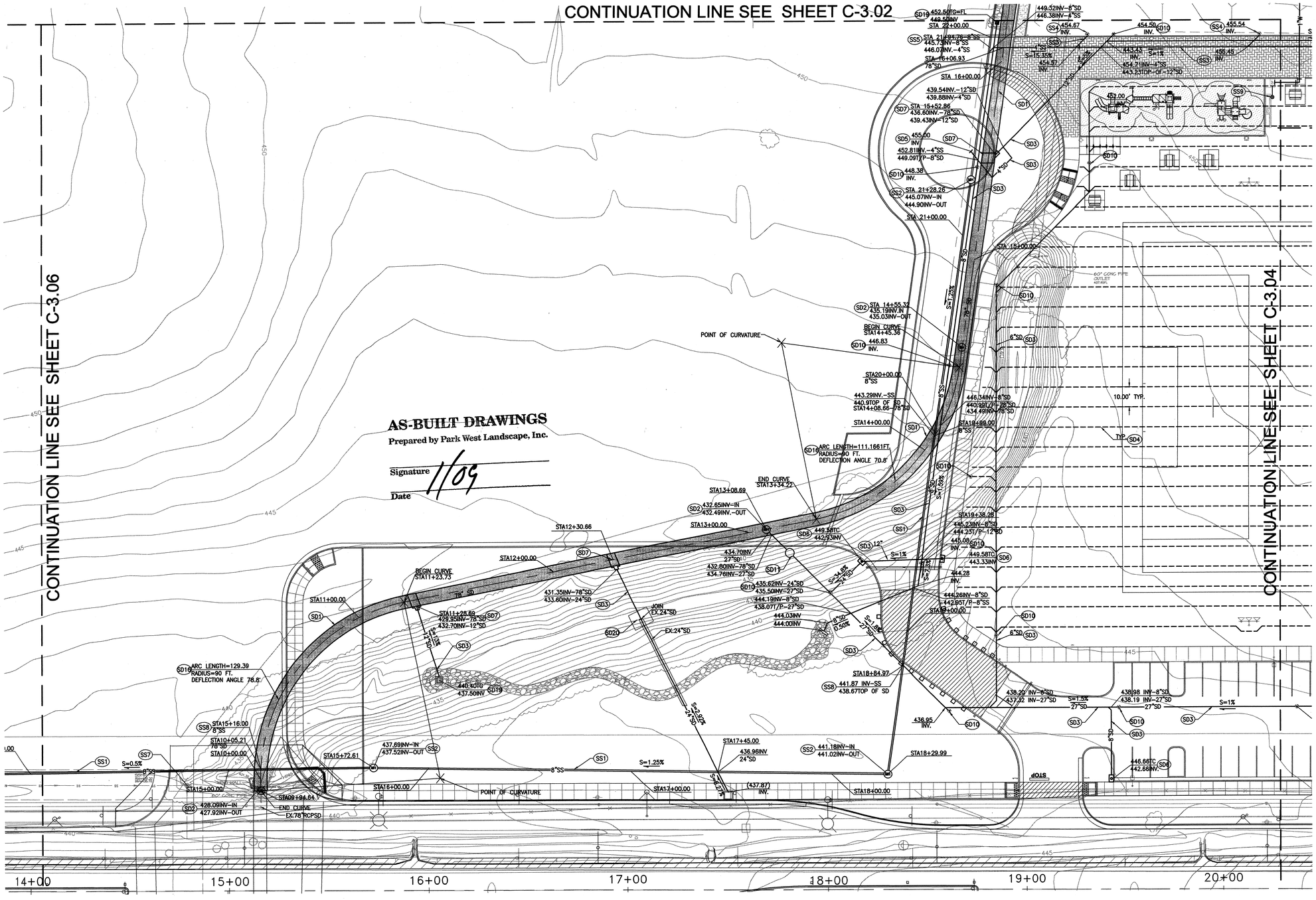
SHEET NO. 7 OF 28

CONTINUATION LINE SEE SHEET C-3.02

CONTINUATION LINE SEE SHEET C-3.06

CONTINUATION LINE SEE SHEET C-3.04

AS-BUILT DRAWINGS
Prepared by Park West Landscape, Inc.
Signature
Date 11/09



UTILITY CONSTRUCTION NOTES:

STORM DRAIN

SD1 78" RCP STORM DRAIN PIPE, D–LOAD=1400. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207–2. INSTALL PER "GREENBOOK" SECTION 306–1.2.

SD2 STORM DRAIN MANHOLE. SEE APWA STD. PLAN 320–1.

SD3 PVC SDR–35 STORM DRAIN PIPE. SEE DETAIL 10 ON SHEET C–5.01.

SD4 6" AKWADRAIN SOIL STRIP DRAIN. SEE DETAIL 7 ON SHEET C–5.02. DRAIN PIPE SHALL BE INSTALLED TO FOLLOW FINISH GRADES OF THE FIELD OR A MAXIMUM SLOPE OF 0.25% TOWARDS THE OUTLET PIPE. DRAIN PIPE LOCATION MAY BE ADJUSTED IN THE FIELD TO CLEAR ANY OBSTRUCTIONS.

SD5 6" PLANTER DRAIN. SEE DETAIL 11 ON SHEET C–5.02.

SD6 CURB OPENING CATCH BASIN, SEE CITY OF BREA STD. DWG. 505. H=4.0'.

SD7 JUNCTION COLLAR. PER APWA STD. PLAN 335–1.

SD8 STORM DRAIN (DESILTING) INLET STRUCTURE, SEE DETAIL 2, ON SHEET C–5.02.

SD9 TRENCH DRAIN, BALCO, INC. MODEL MLG–4A. SEE DETAIL 1, ON SHEET C–5.02.

SD10 STORM DRAIN CLEANOUT. SEE DETAIL 8, ON SHEET C–5.01.

SD11 CDS TECHNOLOGIES MODEL PMSU20–20. SEE DETAIL 3, ON SHEET C–5.04.

SD12 1500 GALLON CLARIFIER. JENSON PRECAST MODEL CL1500 WITH TRAFFIC RATED, FRAME AND COVER CAST IRON.

SD13 24" X 24" PRECAST CONCRETE CATCH BASIN WITH TRAFFIC RATED CAST IRON FRAME AND GRATE.

SD14 FOOTING DRAIN SEE DETAIL 7, ON SHEET C–5.01.

SD15 TRENCH DRAIN PER DETAIL 8, ON SHEET C–5.02.

SD16 BEVELED (RADIUS) RCP SD, D–LOAD=1400. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207–2. INSTALL PER "GREEN BOOK SECTION 306–1.2.

SD17 INSTALL KRISTAR FLOGARD PLUS CATCH BASIN INSERT FILTER.

SD18 18" X 18" NDS ATRIUM GRATE MODEL NO. 1881 WITH CATCH BASIN MODEL NO. 1882.

SD19 24" x 24" PRECAST CONCRETE CATCH BASIN WITH NON–TRAFFIC RATED CAST IRON FRAME AND GRATE.

SD20 REMOVE RIP RAP.

SD21 SUBGRADE DRAIN. SEE DEAIL 8, SHEET C–5.03.

SD22 INSTALL DESILTING INLET PER DETAIL 2, SHEET C–5.04.

SANITARY SEWER

SS1 VITRIFIED CLAY SANITARY SEWER PIPE. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207–8. INSTALL PER "GREENBOOK" SECTION 306–1.2.

SS2 SANITARY SEWER MANHOLE. SEE APWA STD. PLAN 200–2.

SS3 PVC SDR–35 SANITARY SEWER. SEE DETAIL 10 ON SHEET C–5.01.

SS4 SANITARY SEWER CLEANOUT. SEE DETAIL 8 ON SHEET C–5.01.

SS5 SANITARY SEWER LATERAL CONNECTION. SEE CITY OF BREA STD. DWG. 411.

SS6 CAP FOR FUTURE CONNECTION.

SS7 ADJUST EXISTING SEWER MANHOLE TO NEW GRADE.

SS8 ENCASE SEWER LINE 10' ON BOTH SIDES OF 78"SD PIPE.

SS9 INSTALL DRY WELL FOR FOUNTAIN DRAIN. SEE DETAIL 5, ON SHEET C–5.03.

SS10 CONTRACTOR SHALL POT–HOLE AND VERIFY INVERT ELEVATION OF EXISTING 8"SS AT TIE–IN LOCATION PRIOR TO START OF ANY WORK ON NEW SANITARY SEWER LINE.

DOMESTIC WATER

W1 WATERLINE. DUCTILE IRON CITY OF BREA STD. DWG. 301. SIZE AS SHOWN ON PLAN.

W2 FIRE HYDRANT ASSEMBLY. SEE CITY OF BREA STD. DWG. 303.

W3 THRUST BLOCKS AND RESTRAINT. SEE CITY OF BREA STD. DWG. 307.

W4 6" WATER METER SERVICE. SEE CITY OF BREA STD. DWG. 313.

W5 BACKFLOW PREVENTION. SEE DETAIL 6 ON SHEET C–5.03.

W6 4" WATER METER SERVICE. SEE CITY OF BREA STD. DWG. 312.

W7 WATER GATE VALVE. SEE CITY OF BREA STD. DWG 302 AND 309.

W8 COPPER TUBING, TYPE K, PER ASTM 88. FITTINGS PER ASME B16.18, CAST–COPPER–ALLOY OR ASME B16.22, COPPER, SOLDER–JOINT PRESSURE TYPE.

W9 ADJUST EXISTING WATER METER AND BACKFLOW PREVENTION ASSEMBLY TO NEW GRADE.

W10 HOT TAP WITH TAPPING SLEAVE.

W11 2" WATER METER. SEE CITY OF BREA STD. DWG. 306.

UTILITY

U1 GAS, SS AND OIL LINE BY OTHERS (NIC) TO BE INSTALLED WITH A MINIMUM OF 3' OF COVER. CONTRACTOR TO COORDINATE THE WORK WITH OWNER'S UTILITY CONTRACTOR.

U2 SEE SITE ELECTRICAL RECONSTRUCTION PLAN SHEET E1.02.

NOTES:
1. SEE SHEET C–3.07 FOR STORM DRAIN MAINLINE PROFILE.
2. SEE SHEET C–3.08 FOR SEWER MAINLINE PROFILE.

METHANE NOTES:
1. OPEN SPACES AROUND UTILITIES THAT COME INTO BUILDING THROUGH CONCRETE SHALL BE SEALED WITH EXPANSIVE FOAM.
2. CONSTRUCT UTILITY DAM IMMEDIATELY OUTSIDE OF EACH BUILDING STRUCTURE'S FOUNDATION, IN EACH UTILITY TRENCH PER DETAIL 7 ON SHEET C–5.03.

N

RECEIVED
JUL 16 2007
PARK WEST LANDSCAPE, INC.

PLAN
SCALE: 1" = 20'
20' 10' 0' 20' 40'
GRAPHIC SCALE

K-1411

LPA
Architecture
Planning
Interior Design
Landscape Architecture
Graphics

5161 California Ave, Suite 100
Irvine, California 92612

P 949 |261-1001
F 949 |260-1190
E lpa@lpainc.com
W www.lpainc.com

REGISTERED PROFESSIONAL ENGINEER
RICHARD HAHS DAVIS
No. C48082
Exp. 3/31/08
CIVIL
STATE OF CALIFORNIA

kpff Consulting Engineers
8500 Von Karman Ave. 10th FLOOR
Irvine, California 92602
(949) 252-1322 Fax (949) 252-8032

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BREA SPORTS PARK
3333 East Birch Street
Brea, CA
Developed for
City of Brea

RECORD DRAWINGS

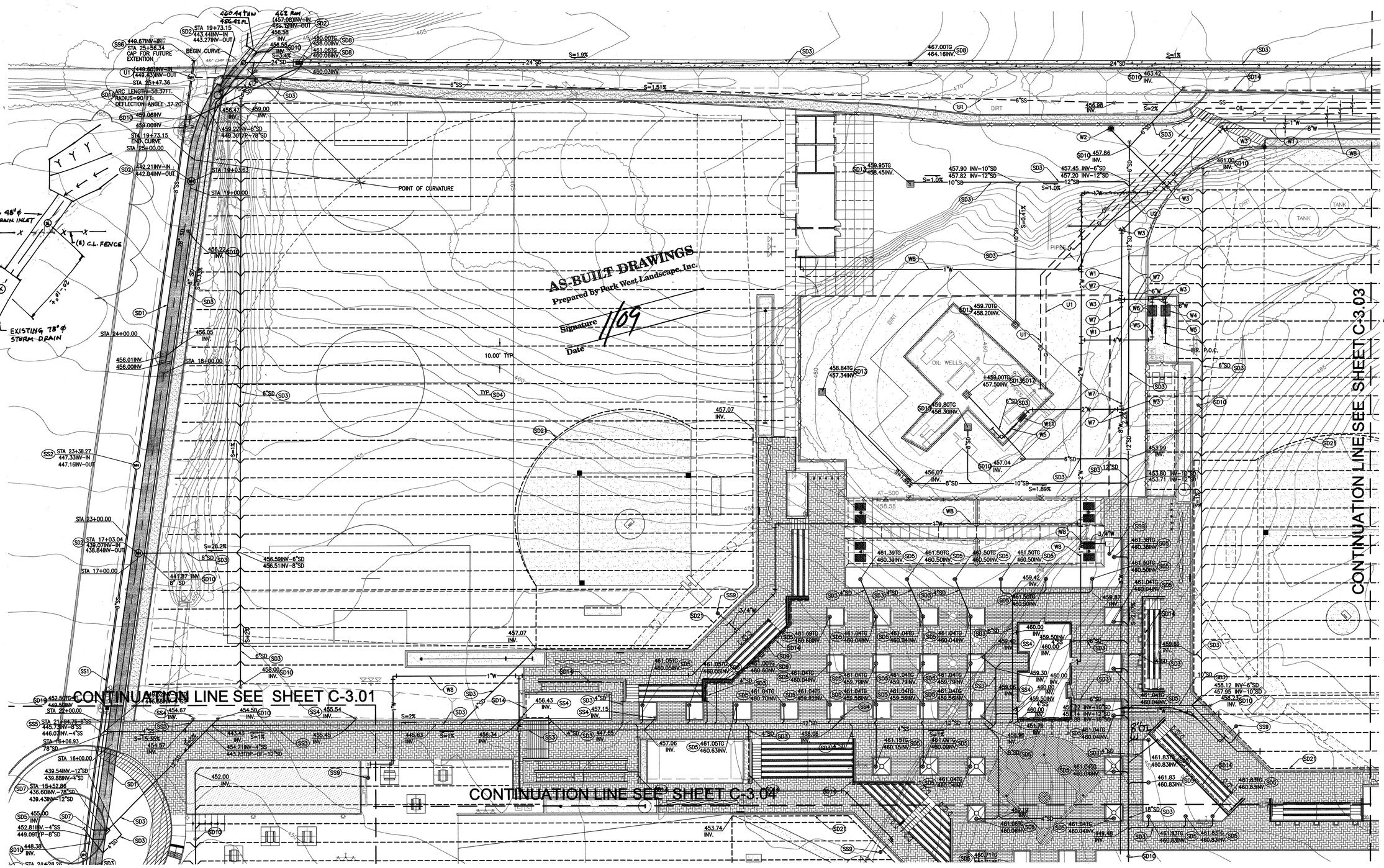
Revision	Description	Date
	100% DESIGN DEVELOPMENT	03-15-06
	50% CD SUBMITTAL	1 JUNE 06
	90% CD SUBMITTAL	08 SEPTEMBER 06
	100% CD SET / AGENCY RESUBMITTAL	17 NOV 06
	BID SET SUBMITTAL	19 MARCH 07

AS-BUILT Tish Eng

Job. No.	105416
Date	5 April 2007
Drawn by	AS
Checked by	AK

UTILITY PLAN

C-3.01



UTILITY CONSTRUCTION NOTES:

STORM DRAIN

(SD1) 78" RCP STORM DRAIN PIPE, D-LOAD=1400. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207-2. INSTALL PER "GREENBOOK" SECTION 306-1.2.

(SD2) STORM DRAIN MANHOLE. SEE APWA STD. PLAN 320-1.

(SD3) PVC SDR-35 STORM DRAIN PIPE. SEE DETAIL 10 ON SHEET C-5.01.

(SD4) 6" AKWADRAIN SOIL STRIP DRAIN. SEE DETAIL 7 ON SHEET C-5.02. DRAIN PIPE SHALL BE INSTALLED TO FOLLOW FINISH GRADES OF THE FIELD OR A MAXIMUM SLOPE OF 0.25% TOWARDS THE OUTLET PIPE. DRAIN PIPE LOCATION MAY BE ADJUSTED IN THE FIELD TO CLEAR ANY OBSTRUCTIONS.

(SD5) 6" PLANTER DRAIN. SEE DETAIL 11 ON SHEET C-5.02.

(SD6) CURB OPENING CATCH BASIN, SEE CITY OF BREA STD. DWG. 505. H=4.0'.

(SD7) JUNCTION COLLAR. PER APWA STD. PLAN 335-1.

(SD8) STORM DRAIN (DESILTING) INLET STRUCTURE, SEE DETAIL 2, ON SHEET C-5.02.

(SD9) TRENCH DRAIN, BALCO, INC. MODEL MLG-4A. SEE DETAIL 1, ON SHEET C-5.02.

(SD10) STORM DRAIN CLEANOUT. SEE DETAIL 8, ON SHEET C-5.01.

(SD11) CDS TECHNOLOGIES MODEL PMSU20-20. SEE DETAIL 3, ON SHEET C-5.04.

(SD12) 1500 GALLON CLARIFIER. JENSON PRECAST MODEL CL1500 WITH TRAFFIC RATED, FRAME AND COVER CAST IRON.

(SD13) 24" X 24" PRECAST CONCRETE CATCH BASIN WITH TRAFFIC RATED CAST IRON FRAME AND GRATE.

(SD14) FOOTING DRAIN SEE DETAIL 7, ON SHEET C-5.01.

(SD15) TRENCH DRAIN PER DETAIL 8, ON SHEET C-5.02.

(SD16) BEVELED (RADIUS) RCP SD, D-LOAD=1400. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207-2. INSTALL PER "GREEN BOOK SECTION 306-1.2.

(SD17) INSTALL KRISTAR FLOGARD PLUS CATCH BASIN INSERT FILTER.

(SD18) 18" X 18" NDS ATRIUM GRATE MODEL NO. 1881 WITH CATCH BASIN MODEL NO. 1882.

(SD19) 24" x 24" PRECAST CONCRETE CATCH BASIN WITH NON-TRAFFIC RATED CAST IRON FRAME AND GRATE.

(SD20) REMOVE RIP RAP.

(SD21) SUBGRADE DRAIN. SEE DEAIL 8, SHEET C-5.03.

(SD22) INSTALL DESILTING INLET PER DETAIL 2, SHEET C-5.04.

SANITARY SEWER

(SS1) VITRIFIED CLAY SANITARY SEWER PIPE. PIPE SPECIFICATION PER "GREENBOOK" SECTION 207-8. INSTALL PER "GREENBOOK" SECTION 306-1.2.

(SS2) SANITARY SEWER MANHOLE. SEE APWA STD. PLAN 200-2.

(SS3) PVC SDR-35 SANITARY SEWER. SEE DETAIL 10 ON SHEET C-5.01.

(SS4) SANITARY SEWER CLEANOUT. SEE DETAIL 8 ON SHEET C-5.01.

(SS5) SANITARY SEWER LATERAL CONNECTION. SEE CITY OF BREA STD. DWG. 411.

(SS6) CAP FOR FUTURE CONNECTION.

(SS7) ADJUST EXISTING SEWER MANHOLE TO NEW GRADE.

(SS8) ENCASE SEWER LINE 10' ON BOTH SIDES OF 78"SD PIPE.

(SS9) INSTALL DRY WELL FOR FOUNTAIN DRAIN. SEE DETAIL 5, ON SHEET C-5.03.

(SS10) CONTRACTOR SHALL POT-HOLE AND VERIFY INVERT ELEVATION OF EXISTING 8"SS AT TIE-IN LOCATION PRIOR TO START OF ANY WORK ON NEW SANITARY SEWER LINE.

DOMESTIC WATER

(W1) WATERLINE. DUCTILE IRON CITY OF BREA STD. DWG. 301. SIZE AS SHOWN ON PLAN.

(W2) FIRE HYDRANT ASSEMBLY. SEE CITY OF BREA STD. DWG. 303.

(W3) THRUST BLOCKS AND RESTRAINT. SEE CITY OF BREA STD. DWG. 307.

(W4) 6" WATER METER SERVICE. SEE CITY OF BREA STD. DWG. 313.

(W5) BACKFLOW PREVENTION. SEE DETAIL 6 ON SHEET C-5.03.

(W6) 4" WATER METER SERVICE. SEE CITY OF BREA STD. DWG. 312.

(W7) WATER GATE VALVE. SEE CITY OF BREA STD. DWG 302 AND 309.

(W8) COPPER TUBING, TYPE K, PER ASTM 88. FITTINGS PER ASME B16.18, CAST-COPPER-ALLOY OR ASME B16.22, COPPER, SOLDER-JOINT PRESSURE TYPE.

(W9) ADJUST EXISTING WATER METER AND BACKFLOW PREVENTION ASSEMBLY TO NEW GRADE.

(W10) HOT TAP WITH TAPPING SLEAVE.

(W11) 2" WATER METER. SEE CITY OF BREA STD. DWG. 306.

UTILITY

(U1) GAS, SS AND OIL LINE BY OTHERS (NIC) TO BE INSTALLED WITH A MINIMUM OF 3' OF COVER. CONTRACTOR TO COORDINATE THE WORK WITH OWNER'S UTILITY CONTRACTOR.

(U2) SEE SITE ELECTRICAL RECONSTRUCTION PLAN SHEET E1.02.

NOTES:

1. SEE SHEET C-3.07 FOR STORM DRAIN MAINLINE PROFILE.
2. SEE SHEET C-3.08 FOR SEWER MAINLINE PROFILE.

METHANE NOTES:

1. OPEN SPACES AROUND UTILITIES THAT COME INTO BUILDING THROUGH CONCRETE SHALL BE SEALED WITH EXPANSIVE FOAM.
2. CONSTRUCT UTILITY DAM IMMEDIATELY OUTSIDE OF EACH BUILDING STRUCTURE'S FOUNDATION, IN EACH UTILITY TRENCH PER DETAIL 7 ON SHEET C-5.03.

RECEIVED
JUL 16 2007
PARK WEST LANDSCAPE, INC.

PLAN
SCALE: 1" = 20'
20' 10' 0' 20' 40'
GRAPHIC SCALE

LPA
Architecture
Planning
Interior Design
Landscape Architecture
Graphics

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BREA SPORTS PARK
RECORD DRAWINGS
3333 East Birch Street
Brea, CA
Developed for
City of Brea

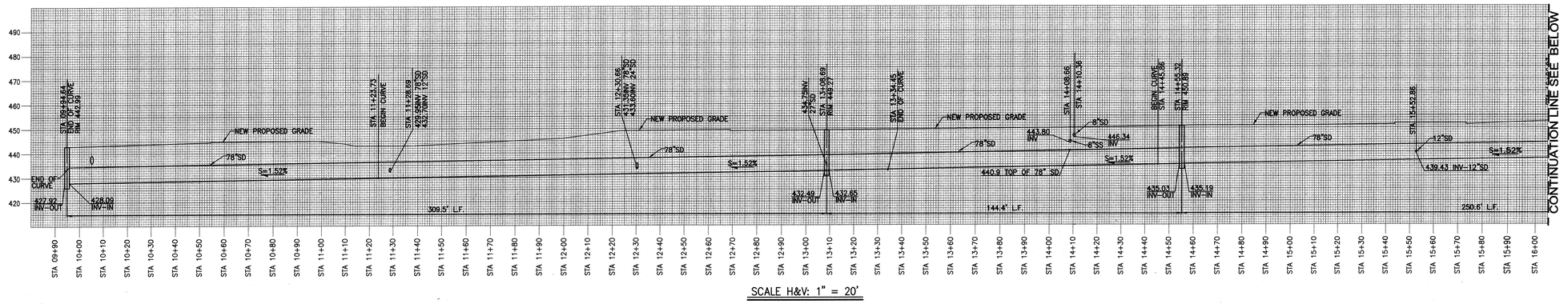
Revision Description	Date

Revision Description	Date
100% DESIGN DEVELOPMENT	03-15-06
50% CD SUBMITTAL	1 JUNE 06
90% CD SUBMITTAL	08 SEPTEMBER 06
100% CD SET / AGENCY RESUBMITTAL	17 NOV 06
BID SET SUBMITTAL	19 MARCH 07

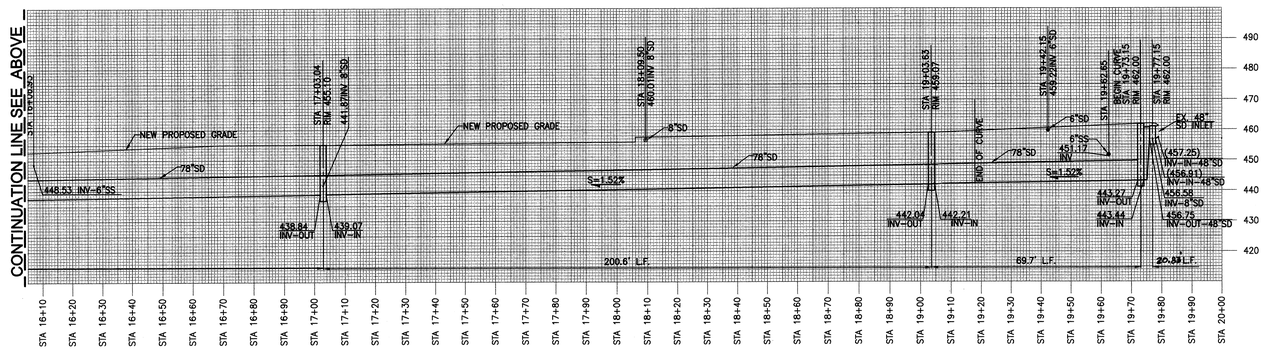
Job. No.	105416
Date	5 April 2007
Drawn by	AS
Checked by	AK

UTILITY PLAN

C-3.02



SCALE H&V: 1" = 20'



SCALE H&V: 1" = 20'

AS-BUILT DRAWINGS
Prepared by Park West Landscape, Inc.
Signature
Date

RECEIVED
JUL 16 2007
PARK WEST LANDSCAPE, INC.

K-1413

LPA
Architecture
Planning
Interior Design
Landscape Architecture
Graphics

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RECORD DRAWINGS

BREA SPORTS PARK

3333 East Birch Street
Brea, CA

Developed for
City of Brea

Revision	Description	Date

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	100% DESIGN DEVELOPMENT	03-1-06
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	BID SET SUBMITTAL	19 MARCH 07

Job. No.	105416
Date	5 April 2007
Drawn by	AS
Checked by	AK

STORM DRAIN PROFILE

C-3.07

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

IN THE

CITY OF BREA, CALIFORNIA

STORM DRAIN NOTES:

1. ALL CONCRETE IN REINFORCED CONCRETE STRUCTURES MUST BE 3250 PSI IN 28 DAYS, TYPE V PORTLAND CEMENT CONCRETE, CLASS A.

2. ALL PIPE LENGTHS SHALL BE HORIZONTAL PROJECTIONS UNLESS OTHERWISE SHOWN.

3. SHORING SHALL BE PROVIDED FOR TRENCH EXCAVATIONS IN NATIVE SOIL TO SATISFY STATE OF CALIFORNIA SAFETY REQUIREMENTS.

4. ALL PIPE CONSTRUCTION WITHIN THE FILL AREA MUST BE COORDINATED WITH THE GRADING WORK TO INSURE THAT WHEN THE FILL OPERATION HAS BEEN COMPLETED AT GRADE, THERE IS A MINIMUM OF ONE FOOT ABOVE THE TOP OF PIPE OR TO A MAXIMUM OF FIVE FEET ABOVE THE PROPOSED SUBGRADE OF THE PIPE, THE STORM DRAIN SHALL BE EXCAVATED AND THE PIPE INSTALLED.

5. ALL WORK SHALL CONFORM TO THE AMERICAN PUBLIC WORKS ASSOCIATION (APWA) STANDARD SPECIFICATIONS. THESE SPECIFICATIONS, WHICH CAN BE PURCHASED FROM THE BNI PUBLICATIONS, INC., SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

6. THE CONTRACTOR MUST NOTIFY THE CITY OF BREA INSPECTOR AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION (714) 990-7689.

7. ALL FILLS SHALL BE COMPACTED TO 90% RELATIVE COMPACTION AS DETERMINED BY THE CALIFORNIA TEST METHOD NO. 216-F, 1963 "FIVE LAYER METHOD". ALL BACKFILL MATERIAL MUST BE FREE OF ORGANIC MATTER.

8. THE CONTRACTOR OR DEVELOPER SHALL PROVIDE ALL SURVEYING REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT. AT THE REQUEST OF THE CITY OF BREA SUFFICIENT REFERENCE STAKING SHALL BE PROVIDED.

9. ALL REINFORCED CONCRETE PIPE SHALL BE BEDDED IN ACCORDANCE WITH PIPE BEDDING DETAIL PER OCPW STANDARD PLAN 1319.

10. PRIOR TO THE PLACEMENT OF STORM DRAIN IMPROVEMENTS, THE CITY'S SOIL ENGINEER SHALL CERTIFY IN WRITING TO THE CITY ENGINEER THAT THE STORM DRAIN'S SUBGRADE IS OF ADEQUATE STRENGTH TO SUPPORT THE STRUCTURES AND ANTICIPATED LOADS.

11. PRIOR TO BEGINNING CONSTRUCTION WORK, THE CITY'S CONTRACTOR SHALL OBTAIN A PERMIT FROM THE STATE DIVISION OF INDUSTRIAL SAFETY. A COPY OF THE PERMIT SHALL BE KEPT ON THE JOB SITE AT ALL TIMES.

12. WHEN APPLICABLE, THE DEVELOPER SHALL OBTAIN A PERMIT FROM THE STATE DEPARTMENT OF FISH AND GAME IN ACCORDANCE WITH SECTION 1602 OF THE CALIFORNIA FISH AND GAME CODE PRIOR TO COMMENCEMENT OF CONSTRUCTION.

13. ALL CONTINUOUS STEEL SHALL BE LAPPED A MINIMUM OF 45 BAR DIAMETERS.

14. ALL EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4 INCH MINIMUM.

15. A CITY OF BREA ENCROACHMENT PERMIT WILL BE REQUIRED TO PERFORM WORK WITHIN THE PUBLIC RIGHT-OF-WAY. ALL WORK SHALL CONFORM TO THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT.

16. THE LENGTH OF MANHOLE STRUCTURES MAY BE INCREASED TO MEET PIPE ENDS AS LONG AS THE REINFORCING STEEL IS CONTINUED AS REQUIRED. THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE MUST APPROVE ANY CHANGE IN SPUR LOCATION.

17. THE FLOOR OF THE MANHOLE STRUCTURES SHALL BE STEEL TROWELED TO THE SPRING LINE.

18. THE BODY OF THE MANHOLE STRUCTURES, INCLUDING SPUR, MUST BE POURED IN ONE CONTINUOUS OPERATION. A CONSTRUCTION JOINT AT THE SPRING LINE, WITH A LONGITUDINAL KEYWAY, WILL BE PERMITTED.

19. ALL REINFORCING BARS MUST BE SECURELY HELD IN PLACE IN THE FORMS. EACH MAT OF STEEL MUST BE TIE-WIRED TOGETHER TWO WAYS AT ALTERNATE INTERSECTIONS.

20. STORM DRAIN BACKFILL FOR ALL FACILITIES WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PLACED AND COMPACTED IN THE PRESENCE OF THE CITY OF BREA'S PUBLIC WORKS INSPECTOR AND MEET OR EXCEED MINIMUM RDMD STANDARDS.

21. ALL PIPES SHALL BE BANDED AND GROUTED.

22. ALL AREA DRAIN PIPES SHALL BE:
   A. ACRYLONITRILE BUTADIENE STYRENE (ABS) SOLID WALL PIPE CONFORMING TO ASTM D2751, SDR35;
   B. POLYVINYL CHLORIDE PLASTIC (PVC) PIPE CONFORMING TO ASTM D3034, SDR35;
   C. ASBESTOS CEMENT PIPE CONFORMING TO ASTM C-663; OR
   D. AN APPROVED EQUAL.

23. R.C.P. SHALL COMPLY WITH ALL ASTM APPLICABLE STANDARDS.

24. CONSTRUCTION MATERIALS AND METHODS SHALL BE SUBJECT TO APPROVAL BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

25. CONSTRUCTION HOURS OF OPERATION SHALL BE BETWEEN 7:00AM AND 5:00PM, MONDAY THROUGH FRIDAY. CONSTRUCTION DURING HOURS OTHER THAN THOSE SPECIFIED SHALL REQUIRE A WRITTEN AUTHORIZATION FROM THE DIRECTOR OF PUBLIC WORKS/CITY ENGINEER.

26. STATE LAW SB 3019 REQUIRES THE CONTRACTOR TO OBTAIN AN IDENTIFICATION NUMBER FROM UNDERGROUND SERVICE ALERT (USA) PRIOR TO THE ISSUANCE OF A CITY ENCROACHMENT PERMIT. THE CONTRACTOR SHALL NOTIFY USA TWO FULL WORKING DAYS (MINIMUM 48 HOURS) PRIOR TO ANY CONSTRUCTION ACTIVITIES, INCLUDING PAVEMENT OVERLAY, EXCAVATION AND ASPHALT CONCRETE OVERLAY, WHICH COULD AFFECT UNDERGROUND UTILITIES.

27. ANY CONTRACTORS OR SUBCONTRACTORS PERFORMING WORK ON THIS PROJECT SHALL FAMILARIZE THEMSELVES WITH THE SITE AND BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM THEIR OPERATIONS, WHETHER OR NOT SUCH FACILITIES ARE SHOWN ON THE PLANS.

28. PRIOR TO BEGINNING ANY CONSTRUCTION, WORK WHICH COULD DAMAGE OR CONFLICT WITH UNDERGROUND STRUCTURES OR UTILITIES, THE CONTRACTOR SHALL EXCAVATE INSPECTION HOLES TO DETERMINE THE LOCATION AND DEPTH OF SAID STRUCTURES AND FACILITIES.

29. PRIOR TO TAKING WATER FROM A FIRE HYDRANT, THE CONTRACTOR SHALL MAKE ARRANGEMENTS TO OBTAIN A HYDRANT WATER METER FROM THE RESPONSIBLE WATER DISTRICT.

30. IF UTILITIES OR OTHER FACILITIES CONFLICT WITH THE PROPOSED IMPROVEMENTS, WORK SHALL STOP AND THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE SHALL BE NOTIFIED IMMEDIATELY.

31. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED OR ALTERED EXISTING IMPROVEMENTS WITHIN THE PUBLIC RIGHT-OF-WAY AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

32. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL AT ALL TIMES.

33. SURVEY MONUMENTS SHALL BE PROTECTED AND PERPETUATED IN PLACE. DISTURBED OR COVERED MONUMENTS SHALL BE RESET BY A REGISTERED CIVIL ENGINEER WHO IS AUTHORIZED TO PRACTICE LAND SURVEYING, OR A LICENSED LAND SURVEYOR.

34. IRRIGATION LINES SHALL BE REMOVED, RELOCATED OR RECONSTRUCTED AS SHOWN OR AS DIRECTED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE, IN THE FIELD.

35. NEW AND EXISTING MANHOLES AND WATER VALVES SHALL BE ADJUSTED TO GRADE.

STORM DRAIN NOTES: (CONTINUED)

36. PRIOR TO PAVING OF STREET, ALL UTILITIES SHALL BE INSTALLED, TESTED AND APPROVED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE APPROPRIATE SERVING UTILITY COMPANY AND VERIFYING THAT THE UTILITY FACILITY IS IN PLACE BEFORE PAVING.

37. TRENCH BACKFILL SHALL BE PROVIDED IN ACCORDANCE WITH THE STANDARD PROVISIONS LISTED ON THE ENCROACHMENT PERMIT OR IN ACCORDANCE WITH APWA STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION LATEST EDITION, AND PER RECOMMENDATION OF THE SOILS ENGINEER.

38. THE CONTRACTOR SHALL NOT ORDER OR PLACE ANY CONCRETE OR ASPHALT CONCRETE PAVING UNTIL THE FORMS AND SUBGRADE OR AGGREGATE BASE HAS BEEN INSPECTED AND APPROVED IN THE FIELD BY THE CITY'S INSPECTOR.

39. THE CONTRACTOR SHALL REMOVE AND REPLACE, IN KIND, A MINIMUM OF ONE FOOT OF EXISTING ASPHALT CONCRETE AND AGGREGATE BASE ADJACENT TO NEWLY CONSTRUCTED CURB AND GUTTER.

40. THE FINAL OR SURFACE LAYER OF ASPHALT CONCRETE SHALL NOT BE PLACED UNTIL ALL ON-SITE IMPROVEMENTS, INCLUDING GRADING HAVE BEEN COMPLETED AND ALL UNACCEPTABLE WORK HAS BEEN CORRECTED, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER OR HIS AUTHORIZED REPRESENTATIVE.

41. "AS-BUILT" RECORD DRAWINGS SHALL BE FURNISHED TO THE CITY UPON COMPLETION OF CONSTRUCTION.

42. APPROVAL OF THESE PLANS BY THE CITY OR IT'S AGENTS SHALL NOT RELIEVE THE CONTRACTOR OR THE APPLICANT FROM THE RESPONSIBILITY FOR THE CORRECTION OF ERRORS OR OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE APPROPRIATE REVISIONS SHALL BE SUBMITTED TO THE CITY ENGINEER FOR REVIEW AND APPROVAL.

UNDERGROUND SERVICE ALERT

CALL BEFORE YOU DIG

Call:Toll FREE
1-800-422-4133
TWO WORKING DAYS
BEFORE YOU DIG

"CAUTION": Remember that the USA Center notifies only those utilities belonging to the center. There could be other utilities present at the work site. The center will inform you of whom they will notify.

UTILITIES

CITY OF BREA ----	1 CIVIC CENTER CIRCLE, BREA CA 92821	(714) 990-7600
SEWER & WATER ---	CITY OF BREA (RON KRAUSE)	(714) 990-7697
STORM DRAIN -----	CITY OF BREA	(714) 990-7667
MAINTENANCE -----	CITY OF BREA (WILL WENZ)	(714) 990-7691
ELECTRIC --------	SOUTHERN CALIFORNIA EDISON (VICTOR PEDROZA)	(714) 870-3228
TELEPHONE -------	AT&T CALIFORNIA (CLIFF CONNORS)	(714) 666-5500
CABLE T.V. ------	TIME WARNER CABLE (DAVE CATE)	(714) 903-8380
GAS ----------	SOUTHERN CALIFORNIA GAS COMPANY (STEVE ALCALA)	(714) 634-3185

SHEET INDEX

1- TITLE SHEET, VICINITY MAP & NOTES
2- STORM DRAIN LINE "A" PLAN AND PROFILE
3- ENLARGED PLAN VIEW
4- STORM DRAIN DETAILS

NOTICE TO CONTRACTOR:

1. THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITY PIPES OR STRUCTURES SHOWN ON THESE PLANS WERE OBTAINED BY A SEARCH OF THE AVAILABLE RECORDS. NO CERTIFICATION IS MADE TO THE ACCURACY OR THOROUGHNESS OF THESE RECORDS. APPROVAL OF THIS PLAN BY THE CITY OF BREA DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF LOCATION OR THE EXISTENCE OF ANY UNDERGROUND UTILITY PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THE OWNER BY ACCEPTING THESE PLANS OR PRECEDING WITH THE IMPROVEMENTS PURSUANT THERETO AGREES TO ASSUME THE LIABILITY AND THE ENGINEER HARMLESS FOR ANY DAMAGES RESULTING FROM THE EXISTENCE OF UNDERGROUND UTILITIES OR STRUCTURES NOT REPORTED. THE CONTRACTOR IS REQUIRED TO TAKE ALL DUE PRECAUTIONARY MEANS TO PROTECT ALL UTILITY LINES AND STRUCTURES SHOWN AND ANY OTHER UTILITIES OR STRUCTURES FOUND AT THE SITE. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE OWNERS OF THE UTILITY OR STRUCTURES CONCERNED BEFORE STARTING WORK.

2. PURSUANT TO ASSEMBLY BILL 3019, NO EXCAVATION PERMIT IS VALID UNLESS UNDERGROUND SERVICE ALERT HAS BEEN CONTACTED AND HAS PROVIDED INQUIRY I.D. NUMBER.

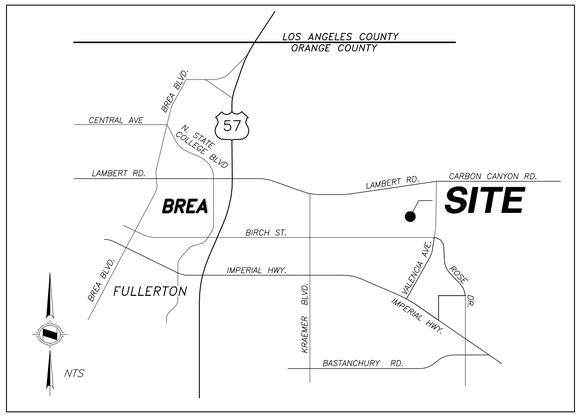
3. CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

4. PRIOR TO THE CONSTRUCTION OF ANY CONCRETE STRUCTURE, THE CONTRACTOR SHALL VERIFY WITH THE SOILS ENGINEER THE TYPE OF CONCRETE RECOMMENDED.

5. UNAUTHORIZED CHANGES AND USES: THE ENGINEER PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, ANY UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

6. CONTRACTOR AGREES THAT IN ACCORDANCE WITH THE GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONTRACTOR WILL ASSUME THE SOLE AND COMPLETE RESPONSIBILITY FOR SITE CONDITIONS DURING THE COURSE AND CONSTRUCTION OF THIS PROJECT, INCLUDING THE SAFETY OF ALL PERSON AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND THAT CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER, ENGINEER AND THE CITY OF BREA HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT. EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, ENGINEERING OR CITY OF BREA.

VICINITY MAP



ESTIMATE OF QUANTITIES

NO.	DESCRIPTION	QUANTITIES TOTAL	UNITS
70	CONSTRUCT 78" C.M.P. (16 GAGE)	5	L.F.
78	CONSTRUCT 78" RCP (SEE PROFILE FOR D-LOAD)	12	L.F.
79	REMOVE INTERF. 48" RCP	5	L.F.
78	INSTALL 78" R.C.P. (SEE PROFILE FOR D-LOAD)	5	L.F.
80	REMOVE INTERF. 78" RCP	12	L.F.
100	CONSTRUCT CONCRETE COLLAR PER P.F. & R.D. STD. PLAN NO. 1317	1	EA.
101	REMOVE EX. M.H. & J.S.	1	EA.
103	CONSTRUCT J.S. TYPE III PER APWA STD. 322-1	1	EA.
104	CONSTRUCT HEADWALL INLET PER DETAILS ON SHEET 4	1	EA.
105	CONSTRUCT BLOCK WALL PER DETAILS ON SHEET 4	64	L.F.
106	CONSTRUCT 2' WIDTH WITH 1:1 SIDE SLOPE V-DITCH WITH CONC. BLOCK WALL	39	L.F.
	SEE SECTION H-H ON SHEET 4 FOR DETAILS		
107	EXISTING FENCE TO BE PROTECTED IN PLACE OR REMOVED & REPLACED	59	L.F.
108	EXISTING D.G. TRAIL AND CURB TO BE REMOVED/REPLACED IN-KIND	258	S.F.
109	EXISTING LAND SCAPE TO BE REMOVED/REPLACED IN-KIND	1,154	S.F.
110	EXISTING VALVE TO BE REMOVED/REPLACED IN-KIND	2	EA.
111	EXISTING 6" S.D. TO BE PROTECTED IN PLACE OR REMOVED & REPLACED IN KIND	70	L.F.
112	EXISTING LOW-FLOW OUTLET STRUCTURE TO BE PROTECTED IN PLACE	1	EA.
113	EXISTING 6" SEWER TO BE PROTECTED IN PLACE OR REMOVED AND REPLACED IN KIND	83	L.F.
114	EXISTING SEWER MANHOLE TO BE PROTECTED IN PLACE	1	EA.
115	EXISTING 8" SEWER TO BE PROTECTED IN PLACE	40	L.F.
116	EXISTING JUNCTION STRUCTURE/MANHOLE TO BE PROTECTED IN PLACE	1	EA.
117	EXISTING 48" C.M.P. TO BE PROTECTED IN PLACE	17	L.F.
118	EXISTING 24" S.D. TO BE PROTECTED IN PLACE	30	L.F.
119	EXISTING 8" S.D. TO BE REMOVED AND REPLACED IN KIND	54	L.F.
120	EXISTING 8" SEWER CAP TO BE PROTECTED IN PLACE	1	EA.
121	PROPOSED CONCRETE APRON, SEE SECTIONS D-D & E-E ON SHEET 4 FOR DETAILS	630	S.F.
122	EXISTING CONC. V-DITCH TO BE PROTECTED IN PLACE	6	L.F.
123	PROPOSED CUT OUT NOTCH TO EXIST. V-DITCH AND JOIN PROPOSED V-DITCH,	2.5	L.F.
	SEE SECTION G-G ON SHEET 3 FOR DETAILS	1	EA.
124	CONCRETE BLOCK WALL (SEE DETAIL NO. 105)	-	L.F.
125	CHAIN LINK FENCE REMOVAL LIMITS ONLY AND TO BE REPLACED IN-KIND	40	L.F.
126	CONSTRUCT WARPED WINGWALL PER DETAIL ON SHEET 3A	1	EA.
127	CONSTRUCT 6" THICK PCC #4 @ 24" BOTH WAYS OVER 4" CMB PER O.C.P.W. STD. PLAN 1805	1,206	S.F.

QUANTITIES SHOWN ARE FOR BONDING PURPOSES ONLY. THE CONTRACTORS SHALL BE RESPONSIBLE FOR THEIR OWN ESTIMATE FOR BIDDING PURPOSES AND SHALL BID THE JOB COMPLETE. THE CONTRACTORS SHALL ALSO ADVISE THE OWNER AND ENGINEER OF ANY APPARENT DISCREPANCIES IN THE ESTIMATE.

SHEET INDEX

1- TITLE SHEET, VICINITY MAP & NOTES
2- STORM DRAIN LINE "A" PLAN AND PROFILE
3 & 3A- ENLARGED PLAN VIEW
4- STORM DRAIN DETAILS

BENCHMARK:

BASIS OF BEARINGS:

OWNER/DEVELOPER:
City of Brea
One Civic Center Circle
Brea, California 92933
Phone:(714) 671-4450
Fax:(714) 671-3691

SOIL FIRM:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

EDWARD A. MANDICH R.C.E. 59089 DATE

REGISTERED PROFESSIONAL ENGINEER DOUGLAS L. STALLSMITH NO. 38796 Exp. 3/31/11 CIVIL STATE OF CALIFORNIA

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	1 CONST. WARPED WINGWALL TRANSITION PER DETAIL 126, CN 106 &	
		123 NOT USED, ADDED CN 126, SECTION G-G NOT USED,	
		ADDED SHEET 3A, SECTIONS A-A & C-C, REMOVABLE C.L. POST	
		ADDED CN 127, REVISED 6' TO 4' C.L. FENCE ON SHEET 3,	
		ADDED BOLLARD DETAIL ON SHEET 3A, SECTION J	

K-1414

APPROVED BY:

CITY ENGINEER RCE DATE
DELFINO CONSUNJI 57908 EXP. 06/30/12

CITY OF BREA
ECONOMIC DEVELOPMENT DEPARTMENT

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

TITLE SHEET

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO.
1 OF 4

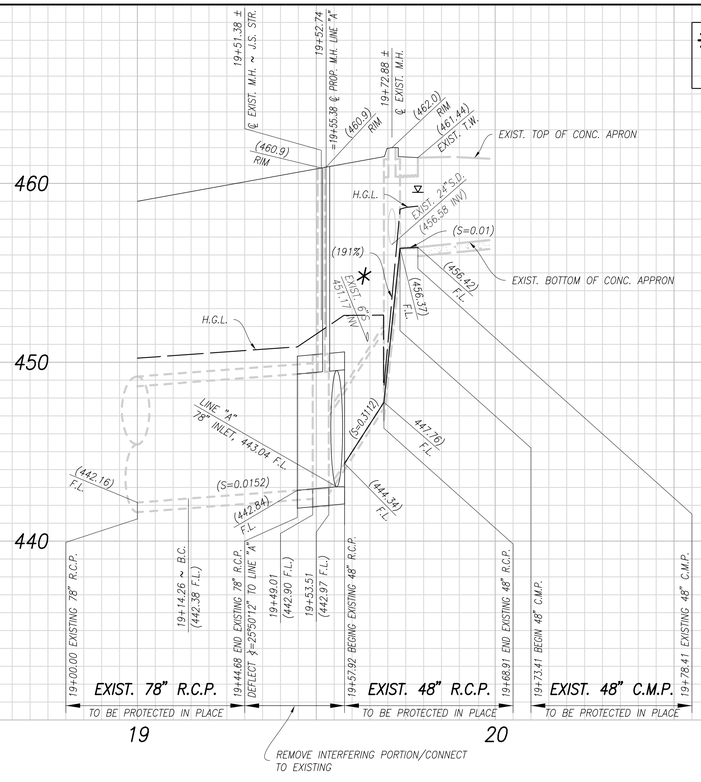
W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

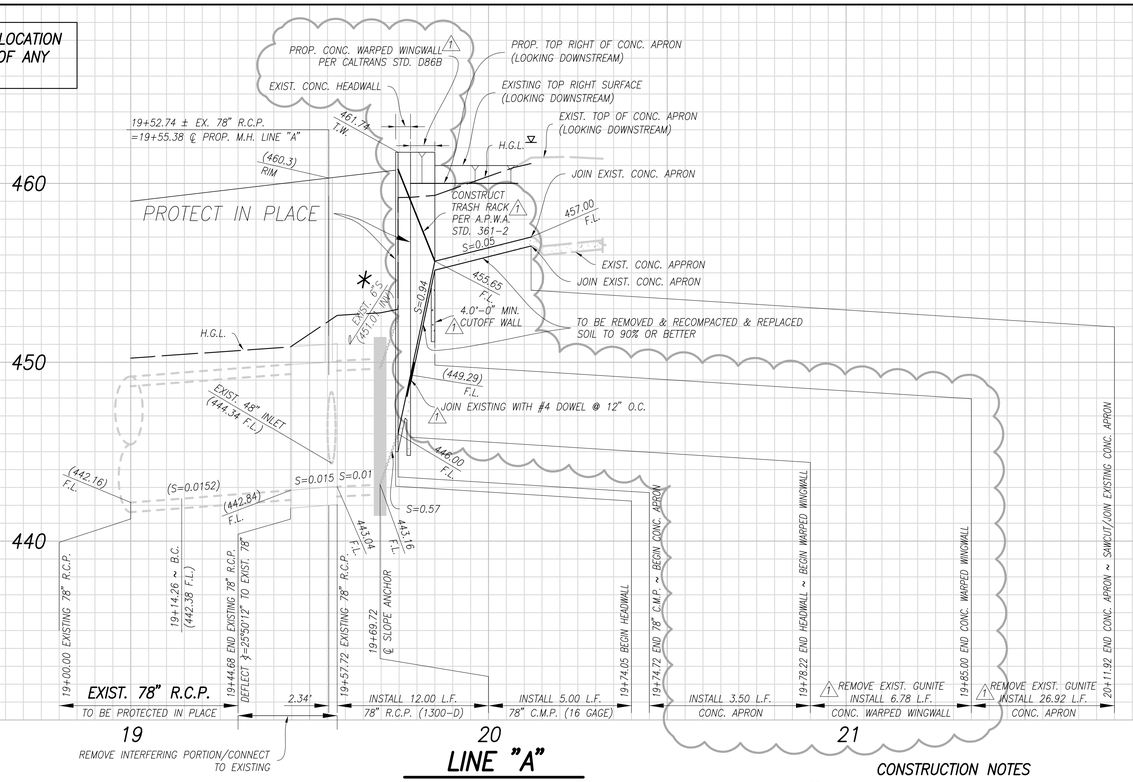
F:\0594\Engineering\SY_Storm Drain\SHT01.dwg

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

✱ CONTRACTOR TO VERIFY HORIZONTAL & VERTICAL LOCATION OF EXISTING UTILITY AND NOTIFY CIVIL ENGINEER OF ANY CONFLICT PRIOR TO STARTING CONSTRUCTION



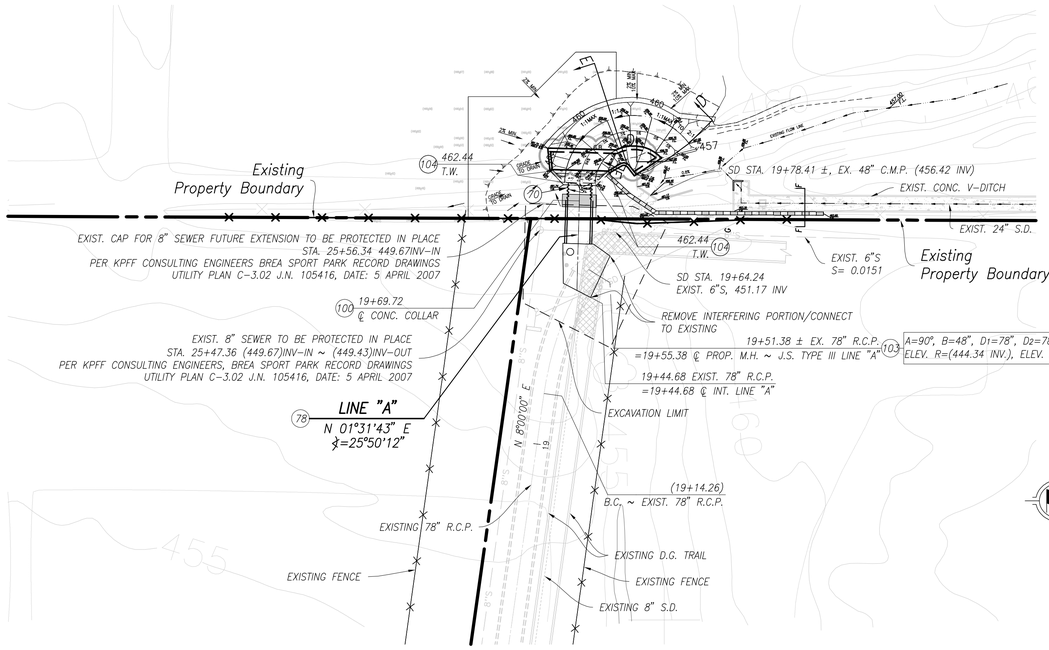


LINE "A"

PROFILE SCALES	
HORIZ.:	1"= 20'
VERT.:	1"= 4'

CONSTRUCTION NOTES

(70) CONSTRUCT 78" C.M.P. (16 GAGE)
(78) INSTALL 78" R.C.P. (SEE PROFILE FOR D-LOAD)
(79) REMOVE INTERFERING PORTION OF 48" R.C.P. AND CONNECT TO EXISTING
(80) REMOVE INTERFERING PORTION OF 78" R.C.P. AND CONNECT TO EXISTING
(100) CONSTRUCT CONCRETE COLLAR PER A.P.W.A. STD. PLAN NO. 380-2
(101) REMOVE EXISTING M.H. & JUNCTION STRUCTURE
(103) CONSTRUCT J.S. TYPE III PER A.P.W.A. STD. PLAN NO. 322-1
(104) CONSTRUCT HEADWALL INLET PER DETAILS ON SHEET 2
(105) CONSTRUCT BLOCK WALL PER DETAILS ON SHEET 2
(106) ~~CONSTRUCT 2' WIDTH WITH 1:1 SIDE SLOPE V-DITCH WITH CONC. BLOCK WALL SEE SECTION H-H ON SHEET 4 FOR DETAILS~~
(107) EXISTING FENCE TO BE PROTECTED IN PLACE OR REMOVED & REPLACED INTERFERING PORTION IN-KIND
(108) EXISTING D.G. TRAIL AND CURB TO BE REMOVED/REPLACED IN-KIND
(109) EXISTING LAND SCAPE TO BE REMOVED/REPLACED IN-KIND
(110) EXISTING VALVE TO BE REMOVED/REPLACED IN-KIND
(111) EXISTING 6" S.D. TO BE PROTECTED IN PLACE OR REMOVED & REPLACED IN KIND
(112) EXISTING LOW-FLOW OUTLET STRUCTURE TO BE PROTECTED IN PLACE
(113) EXISTING 6" SEWER TO BE PROTECTED IN PLACE OR REMOVED AND REPLACED IN KIND
(114) EXISTING SEWER MANHOLE TO BE PROTECTED IN PLACE
(115) EXISTING 8" SEWER TO BE PROTECTED IN PLACE
(116) EXISTING JUNCTION STRUCTURE/MANHOLE TO BE PROTECTED IN PLACE
(117) EXISTING 48" C.M.P. TO BE PROTECTED IN PLACE
(118) EXISTING 24" S.D. TO BE PROTECTED IN PLACE
(119) EXISTING 8" S.D. TO BE REMOVED AND REPLACED IN KIND
(120) EXISTING 8" SEWER CAP TO BE PROTECTED IN PLACE
(121) PROPOSED CONCRETE APRON, SEE SECTIONS D-D & E-E ON SHEET 4 FOR DETAILS
(122) EXISTING CONC. V-DITCH TO BE PROTECTED IN PLACE
(123) ~~PROPOSED CUT OUT NOTCH TO EXIST. V-DITCH AND JOIN PROPOSED V-DITCH, SEE SECTION G-G ON SHEET 3 FOR DETAILS~~
(124) PROPOSED CONC. BLOCK WALLS, SEE SECTIONS F-F & H-H ON SHEET 4 FOR DETAILS
(125) CHAIN LINK FENCE REMOVAL LIMITS ONLY AND TO BE REPLACED IN-KIND
(126) CONSTRUCT TRANSITION WARPED WINGWALL PER DETAIL ON SHEET 3A
(127) CONSTRUCT 6" THICK PCC #4 @ 24" BOTH WAYS OVER 4" CMB PER O.C.P.W. STD. PLAN 1805



LINE "A"

FOR ENLARGED PLAN VIEW OF 1" = 5' SEE SHEET 3 OF 4 FOR MORE DETAILS

NOTE:
(460.67) = GRID TOPO ELEVATIONS PER CITY OF BREA

SCALE: 1" = 20'

20 10 0 20 60
GRAPHIC SCALE 1"=20'

HYDRAULIC DATA

	LINE	STA to STA	Q_{SD}	DIA	So	n	Dc	Vc	Sc	Dn	Vn	Vf	Sf
	EXIST. 78"	19+00.00 19+44.68	622.0	78"	0.0152	0.013	6.17	19.12	0.0122	5.12	22.18	18.74	0.0141
	"A"	19+57.72 19+69.72	569.0	78"	0.0100	0.013	6.05	17.69	0.0102	FULL	---	17.15	0.0118
	"A"	19+69.72 19+74.72	569.0	78"	0.5680	0.024	6.05	17.69	0.0347	2.29	54.53	17.15	0.0401
SEE WSPG	IRR. CHNL	19+74.72 20+11.92	569.0	IRR.	5% ~ 94%	0.015	--	--	--	--	--	--	--
	EXIST. 48"	19+57.92 19+68.91	53.0	48"	0.3112	0.013	2.19	7.54	0.0040	0.70	36.14	4.22	0.0014
	EXIST. 48"	19+73.41 19+78.41	53.0	48"	0.0100	0.024	2.19	7.54	0.0138	2.42	6.66	4.22	0.0046

BENCHMARK:

BASIS OF BEARINGS:

OWNER/DEVELOPER:
City of Brea
One Civic Center Circle
Brea, California 92933
Phone:(714) 671-4450
Fax:(714) 671-3691

SOIL FIRM:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	/1\ADDED CN 126 , CN 106 & 123 NOT USED,	
		UPDATED LINE "A" PROFILE & ADDED NOTES	

K-1415

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

LINE "A" Sta. 19+57.72 TO Sta. 20+11.92

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO. 2 OF 4

CIP PROJECT NO. 7847

W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

F:\0594\Engineering\SY_Storm Drain\SHT02.dwg

NOTE:
(460x67) = GRID TOPO ELEVATIONS PER CITY OF BREA

TEMPORARY CONSTRUCTION LIMIT
110'

PROPOSED LICENSE AREA

GRADING LIMIT

TEMPORARY CONSTRUCTION LIMIT

2% MAX
3% MAX TO DAYLIGHT

15'

15' 2% MIN 10% MAX

TRASK RACK PER APWA STD 361-2

2% MIN

50'

20'

27'

30'

40'

28'

11.2'

39'

8.2'

13.8'

21.9'

7.0'

18.0'

460

457

1:1 MAX

10 2:

5%

0.8%

1.5%

1.2%

1.0%

569cf/s

534cf/s

94.9'

CB

DI

461.74 T.W.
460.0 B.W.

461.74 T.W.

461.44 T.W.

461.17 T.W.

462.93 T.W.

463.02 T.W.

463.30 T.W.

463.60 T.W.

446.00 F.L.

(449.29) F.L.

(444.34) F.L.

443.04 F.L.

(442.84) F.L.

455.65 F.L.

455.49 F.L.

456.00 F.L.

456.25 F.L.

456.50 F.L.

456.75 F.L.

457.00 F.L.

456.66 F.L.

456.59 F.L.

456.42 F.L.

456.41 F.L.

PROP. EXCAVATION LIMIT

4" CONCRETE

GRADE TO DRAIN

CUT OUT FOR OVERFLOW

EXISTING FLOW LINE

EXISTING V-DITCH

25'

2'

18"

Existing Property Line

LINE "A"

EXISTING FENCE

STA. 0+00

STA. 0+08

STA. 0+22

STA. 0+44

STA. 0+51

STA. 0+69
END OF PROJECT

CONSTRUCTION NOTES
(SEE SHEET 2 OF 4 FOR DESCRIPTIONS)

(107) EXISTING FENCE TO BE PROTECTED IN PLACE OR REMOVED & REPLACED INTERFERING PORTION IN-KIND

NOTE:
⚠1 PERMANENT 4' C.L. FENCE LOCATION AROUND STORM DRAIN IMPROVEMENTS SHALL BE DETERMINED BY CITY ENGINEER

VARIES
EXISTING CHAIN LINK POST
SEE BLOCK WALL DETAIL NO. 105
3" MIN. COVER
3" MIN.
6"
3"
24"
12"
461.8 TOP EL.
461.3 F.L.
PROP. 2' WIDE CONC. DITCH
SAW CUT AND REMOVE INTERFERING PORTION OF EXISTING V-DITCH
EXIST. SURFACE
4" CONC. OR GUNITE SEE CONST. NOTES FOR PAVED DRAINAGE DEVICES SHEET 4
EXISTING 4' CONC. V-DITCH
4'

SECTION G-G ⚠1
PROP. 24" CUT OUT NOTCH AT EXIST. V-DITCH AT STA. 0+44
(LOOKING DOWNSTREAM)
NOT TO SCALE

SCALE: 1" = 5'

5 2.5 0 5 15
GRAPHIC SCALE 1"=5'

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

BENCHMARK:

BASIS OF BEARINGS:

OWNER/DEVELOPER:
City of Brea
One Civic Center Circle
Brea, California 92823
Phone:(714) 671-4450
Fax:(714) 671-3691

SOIL FIRM:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
FX: (949) 583-0759 • PH: (949) 583-1010

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	⚠1 ADDED CN 126, SECTION G-G NOT USED,	
		REVISED 6' TO 4' C.L. FENCE, ADDED TRASK RACK ON PLAN VIEW	
		ADDED SECTION J	

K-1416

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: E.A.M.

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

ENLARGED PLAN VIEW OF 1" = 5'

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

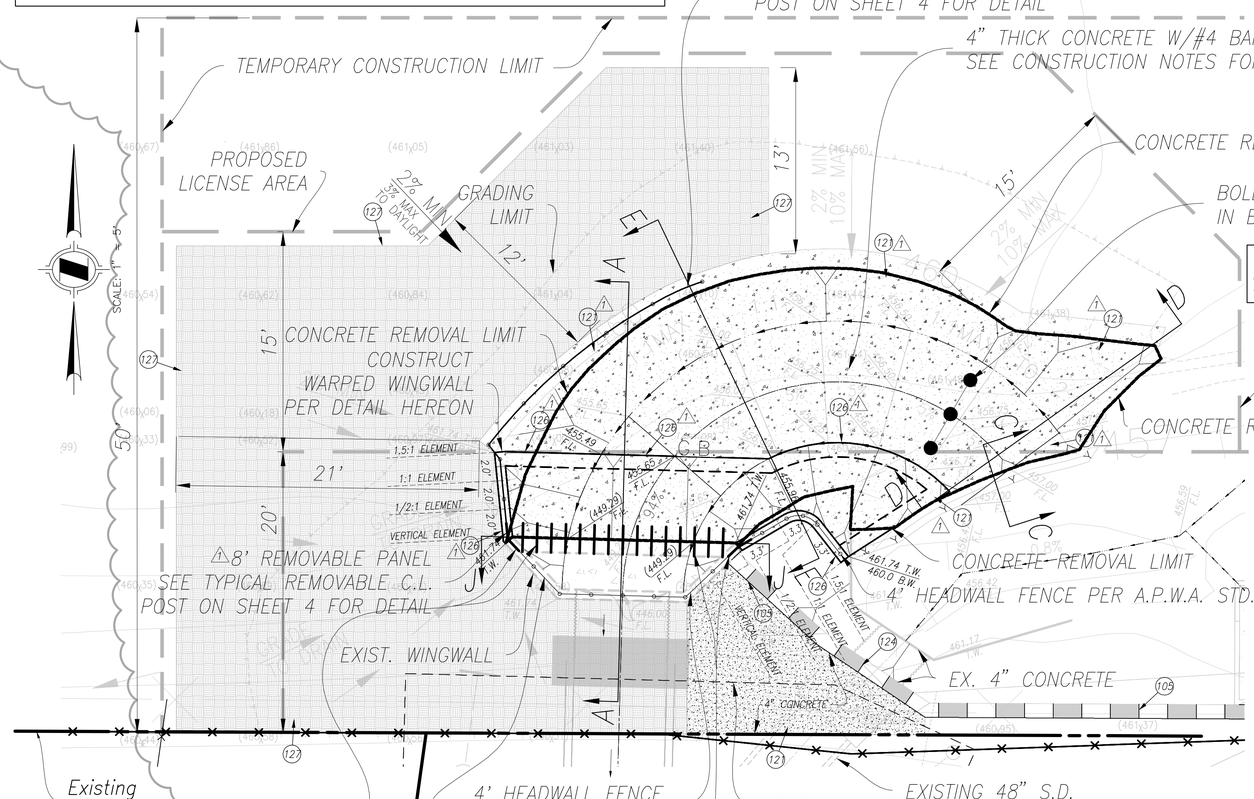
PROJECT NO.

SHEET NO.
3 OF 4

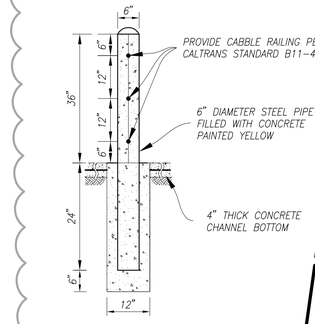
W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

F:\0594\Engineering\SY_Storm Drain\SHT03.dwg

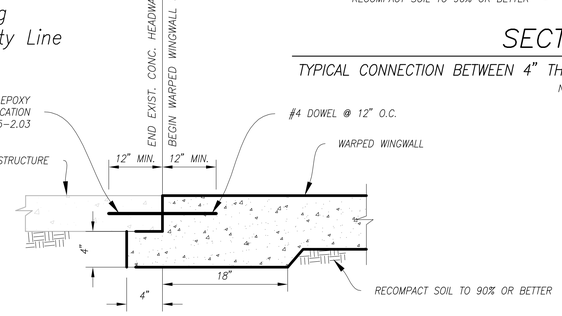
NOTE:
(460x67) = GRID TOPO ELEVATIONS PER CITY OF BREA



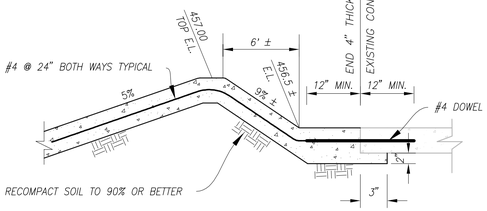
5 2.5 0 5 15
GRAPHIC SCALE 1"=5'



BOLLARD DETAIL
NOT TO SCALE



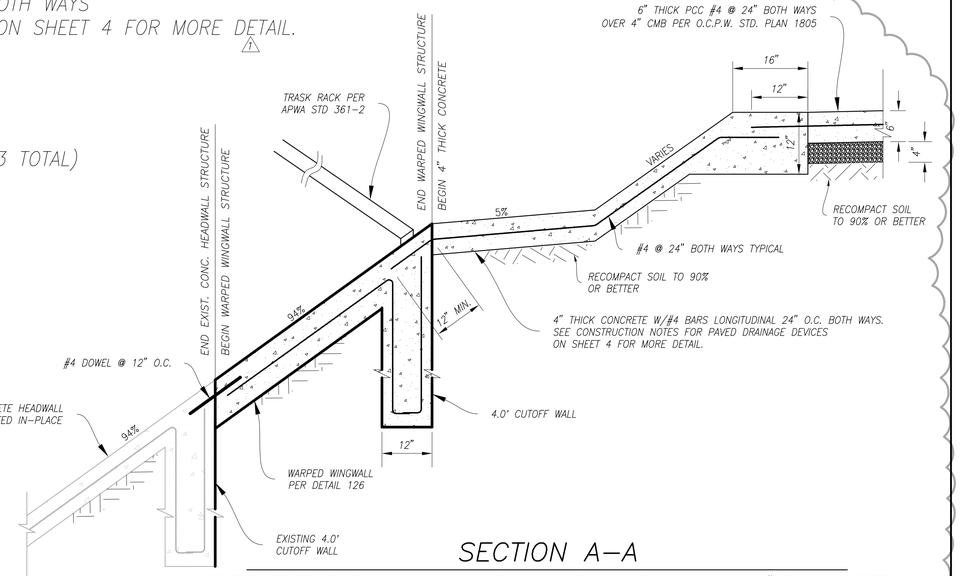
TYPICAL CONNECTION DETAIL BETWEEN EXIST. CONC. HEADWALL & WARPED WINGWALL



SECTION C–C

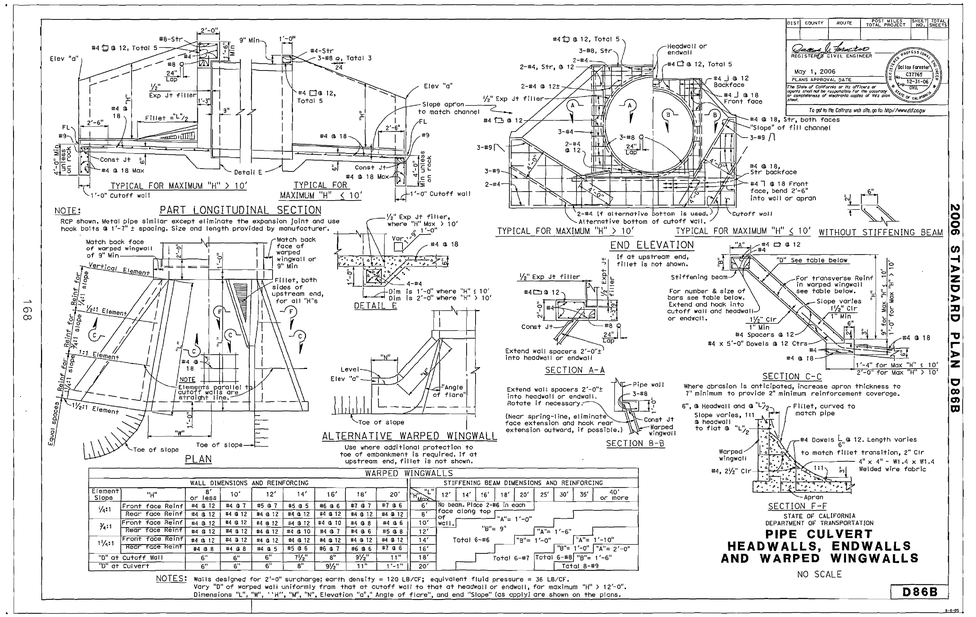
TYPICAL CONNECTION BETWEEN 4" THICK CONCRETE & EXISTING CONCRETE APRON
NOT TO SCALE

CONSTRUCTION NOTES ⚠1
(126) CONSTRUCT WARPED WINGWALL PER DETAIL HEREON
(12) PROPOSED CONCRETE APRON, SEE SECTIONS D-D & E-E ON SHEET 4 FOR DETAILS



SECTION A–A

PROFILE BETWEEN EXIST. CONC. HEADWALL WITH PROPOSED WARPED WINGWALL AND 4" THICK CONCRETE
NOT TO SCALE



WARPED WINGWALLS																
	WALL DIMENSIONS AND REINFORCING								STIFFENING BEAM DIMENSIONS AND REINFORCING							
Element Slope	"H"	8' or less	10'	12'	14'	16'	18'	20'	"H" Max.	12'	14'	16'	18'	20'	30'	35'	40' or more
1/2:1	Front face Reinf	#4 @ 12	#4 @ 9	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6	6'	No beam. Place 2-#6 in each face along top							
	Rear face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	8'								
1:1	Front face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 8	#4 @ 8	#4 @ 6	10'	"A"= 1'-0"							
	Rear face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 6	#5 @ 8	12'	"B"= 9"							
1½:1	Front face Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 9	#4 @ 12	14'	Total 6-#6	"A"= 1'-6"						
	Rear face Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 5	#5 @ 7	#6 @ 5	#7 @ 6	16'		"B"= 1'-0"	"A"= 1'-10"					
"G" at Cutoff Wall	6"	6"	6"	6"	7½"	8"	9½"	11"	18'	Total 6-#7		"B"= 1'-0"	"A"= 2'-0"				
"G" at Culvert	6"	6"	6"	8"	9½"	11"	1'-1"	1'-3"	20'			Total 6-#8					

NOTES: Walls designed for 2'-0" surcharges earth density = 120 LB/CF; equivalent fluid pressure = 36 LB/CF.
Vary "D" of warped walls uniformly from that at cutoff wall to that at headwall or endwall, for maximum "H" > 12'-0".
Dimensions "L", "W", "H", "W", "N", Elevation "G", Angle of Flare", and end "Slope" (as apply) are shown on the plans.

(126) **WARPED WINGWALL DETAILS** ⚠1
NOT TO SCALE

168

2006 STANDARD PLAN D86B

STORM DRAIN IMPROVEMENT AT THE BREA SPORT PARK

CIP PROJECT NO. 7847

BENCHMARK:	OWNER/DEVELOPER: City of Brea, One Civic Center Circle, Brea, California 92933, Phone:(714) 671-4450, Fax:(714) 671-3691	HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING · ENGINEERING · SURVEYING, Three Hughes · Irvine, CA 92618, FX: (949) 583-0759 · PH: (949) 583-1010
BASIS OF BEARINGS:	SOIL FIRM:	

REVISIONS			
DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	⚠1 ADDED SHEET 3A, CN 121 & 126, WARPED WINGWALL DETAIL	
		126 & TYPICAL CONNECTION DETAIL BETWEEN EXIST. CONC.	
		HEADWALL & WARPED WINGWALL, ADDED SECTIONS A-A & C-C	
		ADDED 8' REMOVABLE PANEL CHAIN LINK FENCE, CN 127,	
		BOLLARD DETAIL, SECTION J	

K-1417

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

CALTRANS TRANSITION WINGWALL

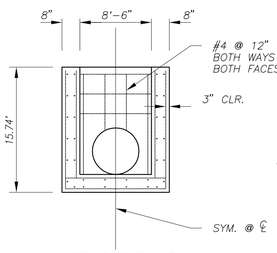
CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

PROJECT NO.

SHEET NO. 3A OF 4

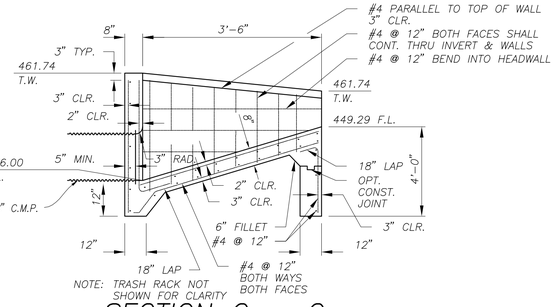
W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

F:\0594\Engineering\SY_Storm Drain\SHT03A.dwg



NOTE: BARRIER NOT SHOWN FOR CLARITY

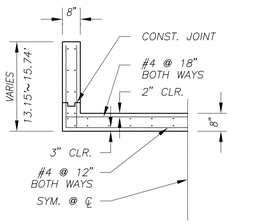
SECTION A – A



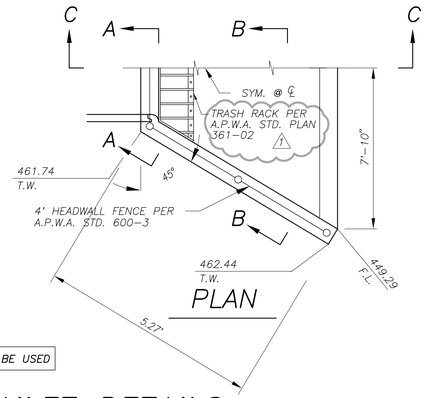
NOTE: TRASH RACK NOT SHOWN FOR CLARITY

SECTION C – C

(NOTE: HEADWALL FENCE NOT SHOWN)



SECTION B – B

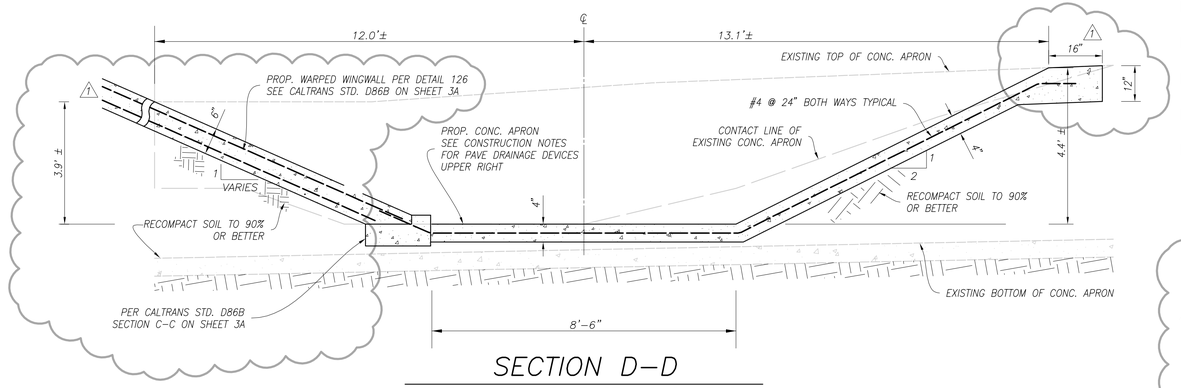


PLAN

NOTE: f'c = 4000 PSI OF CONCRETE SHALL BE USED

104 INLET DETAILS

N.T.S.



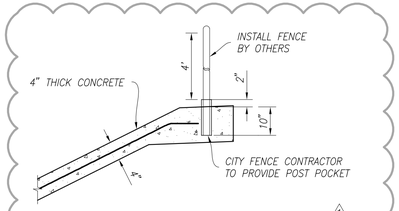
SECTION D–D

CUT A NOTCH TO EXIST. CONC. APRON & JOIN PROP. CONC. APRON (LOOKING DOWNSTREAM)

NOT TO SCALE

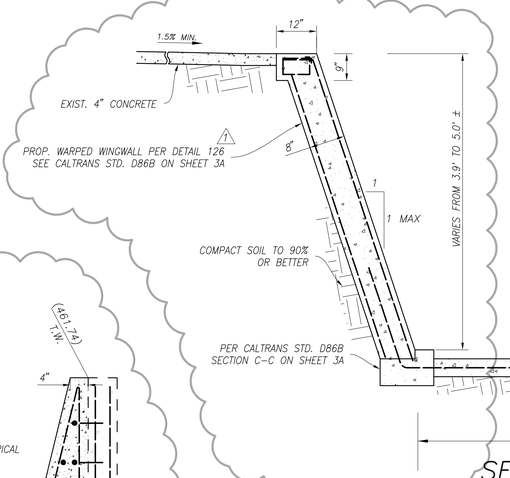
CONSTRUCTION NOTES FOR PAVED DRAINAGE DEVICES

1. APPROVED MATERIAL FOR CONSTRUCTION OF DEVICE IS EITHER 4" CONC. W/ NO. 4 BARS LONGITUDINAL 24" O.C. WITH NO. 4 TIE BARS 24" O.C. 1 1/2" ROCK B3250.
2. INSPECTION OF GRADED SWALE IS REQUIRED PRIOR TO INSTALLATION OF PAVING.
3. GROUND SHALL BE PRE-WET TO THE SATISFACTION OF THE BUILDING OFFICIAL OR ENGINEER PRIOR TO PLACEMENT OF CONCRETE.
4. PAVED DEVICE SHALL BE CURED WITH A MOISTURE LOSS RETARDANT.
5. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSION STRENGTH AT 28 DAYS OF 3250 P.S.I.



TYPICAL REMOVABLE CHAIN LINK POST

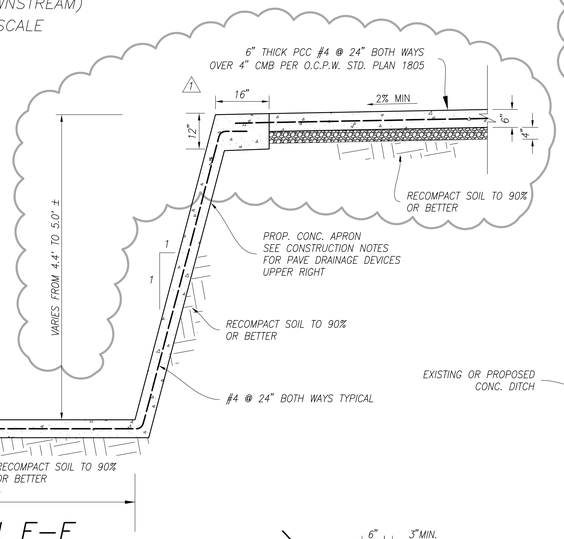
NOT TO SCALE

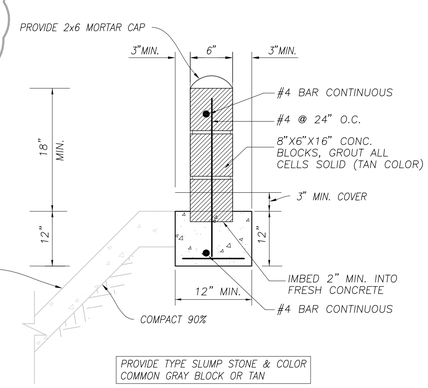


SECTION E–E

PROP. CONC. APRON WITH VARIED SIDE SLOPE (LOOKING DOWNSTREAM)

NOT TO SCALE



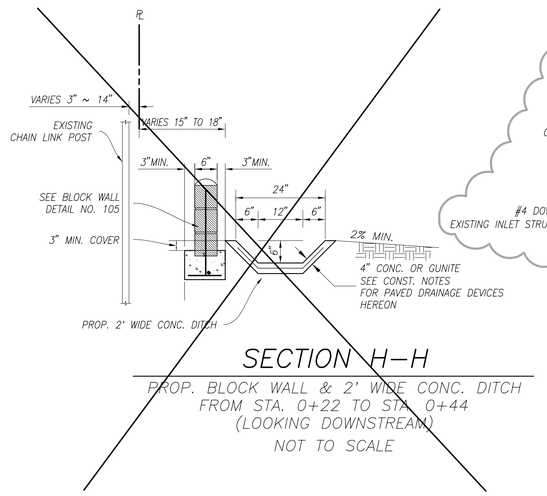


PROVIDE TYPE SLUMP STONE & COLOR COMMON GRAY BLOCK OR TAN

105 BLOCK WALL

(LOOKING UPSTREAM)

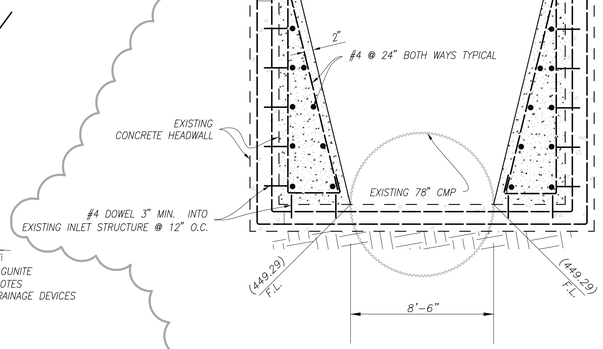
NOT TO SCALE



SECTION H–H

PROP. BLOCK WALL & 2' WIDE CONC. DITCH FROM STA. 0+22 TO STA. 0+44 (LOOKING DOWNSTREAM)

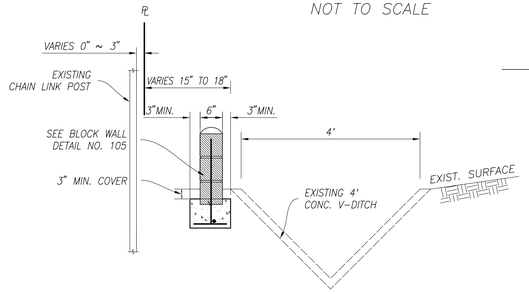
NOT TO SCALE



SECTION J–J

PROP. CONC. APRON WITH VARIED SIDE SLOPE (LOOKING DOWNSTREAM)

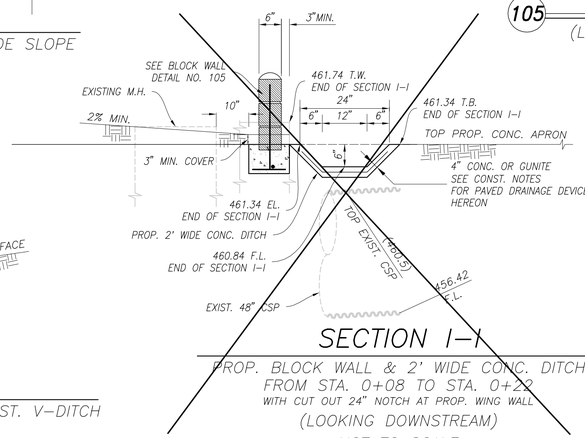
NOT TO SCALE



SECTION F–F

PROP. BLOCK WALL ALONG SOUTH SIDE OF EXIST. V-DITCH FROM STA. 0+44 TO STA. 0+69 (LOOKING DOWNSTREAM)

NOT TO SCALE



SECTION I–I

PROP. BLOCK WALL & 2' WIDE CONC. DITCH FROM STA. 0+08 TO STA. 0+22 WITH CUT OUT 24" NOTCH AT PROP. WING WALL (LOOKING DOWNSTREAM)

NOT TO SCALE

BENCHMARK:	OWNER/DEVELOPER: City of Brea, One Civic Center Circle, Brea, California 92933, Phone:(714) 671-4450, Fax:(714) 671-3691	H&A HUNSAKER & ASSOCIATES IRVINE, INC. PLANNING • ENGINEERING • SURVEYING, Three Hughes • Irvine, CA 92618, FX: (949) 583-0759 • PH: (949) 583-1010	
BASIS OF BEARINGS:	SOIL FIRM:		

REVISIONS

DATE	INITIAL	DESCRIPTIONS	APPVD
02/28/11	HTC	1 UPDATED SECTIONS E, D & NOTE FOR DETAIL 104, ADDED	
		TYPICAL REMOVABLE C.L. POST, SECTIONS H & I NOT USED,	
		ADDED SECTION J	

K-1418

DRAWN BY: H.C.
DESIGN BY: H.C.
CHECKED BY: D.L.S

STORM DRAIN IMPROVEMENT TO EXISTING 78" RCP AT THE BREA SPORT PARK

CITY OF BREA
DEPARTMENT OF DEVELOPMENT SERVICES

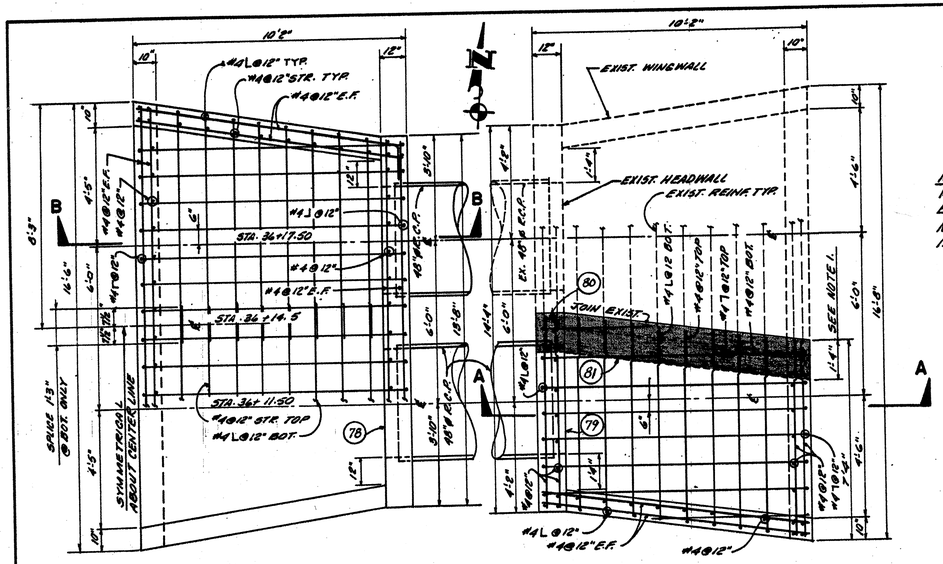
PROJECT NO.

SHEET NO. 4 OF 4

W.O. 3654-1 BIN 632-A RM 165 DOC. NO.
STORM DRAIN IMPROVEMENT AT SPORT PARK, CITY OF BREA

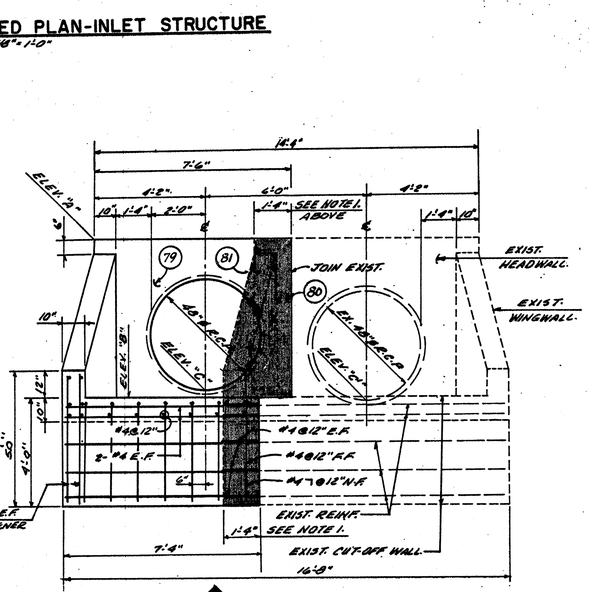
F:\0594\Engineering\SY_Storm Drain\SHT04.dwg

CIP PROJECT NO. 7847



PLAN-OUTLET STRUCTURE

SCALE: 3/8"=1'0"



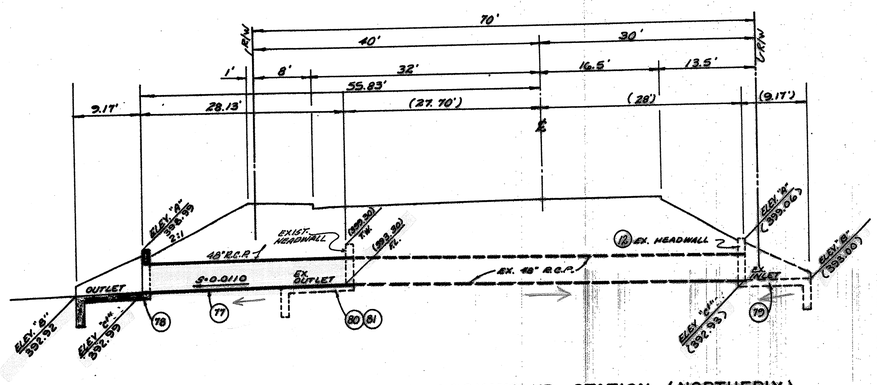
MODIFIED PLAN-INLET STRUCTURE

SCALE: 3/8"=1'-0"

NOTE:
1.) REMOVE EXIST. CONC AND EXPOSE EXIST. REINF, SPLICE NEW REINF. TO EXIST. AS INDICATED ON PLAN.

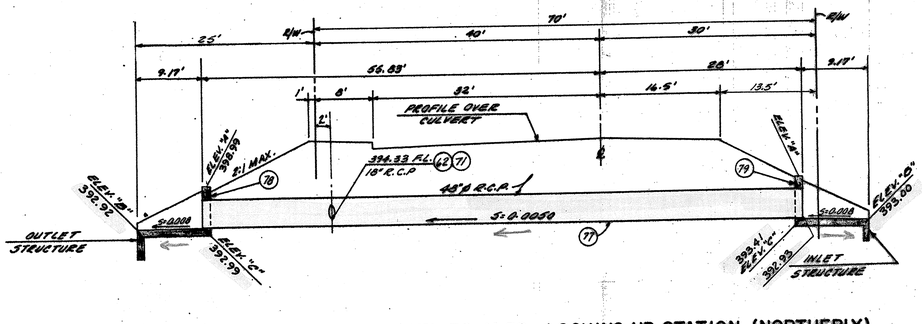
ELEVATION SCHEDULE				
LOCATION	ELEV. "A"	ELEV. "B"	ELEV. "C"	ELEV. "C'"
INLET STRUCT.	(399.04)*	(393.00)	393.41	(392.99)
OUTLET STRUCT.	396.99	392.92	392.99	392.99

LEGEND:
N.F. DENOTES NEAR FACE.
F.F. DENOTES FAR FACE.
E.F. DENOTES EACH FACE.



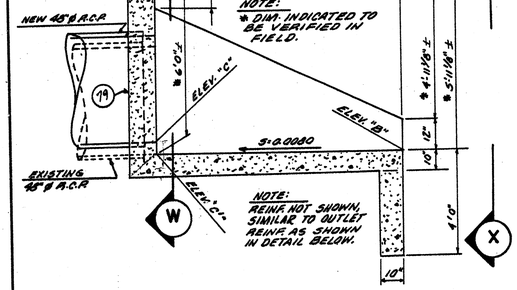
CULVERT SECTION - STA. 36+17.50 - LOOKING UP STATION (NORTHERLY)

SCALE: HORIZ. 1"=10'
VERT. 1"=5'



CULVERT SECTION - STA. 36+11.50 - LOOKING UP STATION (NORTHERLY)

SCALE: HORIZ 1"=10'
VERT 1"=5'

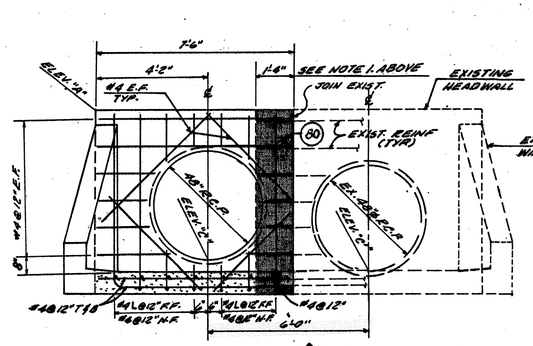


SECTION "A-A" (INLET)

SCALE: 3/8"=1'-0"

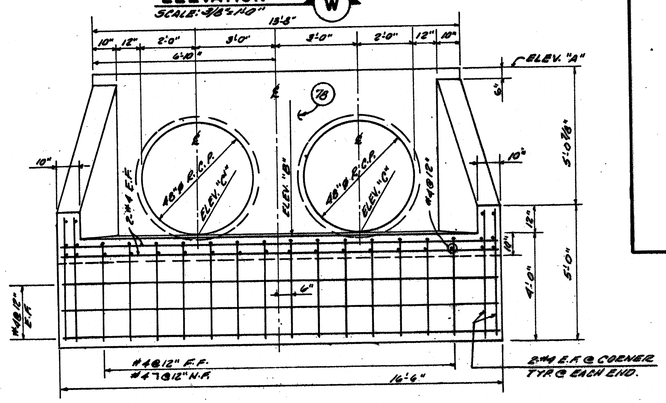
ELEVATION

SCALE: 3/8"=1'-0"



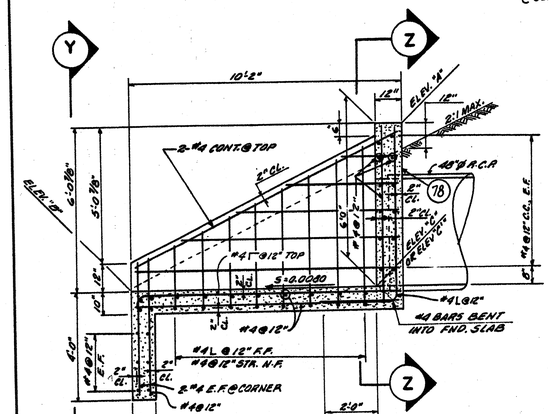
ELEVATION

SCALE: 3/8"=1'-0"



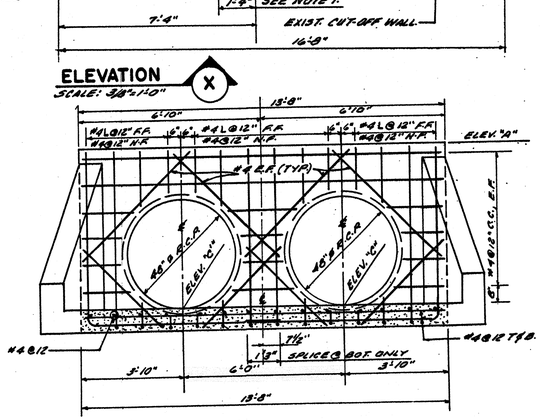
ELEVATION

SCALE: 3/8"=1'-0"



SECTION "B-B" (OUTLET)

SCALE: 3/8"=1'-0"

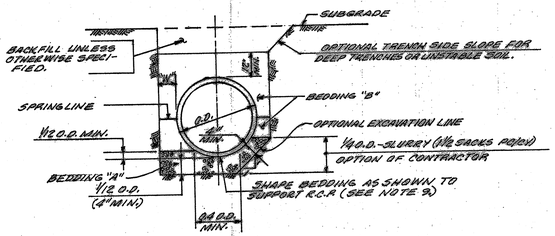


ELEVATION

SCALE: 3/8"=1'-0"

BEDDING & BACKFILL NOTES:

1.) BEDDING "A" SHALL BE COMPOSED OF SAND, NO. 3 OR NO. 4 CRUSHED ROCK OR GRAVEL OR OTHER GRANULAR MATERIAL HAVING A SAND EQUIVALENT OF NOT LESS THAN 30, AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER.
2.) BEDDING "B" SHALL BE COMPOSED OF SAND OR OTHER GRANULAR MATERIAL AS MAY BE SPECIFIED OR APPROVED BY THE ENGINEER.
3.) BEDDING "B" SHALL BE COMPACTED TO A RELATIVE COMPACTION OF NOT LESS THAN 90 PERCENT, UNLESS OTHERWISE SPECIFIED.
4.) BACKFILL SHALL BE PER SECTION 19 OF THE STANDARD SPECIFICATIONS.
5.) WHERE THE COVER IS 8 FEET OR LESS, "W" MUST BE GREATER THAN OR EQUAL TO 6 INCHES. WHERE THE COVER IS GREATER THAN 8 FEET, "W" MUST BE BETWEEN 6 AND 10 INCHES.
6.) "W" SHALL INCLUDE THE THICKNESS OF ANY SHORING.
7.) SHORING SHALL BE A MINIMUM OF 6" FROM THE PIPE AT SPRINGLINE.
8.) AN IMPROVED BEDDING METHOD SHALL BE SUBMITTED TO THE ENGINEER FOR ANY "W" OTHER THAN THAT PERMITTED IN NOTE 5.
9.) THE TRENCH BOTTOM SHALL BE SHAPED AS SHOWN, OR THE CONTRACTOR, AT HIS OPTION MAY CHOOSE NOT TO SCREED BEDDING "A" IN WHICH CASE, THE PIPE SHALL BE BACKFILLED TO A DEPTH OF 1/4 O.D. WITH TRENCH BACKFILL SLURRY AT HIS EXPENSE.



R.C.P. BEDDING AND BACKFILL DETAIL (2/12)

NO SCALE

CULVERT-HEADWALL DETAILS (1/12)

SCALE: AS SHOWN

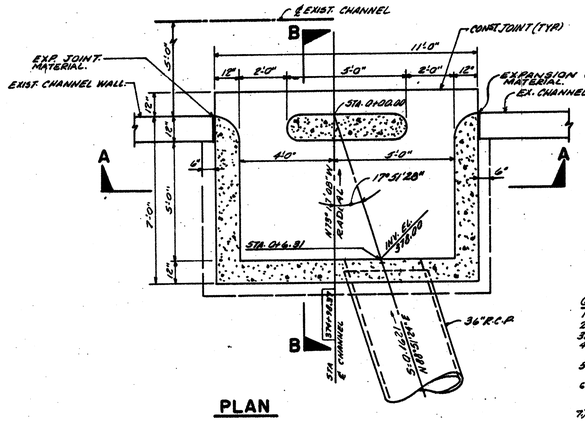
"AS BUILT" 4-7-83

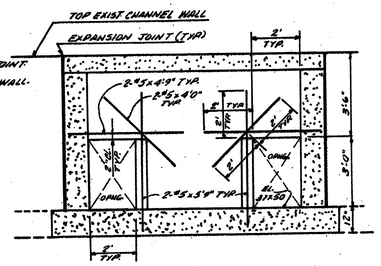
K-1419

ROSE DRIVE A.H.F.P. NO. 1065
ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

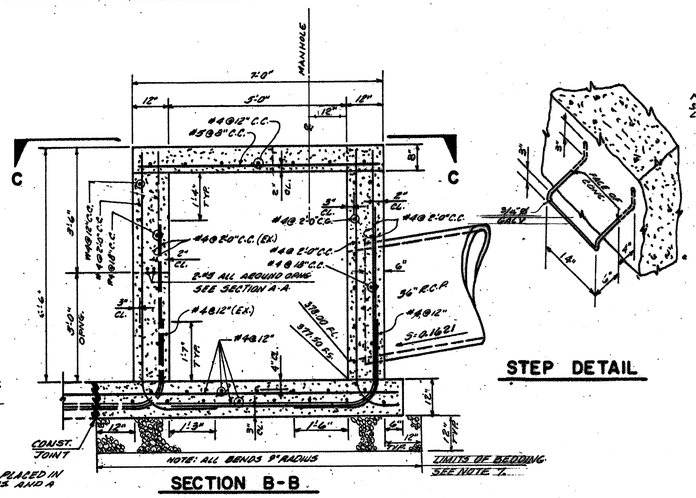
DRAINAGE DETAILS
DOUBLE 48" R.C.P. CULVERT AND HEADWALL STA. 36+14.5

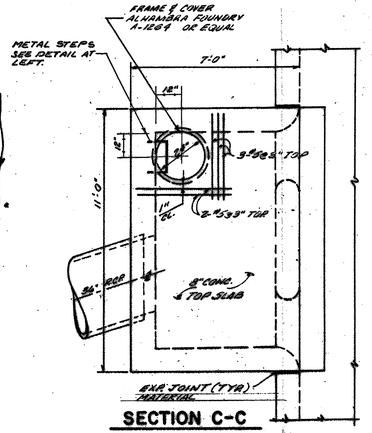
DRAWN BY: B.R.G.		SHEET 12 OF 21
CHECKED BY:		
DATE: 8/17/82	SCALE: AS SHOWN	





GENERAL NOTES:
1) CONCRETE SHALL BE CLASS 560-C-4000.
2) REINF. STEEL SHALL BE GRADE 60 CONFORMING TO A.S.T.M. A-615.
3) EXPOSED EDGES OF CONCRETE SHALL BE BEVELED.
4) LONGITUDINAL STEEL, TRANSVERSE STEEL. BARS PER A.C.I. 318-77.
5) EXPANSION JOINTS SHALL BE 1" PREMOLDED BITUMINOUS, EXTENDING FULL DEPTH OF WALL.
6) METAL STEPS SHALL BE EMBEDDED SPACED @ 15" INTERVALS FROM 15" ABOVE FLOOR TO WITHIN 12" OF THE TOP OF THE BOX. GALVANIZE AFTER FABRICATION.
7) MATERIAL USED FOR STRUCTURAL BACKFILL SHALL BE FURNISHED AND PLACED IN ACCORDANCE WITH SECTION 19-3.06 "STRUCTURE BACKFILL" OF STD. SPECS. AND A MIN. OF 12" THICK @ 18" EACH SIDE OF EXTERIOR WALL.

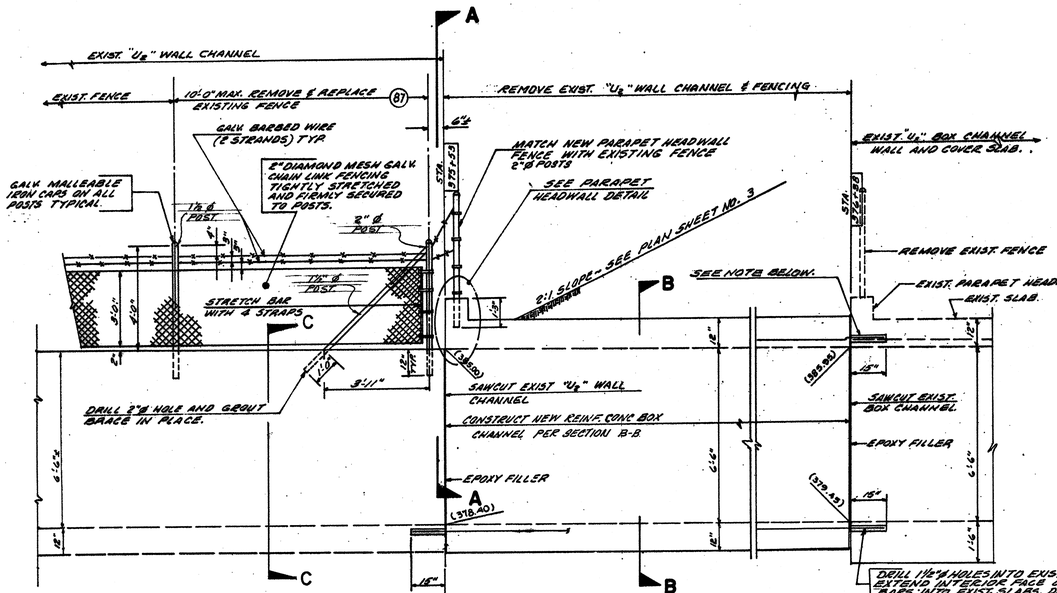




CHAMBER INLET STRUCTURE — DETAILS

NO SCALE

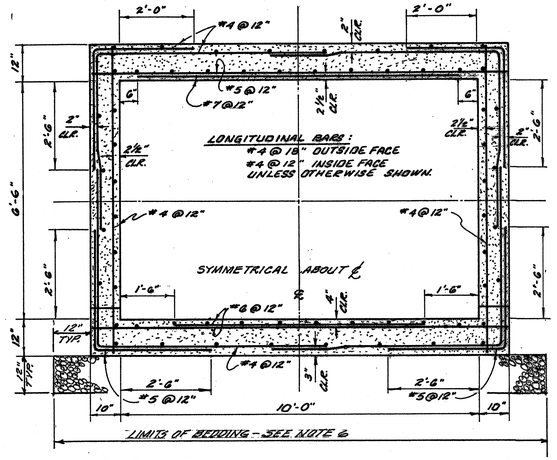
1/13



CARBON CANYON CHANNEL - REINF. CONC. BOX CHANNEL ADDITION

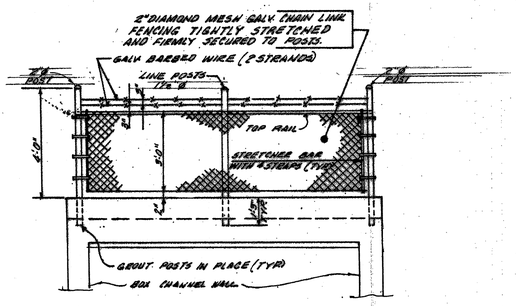
SCALE: 3/8" = 1'-0"

2/13



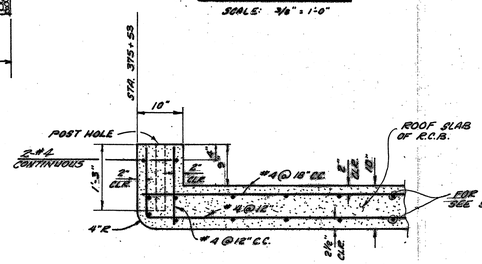
R.C.B. SECTION B-B
STA. 375+53 TO STA. 376+38

SCALE: ½" = 1'-0"



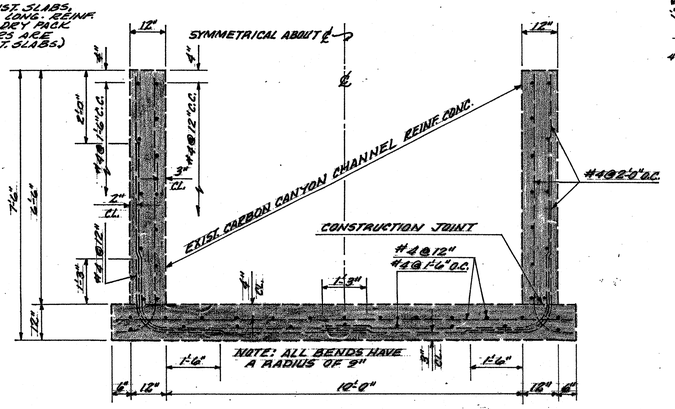
PARAPET HEADWALL FENCE
SECTION A-A (87)

SCALE: 3/4" = 1'-0"



PARAPET HEADWALL DETAIL

SCALE: 3/4" = 1'-0"



EXIST. "U2" WALL CHANNEL
SECTION C-C

SCALE: 1/2" = 1'-0"

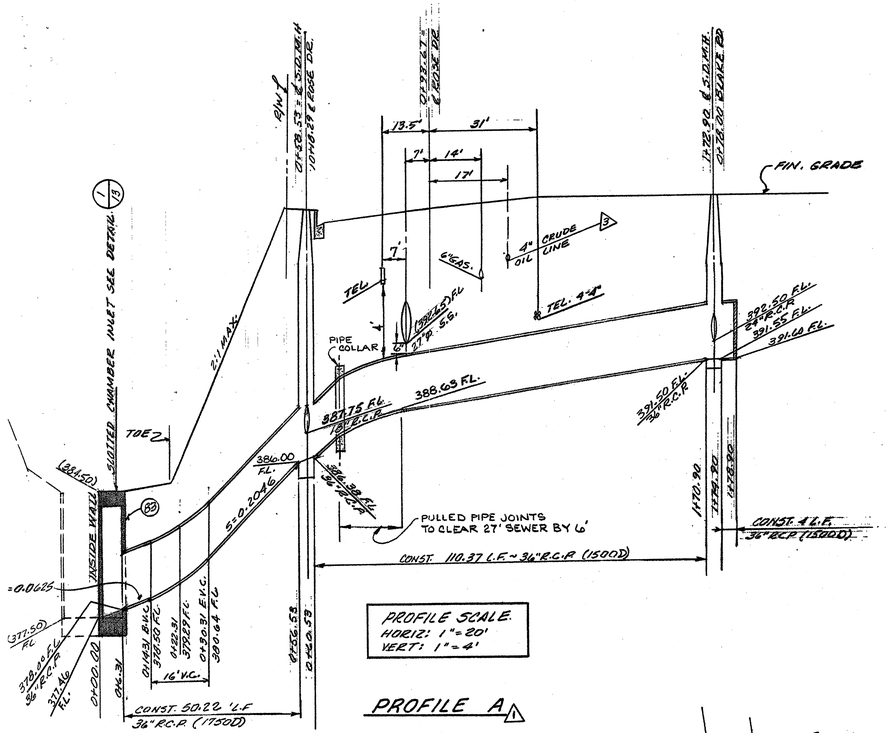
GENERAL NOTES:
1) CONCRETE SHALL BE CLASS 560-C-4000.
2) REINF. STEEL SHALL BE GRADE 60 CONFORMING TO A.S.T.M. A-615.
3) EXPOSED EDGES OF CONCRETE SHALL BE BEVELED.
4) LONGITUDINAL STEEL, TRANSVERSE STEEL BARS PER A.C.I. 318-77.
5) EXPANSION JOINTS SHALL BE EPOXY FILLER, EXTENDING FULL DEPTH OF WALL & SLABS.
6) MATERIAL USED FOR STRUCTURAL BACKFILL SHALL BE FURNISHED & PLACED IN ACCORDANCE WITH SECTION 19-3.06 "STRUCTURE BACKFILL" OF THE STANDARD SPECIFICATIONS AND A MIN. OF 12" THICK & 12" EACH SIDE OF EXTERIOR WALL.

"AS BUILT" 4-7-83

ROSE DRIVE A.H.F.P. NO. 1065	
ENGINEERING DEPARTMENT CITY OF BREA, CALIFORNIA	
DRAINAGE DETAILS CARBON CANYON CHANNEL 10'x 6'-6" R.C.B. AND INLET STRUCTURE	
DRAWN BY: B.R.G.	SHEET 13 OF 21
CHECKED BY: J.E.S.	
DATE: 8/17/82	SCALE: AS SHOWN

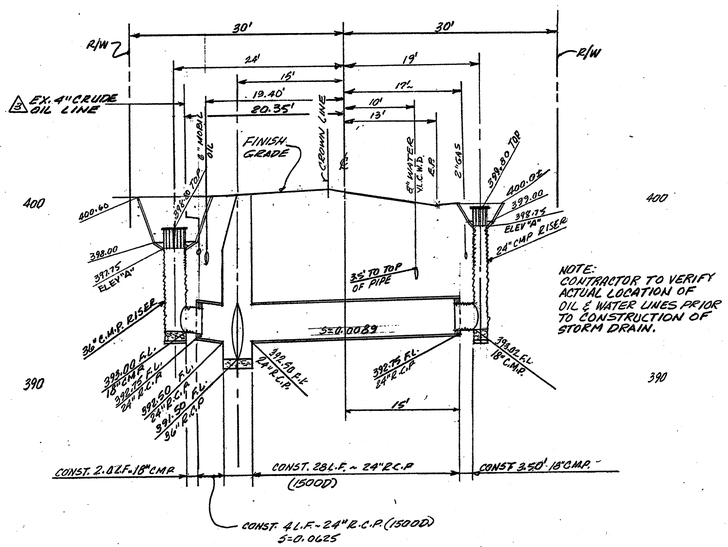
K-1420

REV 1.0 2005



PROFILE SCALE.
HORIZ: 1"=20'
VERT: 1"=4'

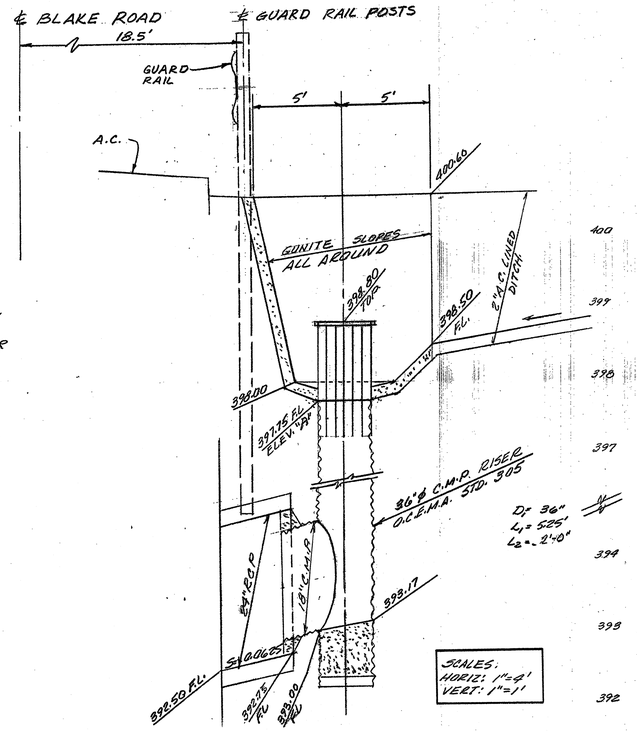
PROFILE A ⚠1



NOTE:
CONTRACTOR TO VERIFY ACTUAL LOCATION OF OIL & WATER LINES PRIOR TO CONSTRUCTION OF STORM DRAIN.

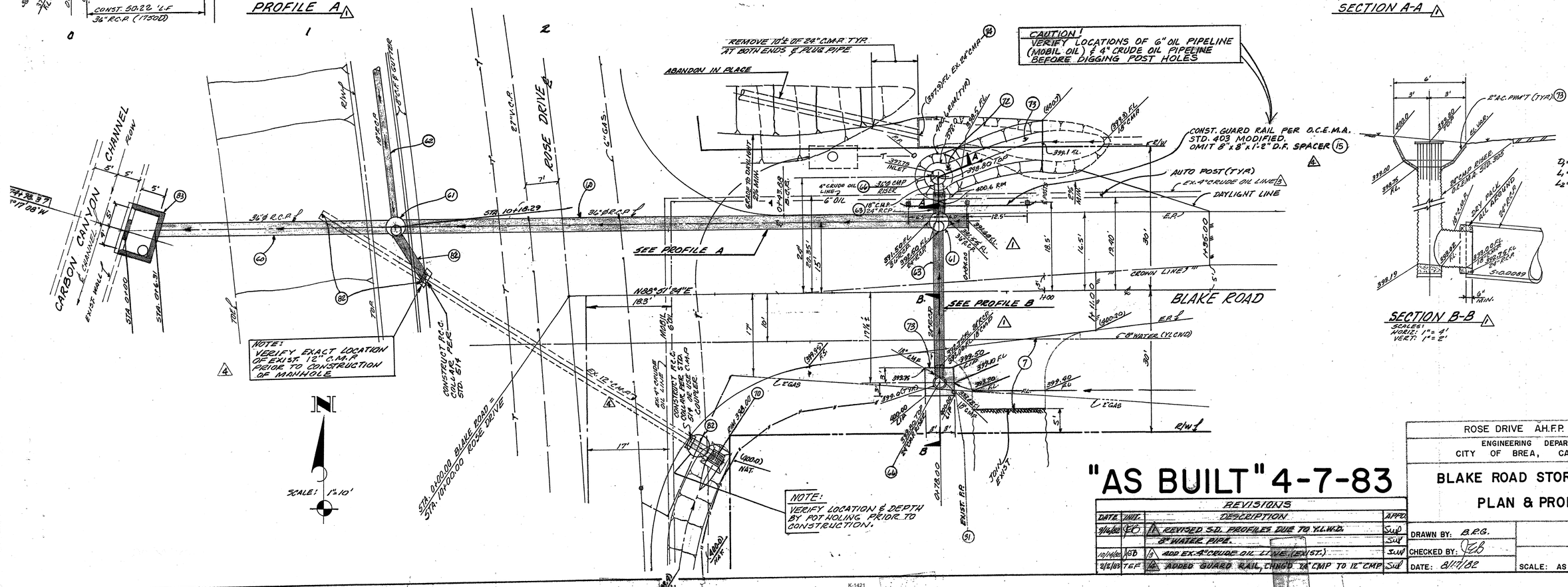
PROFILE SCALE
HORIZ: 1"=10'
VERT: 1"=4'

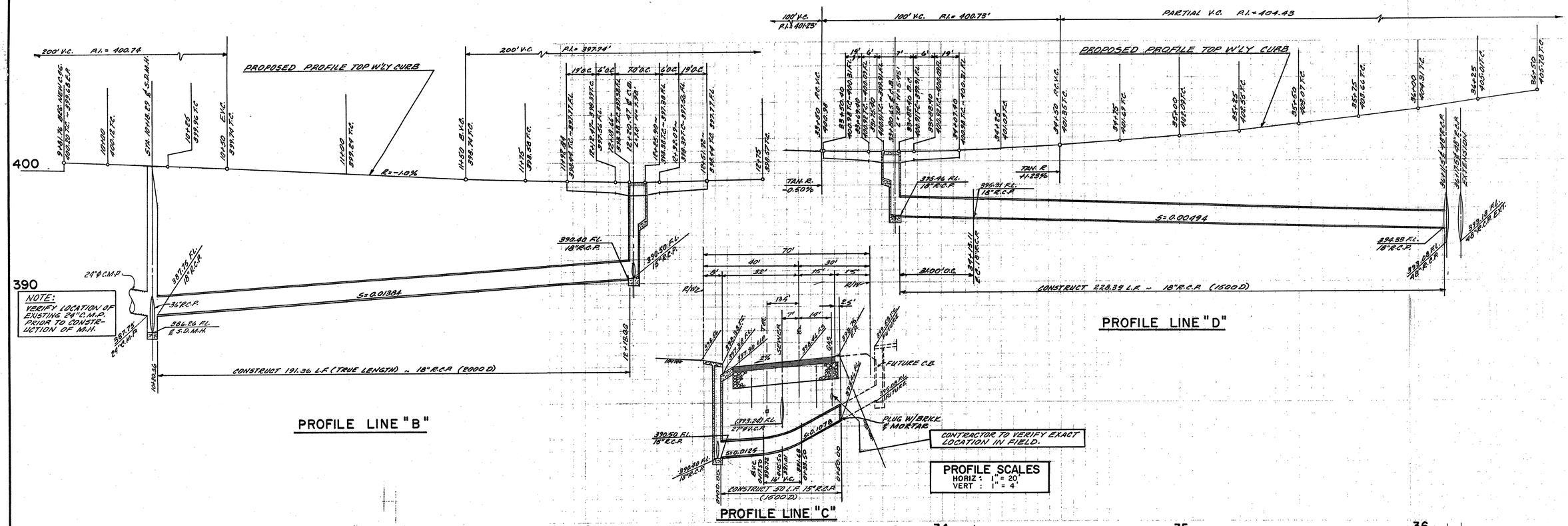
PROFILE B ⚠1



SCALES:
HORIZ: 1"=4'
VERT: 1"=1'

SECTION A-A ⚠1


CARBON CANYON ℄ CHANNEL
℄ CHANNEL
EXIST WALL
5'
5'
5'
N 88° 08' W
STA. 0+00
STA. 0+16.31
℄ ROSE DRIVE
℄ BLAKE ROAD
STA. 10+18.29
36"ϕ R.C.P.
18" R.C.P.
27" V.C.P.
1'
7'
12'
12'
SEE PROFILE A
SEE PROFILE B
N 88° 31' 24" E
183'
174.5'
NOTE: VERIFY EXACT LOCATION OF EXIST. 12" C.M.P. PRIOR TO CONSTRUCTION OF MANHOLE
CONSTRUCT R.C.C. COLLAR PER STD. 614
EX. 12" C.M.P.
EX. 4" CRUDE OIL LINE
CONSTRUCT R.C.C. COLLAR PER STD. 614
REMOVE 10'± OF 24" C.M.P. TYP. AT BOTH ENDS & PLUG PIPE
ABANDON IN PLACE
(397.3) F.L. EX. 24" C.M.P.
42'± L.E.M.(TYP.)
398.5 F.L.
398.5 TOP
399.1 F.L.
EXCAVATE TO DAYLIGHT 2:1 MAX.
4" CRUDE OIL LINE
6" OIL
3'x1'0 CMP RISER
18" C.M.P. 24" R.C.P.
400.6 RIM
398.80 TOP
398.50 F.L.
398.75 F.L.
24" R.C.P.
398.91 F.L.
18" C.M.P.
398.50 F.L.
24" R.C.P.
398.75 F.L.
24" R.C.P.
S=0.0089
CONST. GUARD RAIL PER O.C.E.M.A. STD. 403 MODIFIED. OMIT 8"x8"x1'-2" D.F. SPACER (15)
AUTO POST (TYP.)
EX. 4" CRUDE OIL LINE
DAYLIGHT LINE
E.P.
12.5'
18.5'
16.5'
19.40'
30'
20.35'
15'
2'0"
CROWN LINE
1400
1400
(400.20)
E.P.
8" WATER CYL. C.M.D.
30'
18" C.M.P.
399.50 F.L.
399.40 F.L.
399.20 F.L.
399.40 F.L.
18" C.M.P.
5'
3'
3'
400.00 TOP
398.50 F.L.
24" R.C.P.
398.75 F.L.
24" R.C.P.
S=0.0089
JOINT EXIST.
EXIST. R.R.
(400.0) NAT.
(399.90) NAT.
(400.0) NAT.
(400.0) NAT.
(400.0



"AS BUILT" 4-7-83

REVISIONS			
DATE	INIT.	DESCRIPTION	APP'D
10/19/82		B ADDED 4" CRUDE OIL LINE (EXIST.)	

ROSE DRIVE A.H.F.P. NO. 1065

ENGINEERING DEPARTMENT
CITY OF BREA, CALIFORNIA

ROSE DRIVE STORM DRAIN PLAN & PROFILE

DRAWN BY B.R.G.
CHECKED BY [illegible]
DATE: 8/17/82
SCALE: AS NOTED

SHEET 15 OF 21

K-1422

MAY 10 2005

DOUBLE 48"RCP - CROSSING ROSE DRIVE