Appendix F Preliminary Hydrology Report

Appendix

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PRELIMINARY HYDROLOGY REPORT

Project Name:

OAK CREEK COMMUNITY PARK

15616 Valley Oak Drive
Irvine, California CA 92618

Prepared for:

City of Irvine

Community Services Department
One Civic Center Plaza
Irvine, CA 92623-9575

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APRIL 2022

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Civil Engineers

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SECTION A HYDROLOGY AND HYDRAULICS REPORT

SECTION B APPENDIX ATTACHMENTS

I. INTRODUCTION

This preliminary report is prepared for the City of Irvine Community Services Department as part of the effort to expand the existing facilities at the Oak Creek Community Park located at 15616 Valley Oak Drive in the City of Irvine, California (refer to the Vicinity Map in Appendix A). The project site is bounded by Sand Canyon Avenue to the southeast, Valley Oak Drive to the northwest, Barranca Parkway to the southwest, and corporate offices to the northeast. The existing park facilities that include a baseball field, two soccer fields, a children's playground area, a flat grassy play area, a restroom building, a picnic shelter, BBQ grills, picnic tables and a paved parking lot are all located at the northerly portion of the site. The southerly portion of the site is owned by Southern California Edison (SCE) and is currently undeveloped. The proposed expansion of park facilities would include improvements within SCE's property.

The purpose of this report is to provide a hydrologic evaluation of both existing and proposed (post improvement) conditions to estimate peak storm runoff values to support the design of proposed storm drainage and water quality facilities. The project site is located within Zone X per the FEMA Map reference in Appendix C.

II. EXISTING DRAINAGE CONDITION

Existing site topography generally slopes in a westerly direction with elevations ranging from 141.3 to 156 feet above sea level (MSL). No off-site drainage is anticipated to contribute to on-site run-off as shown on the Preliminary Existing Condition Hydrology Map (PECHM) provided in Appendix K.

Drainage from the northerly half of the developed park site is captured by various on-site catch basins and inlets into an existing on-site storm drain line that runs along the park's existing asphalt drive and parking area. This storm drain line is shown on the AS-BUILT reference plans provided in Appendix M as Lateral "B-5", Appendix N as Lateral "B-3A", and Appendix O as Line "A". For consistency, this report will refer to this storm drain line as Line "A".

On-site drainage is conveyed by Line "A" to an existing 78" RCP storm drain line in Valley Oak Drive, as shown on the AS-BUILT reference plans provided in Appendix M and N as Line "B". For consistency, this report will refer to this storm drain line as Line "B".

Drainage from the southerly half of the undeveloped park site within SCE's property is captured by an existing 24" CSP riser inlet located at the westerly corner of the site and conveyed by an existing 18" RCP pipe to Line "B" in Valley Oak Drive. This 18" pipe is shown on the AS-BUILT reference plans provided in Appendix N as Lateral "B-1". For consistency, this report will refer to this storm drain lateral as Line "C".

III. PROPOSED DRAINAGE CONDITION

The proposed drainage condition includes provisions to capture and treat run-off from both the northerly and southerly portions of the park site. Minor improvements are proposed for the northerly portion of park site that includes the conversion of the existing baseball field into a synthetic turf soccer field, the conversion of the existing soccer field located at the southeasterly corner of the site into a dog park, and miscellaneous sidewalk and hardscape related improvements. Proposed improvements for the southerly portion of the park site within SCE's property includes an asphalt parking lot with landscape islands, an open turf field, miscellaneous sidewalk, ramps, and steps to facilitate non-ADA and ADA access. Storm drain improvements consisting of a trench drain and 18" RCP pipe conveys drainage from the proposed parking lot to a water quality unit. Treated and overflow runoff from the water quality unit drains towards the westerly corner of the site and is captured by the existing 24" CSP riser that conveys runoff via Line "C" to Line "B" in Valley Oak Drive. Existing drainage patterns will be maintained for the proposed condition as the site is already tabled for draining into the existing 78" RCP pipe (or Line "B") located in Valley Oak Drive. The Proposed Condition Hydrology Map depicting the drainage patterns and peak flow values is shown on the Preliminary Proposed Condition Hydrology Map (PPCHM) provided in Appendix L.

IV. HYDROLOGY ANALYSIS

A. METHODOLOGY

Hydrologic calculations to determine the storm frequency design discharges for this project were performed using the Orange County Rational Method. The Rational Method equation relates rainfall intensity, runoff coefficient and drainage area size to compute the drainage area peak runoff. Guidelines and parameters that relate to the Rational Method are as follows:

- The rational method equation is only applicable where the rainfall intensity can be assumed to be uniformly distributed over the drainage area at a uniform rate throughout the duration of the storm.
- The equation includes the element of the soil surface characteristics. The Soils Group Map from the Hydrology Manual indicates the existing soils of the project consist primarily of soil type "B" (see Appendix D). Soil ratings are based on a scale of "A" to "D", where "A" is the most pervious. The soil pervious rate is also affected by the type of vegetation and/or ground cover, and the percentage of impervious surface such as asphalt concrete paving, etc.
- The nomograph used to determine the time of concentration of the initial area is

based on the Kirpich formula. The Hydrology Manual specifies that the initial area shall be less than 10 acres and the flow path less than 300 feet.

- Standard intensity-duration curve date was taken from the Orange County Hydrology Manual, dated October 1986.

- For hydrology computations, Antecedent Moisture Content (AMC) I is utilized for 2-year storm events, AMC II is utilized for 10-year and 25-year storm events, and AMC III is utilized for 100-year storm events.

- Land use categories utilized in the computations includes *Commercial* (applicable to paved street for existing and proposed condition), B*arren* for area in the existing SCE site, and *Park Facilities for existing and proposed turf fields*.

Site hydrology was analyzed using the Advance Engineering Software (AES) software package for Orange County, which complies with the County of Orange Hydrology Manual. The software computes peak flows based on the Rational Method and conforms to the County of Orange Hydrology Manual.

B. DESIGN ASSUMPTIONS AND OBJECTIVES

A site hydrology analysis was performed to include the following:

- Delineation of on-site drainage tributary areas based on the proposed grading scheme for the project site and location of drainage inlets and/or drainage convergence points.
- Determination of 2-year, 10-year, and 25-year frequency storm design discharges. The 2-year frequency storm design discharges are computed to support water quality related calculations as provided in the Water Quality Management Plan (WQMP) for the project.
- Peak runoff for design and sizing of proposed storm drain facilities are dependent on parameters such as drainage path lengths, ground and pipe slopes, type and condition of the runoff surface, proposed land use and soil type. Pipe travel times were calculated based actual pipe sizes provided by the AS-BUILT reference plans.

Existing condition drainage patterns for the project site were determined utilizing the following information:

- Topographic Survey (see Appendix B).
- Record Drawings for Line “A” Storm Drain Improvements (see Appendix M, N, O).
- FEMA Flood Map (see Appendix C).

Existing and proposed drainage patterns are plotted on the PECHM and PPCHM

provided in Appendix K and Appendix L respectively. For modeling purposes, the site and all tributary drainage areas are further divided into smaller drainage subareas to more accurately model drainage patterns within the project site. All areas and flow information are utilized for input into the AES software to determine peak flowrates for both existing and proposed conditions.

C. SUMMARY OF RESULTS

The AES software calculations that indicate the existing and proposed condition peak flow rates based on the 2-year, 10-year, 25-year are provided in the Appendix E through Appendix J of this report. The 2-year storm event calculations are provided for water quality computations purposes only. The existing condition estimated subarea peak runoff corresponding to the 2-year, 10-year and 25-year storm event is summarized by Table I below.

TABLE I
EXISTING CONDITION ESTIMATED SUBAREA PEAK RUNOFF

Drainage Sub-Area	Area (Acres)	Q_2 (CFS)	Q_{10} (CFS)	Q_{25} (CFS)	TC_{25} (Minutes)
Subarea A	11.23	11.51	22.25	26.74	7.41
Subarea B	7.87	5.96	12.73	15.80	12.74
Total	**19.10**	**17.47**	**34.98**	**42.54**	**-**

As shown on the PECHM in Appendix K and summarized by Table I above, a peak runoff of about 42.5 CFS based on the 25-year storm event is conveyed from the park site to Line "B", the 78" RCP storm drain pipe in Valley Oak Drive. About 26.4 CFS of on-site drainage contributions to Line "B" is conveyed by Line "A" with the balance of 15.8 CFS conveyed by Line "C". As shown on the PECHM and PPCHM, the total drainage subareas that discharges to Line "B" spans approximately 19.1 acres. Peak flow contributions from street parkway areas that surface drain directly to San Canyon Avenue and Valley Oak Drive are not considered as on-site run-off contributions. The proposed condition estimated subarea peak runoff corresponding to the 2-year, 10-year and 25-year storm event is summarized by Table II below.

TABLE II
PROPOSED CONDITION SUBAREA PEAK RUNOFF

Drainage Sub-Area	Area (Acres)	Q_2 (CFS)	Q_{10} (CFS)	Q_{25} (CFS)	TC_{25} (Minutes)
Subarea A	11.64	12.10	23.53	28.34	7.41
Subarea B	7.45	5.92	11.81	14.46	11.48
Total	**19.09**	**18.02**	**35.34**	**42.80**	**-**

For existing conditions and based on the latest AS-BUILT reference plan for Line "A" provided in Appendix O, a 25-year peak flow of 36.2 CFS is shown captured from the park-site and conveyed by Line "A" to Line "B". The hydraulic grade line (HGL) shown on the profile sheet also indicates that Line "A" is operating under open-channel or non-pressurized flow conditions during peak flow events. Per Appendix N, a 25-year peak flow of 6.4 CFS is shown captured from the park-site and conveyed by Line "C" to Line "B". The hydraulic grade line (HGL) shown on the profile indicates that the downstream portion of Line "C" is operating under pressurized flow conditions during peak flow events. Per the PECHM and Table I above, the existing condition 25-year storm peak flow for subarea A and subarea B is estimated at 26.7 CFS and 15.8 CFS respectively. Per the PPCHM and Table II above, the proposed condition 25-year storm peak flow for subarea A and subarea B is estimated at 28.3 CFS and 14.5 CFS respectively. On-site peak flow contributions to Line "B" from Line "A" and Line "C" are summarized by Table III below.

TABLE III
25-YEAR STORM SUBAREA PEAK RUNOFF CONVEYANCE TO LINE "B"

Source Document	Peak Flow Rate (CFS)			Comments
	Line "A"	Line "C"	Total	
AS-BUILT Plans (Exist. Condition)	36.2	6.4	42.6	Line "A" - Non-pressurized flow Line "C" – Pressurized flow @ DS portion
PECHM (Exist. Condition)	26.74	15.80	42.54	Total existing on-site runoff to Line "B" is similar to AS-BUILT values
PPCHM (Prop. Condition)	28.34	14.46	42.80	Total proposed on-site runoff to Line "B" is similar to AS-BUILT values

Peak flow values between the AS-BUILT plans and the PECHM should be similar since the PECHM is representative of existing site conditions. As anticipated, the total onsite runoff contributions to Line "B" appears to be the same. However, flow distributions to Line "A" and Line "C" are dissimilar. Since it is unclear how the AS-BUILT plan peak flows were generated, PECHM peak flows for Line "A" and Line "C" will be assumed as the baseline condition. In comparison to the PECHM, PPCHM values indicate a slight increase in peak runoff at Line "A" of 1.60 CFS, a slight reduction in peak runoff at Line "C" of about 1.34 CFS, and a slight increase in the overall on-site contributions to Line "B" of about 0.26 CFS. Due to the minute differences in peak flows, no significant changes to Line "A", Line "B" or Line "C" is anticipated for the proposed condition.

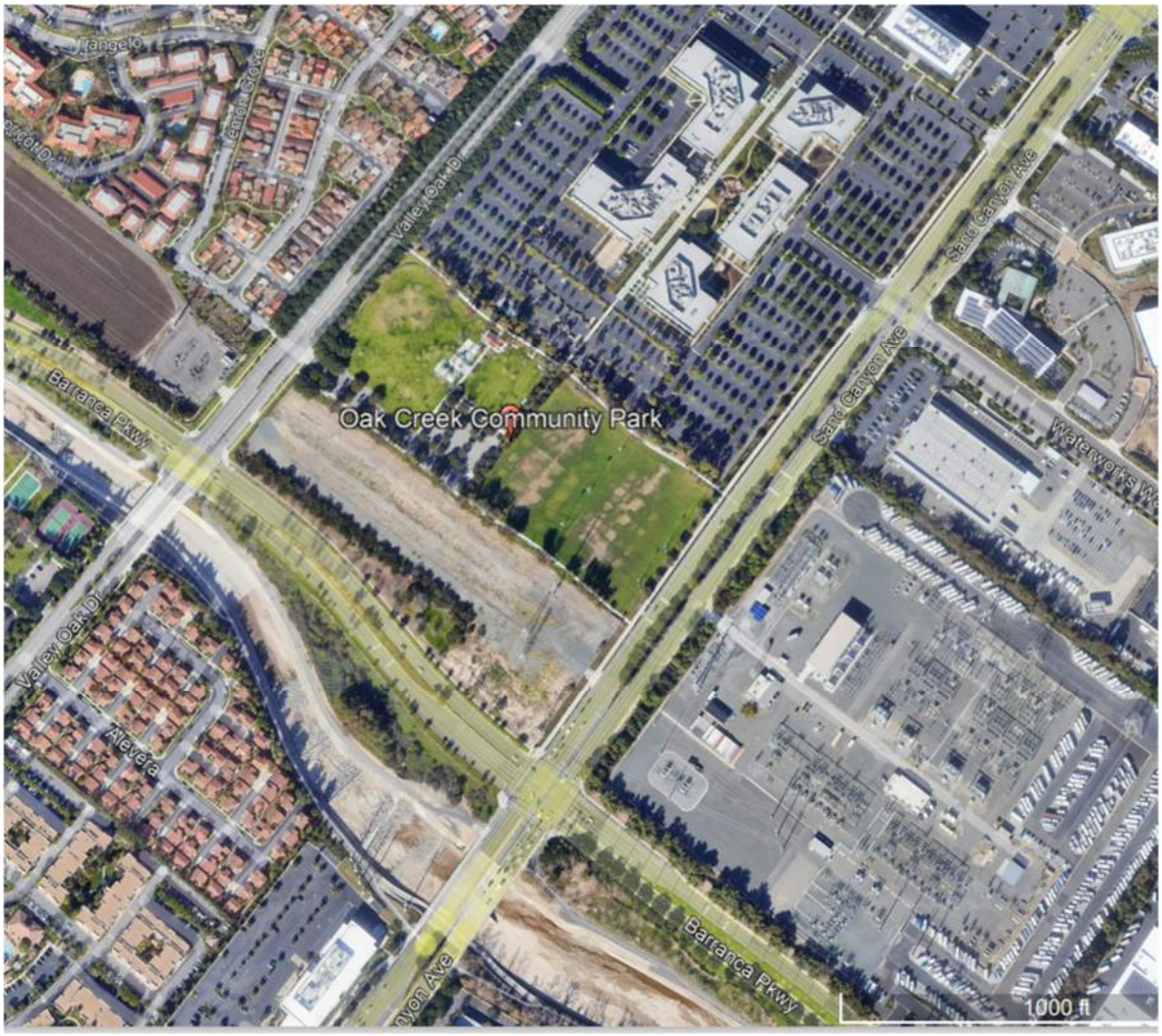
Table IV below provides for peak flow values contributing to Line "B" based on the 2-year storm event. As shown, the total peak flow rate for the proposed condition of about 18.02 CFS is slightly larger than the existing condition peak flow rate of about 17.47 CFS, translating to an overall increase in onsite runoff of about 0.55 CFS.

TABLE IV 2-YEAR STORM SUBAREA PEAK RUNOFF CONVEYANCE TO LINE "B"				
Source Document	**Peak Flow Rate (CFS)**			**Comments**
	Line "A"	**Line "C"**	**Total**	
PECHM (Exist. Condition)	11.51	5.96	17.47	-
PPCHM (Prop. Condition)	12.10	5.92	18.02	-
-	**Difference**		**0.55**	-

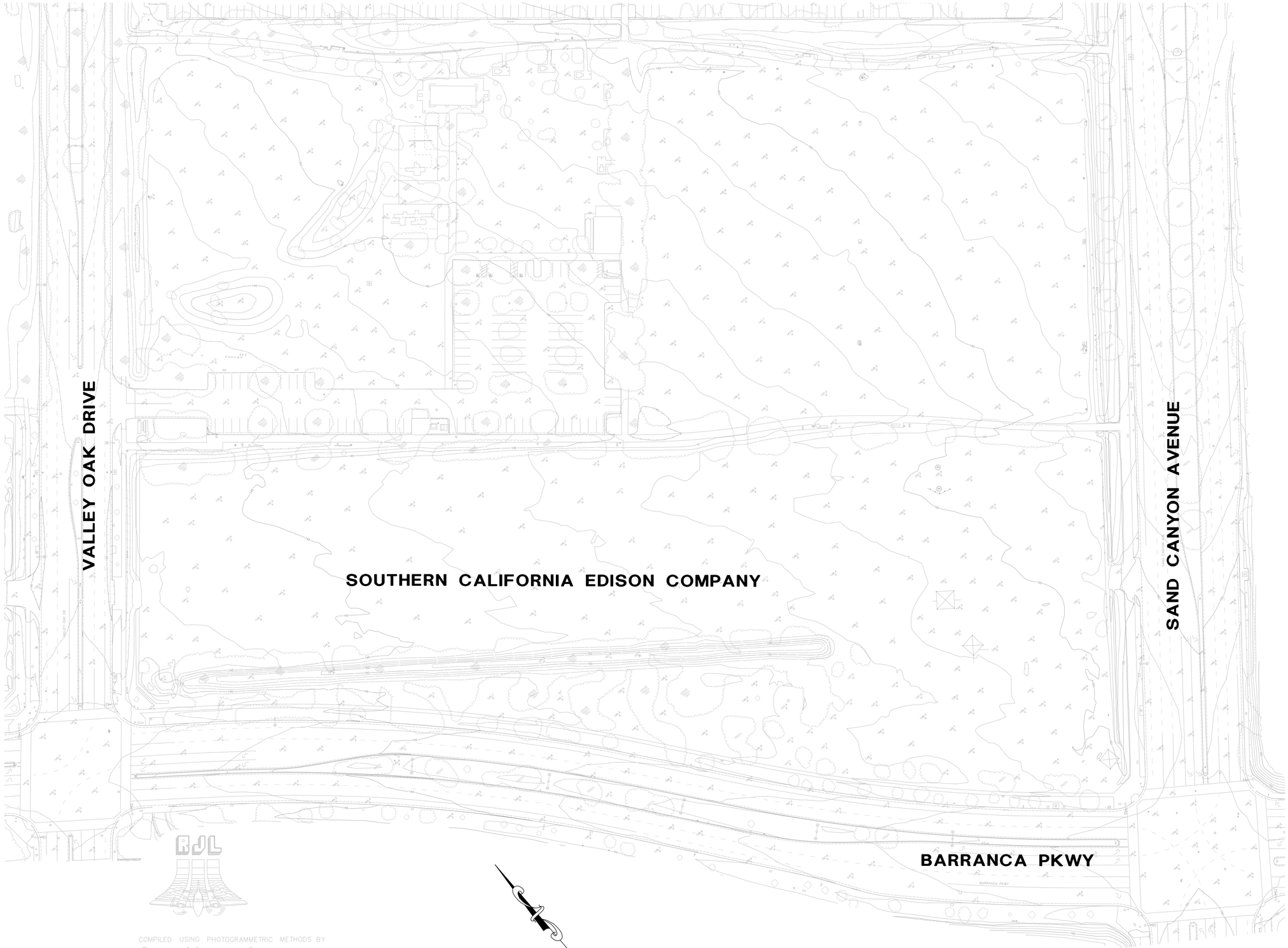
The 0.55 CFS overall increase in onsite peak runoff equates to about a 3.15% increase from the existing condition. Since the increase in onsite peak runoff is less than five percent (5%), hydromodification controls are not anticipated to be required for the project.

END OF SECTION A

Appendix A
Vicinity Map



Appendix B
TOPOGRAPHIC SURVEY MAP



COMPILED USING PHOTOGRAMMETRIC METHODS BY
ROBERT J. LUNG & ASSOCIATES
2832 WALNUT AVENUE, SUITE E
TUSTIN, CALIFORNIA 92680
(714) 832-2077

WORK ORDER: 44133
DATE OF PHOTOGRAPHY: 7/24/19
CONTOUR INTERVAL: 1'

50' 25' 0' 50' 100'
GRAPHIC SCALE: 1"=50'

CITY OF IRVINE
OAK CREEK COMMUNITY PARK

TOPOGRAPHIC SURVEY MAP

JOB NO.:	19-2260
DATE:	03/17/2022
DRAWNED BY:	
DESIGNED BY:	
APPROVED BY:	
SHEET	1 OF 1

Appendix C

NATIONAL FLOOD HAZARD LAYER FIRMETTE

National Flood Hazard Layer FIRMette

FEMA

117°46'35"W 33°40'14"N

117°45'58"W 33°39'44"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

F-13

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/8/2022 at 1:53 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix D
HYDROLOGIC CLASSIFICATION OF SOILS

HYDROLOGIC CLASSIFICATION OF SOILS

ORANGE COUNTY, CALIFORNIA

MAY 1986, PLATE B

Appendix E

Existing Q_2 Hydrology Calculations

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2008 Advanced Engineering Software (aes)
              Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                              Analysis prepared by:

                          ADAMS STREETER CIVIL ENGINEERS
                        16755 VON KARMAN AVENUE, SUITE 150
                                IRVINE, CA 92606
                                 (949) 474-2330

 ************************** DESCRIPTION OF STUDY **************************
* 2-YEAR STORM EVENT HYDROLOGY ANALYSIS                                   *
* OAKCREEK COMMUNITY PARK, IRVINE CALIFORNIA                              *
* EXISTING CONDITION                                                      *
 **************************************************************************

  FILE NAME: OAK02EXA.DAT
  TIME/DATE OF STUDY: 15:59 04/04/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  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   0.50    2.00 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) =   251.00
  ELEVATION DATA: UPSTREAM(FEET) =    157.60  DOWNSTREAM(FEET) =    151.80
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.355
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.580
  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                B        0.07      0.30     0.850    36    9.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.08
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.08

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
  ** WARNING: Computed Flowrate is less than 0.1 cfs,
               Routing Algorithm is UNAVAILABLE.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.580
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.24      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    0.29
  EFFECTIVE AREA(ACRES) =      0.31   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       0.37

****************************************************************************
  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)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   363.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.12
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.37
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   10.82
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.82
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.453
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.46      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      0.77   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       0.83

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =    97.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.11
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.83
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   11.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     711.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   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
  PUBLIC PARK                B        0.11      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.12
  EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       0.93

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.25
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.93
```

```
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   11.57
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     846.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.57
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.399
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.77      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    0.79
 EFFECTIVE AREA(ACRES) =      1.65   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        1.6       PEAK FLOW RATE(CFS) =       1.70

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.70
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.58
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     851.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.58
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.398
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        3.91      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    3.91      SUBAREA RUNOFF(CFS) =    4.02
 EFFECTIVE AREA(ACRES) =      5.56   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        5.6       PEAK FLOW RATE(CFS) =       5.72

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0111
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.00
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.72
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   12.22
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1082.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   12.22
  RAINFALL INTENSITY(INCH/HR) =   1.36
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       5.56
  TOTAL STREAM AREA(ACRES) =       5.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.72

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    150.00  DOWNSTREAM(FEET) =    144.55

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.542
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.475
  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                B        0.76      0.30      0.850    36   10.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.010
```

```
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.83
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   11.09
 LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     467.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.09
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.433
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.60      0.30      0.100    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    0.76
 EFFECTIVE AREA(ACRES) =      1.36   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       1.56

****************************************************************************
 FLOW PROCESS FROM NODE      8.30 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0077
 FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.74
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.56
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   11.25
 LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.00 =     504.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   11.25
 RAINFALL INTENSITY(INCH/HR) =   1.42
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.52
 EFFECTIVE STREAM AREA(ACRES) =       1.36
 TOTAL STREAM AREA(ACRES) =       1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.56

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

```
 FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   252.00
 ELEVATION DATA: UPSTREAM(FEET) =    147.00  DOWNSTREAM(FEET) =    142.68

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.261
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.990
 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                 B        0.44      0.30     0.100    36    6.26
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.78
 TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
 FLOW PROCESS FROM NODE      8.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0557
 FLOW LENGTH(FEET) =    37.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.13
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.78
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.36
 LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.00 =     289.70 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 =  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) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.44
 TOTAL STREAM AREA(ACRES) =       0.44
 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        5.72   12.22    1.355  0.30( 0.26) 0.85       5.6       1.00
     2        1.56   11.25    1.421  0.30( 0.16) 0.52       1.4       8.10
```

```
    3        0.78    6.36    1.971  0.30( 0.03) 0.10       0.4       8.40

  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        6.69    6.36    1.971  0.30( 0.21) 0.71       4.1       8.40
      2        7.70   11.25    1.421  0.30( 0.22) 0.74       6.9       8.10
      3        7.73   12.22    1.355  0.30( 0.22) 0.74       7.4       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.73    Tc(MIN.) =    12.22
  EFFECTIVE AREA(ACRES) =       7.36   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =        7.4
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1082.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   261.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.85
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.73
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   13.12
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    1343.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.12
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.301
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.52      0.30     0.100    36
  PUBLIC PARK                B        3.04      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.740
  SUBAREA AREA(ACRES) =    3.56      SUBAREA RUNOFF(CFS) =    3.46
  EFFECTIVE AREA(ACRES) =     10.92   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      10.60

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       11.08    7.29    1.823  0.30( 0.22) 0.72       7.7       8.40
```

```
      2       10.74   12.15    1.360  0.30( 0.22) 0.74      10.5       8.10
      3       10.60   13.12    1.301  0.30( 0.22) 0.74      10.9       1.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      11.08  Tc(MIN.) =    7.29
  AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.72  EFFECTIVE AREA(ACRES) =       7.66

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.29
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.823
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.31      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =      7.97   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      11.51

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.51
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.43
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1388.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    43.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.51
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1431.70 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    93.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.51
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.77
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    1525.60 FEET.
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
 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) =     2.35
 ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    149.00

 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.)
 NATURAL POOR COVER
 "BARREN"                   B        0.63      0.30     1.000    72    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      1.11
 TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      1.11

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    149.00  DOWNSTREAM(FEET) =    139.90
 CHANNEL LENGTH THRU SUBAREA(FEET) =   858.00   CHANNEL SLOPE =  0.0106
 CHANNEL FLOW THRU SUBAREA(CFS) =       1.11
 FLOW VELOCITY(FEET/SEC) =   1.58 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   9.07   Tc(MIN.) =   14.07
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     860.35 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.07
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.250
 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"                   B        4.59      0.30     1.000    72
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    4.59      SUBAREA RUNOFF(CFS) =    3.92
 EFFECTIVE AREA(ACRES) =      5.22   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        5.2       PEAK FLOW RATE(CFS) =       4.46

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

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.07
  RAINFALL INTENSITY(INCH/HR) =   1.25
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.22
  TOTAL STREAM AREA(ACRES) =       5.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.46

******************************************************************************
  FLOW PROCESS FROM NODE     23.10 TO NODE     23.20 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) =    150.80  DOWNSTREAM(FEET) =    147.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.337
  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"                    B        0.84      0.30     1.000    72   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      0.78

******************************************************************************
  FLOW PROCESS FROM NODE     23.20 TO NODE     23.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    147.80  DOWNSTREAM(FEET) =    139.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   791.00   CHANNEL SLOPE =  0.0100
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.78
  FLOW VELOCITY(FEET/SEC) =   1.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   8.79   Tc(MIN.) =   21.32
  LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1076.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   21.32
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.985
  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"                     B        1.81      0.30      1.000    72
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOFF(CFS) =    1.12
  EFFECTIVE AREA(ACRES) =      2.65   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       1.63

****************************************************************************
  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 =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   21.32
  RAINFALL INTENSITY(INCH/HR) =   0.98
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       2.65
  TOTAL STREAM AREA(ACRES) =       2.65
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.63

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.46   14.07    1.250  0.30( 0.30) 1.00       5.2      21.00
      2        1.63   21.32    0.985  0.30( 0.30) 1.00       2.6      23.10

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.96   14.07    1.250  0.30( 0.30) 1.00       7.0      21.00
      2        4.85   21.32    0.985  0.30( 0.30) 1.00       7.9      23.10

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.96    Tc(MIN.) =    14.07
  EFFECTIVE AREA(ACRES) =       6.97   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        7.9
  LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1076.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
```

```
  FLOW LENGTH(FEET) =    45.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.89
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.96
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   14.20
  LONGEST FLOWPATH FROM NODE     23.10 TO NODE     24.00 =    1121.70 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.9  TC(MIN.) =     14.20
  EFFECTIVE AREA(ACRES) =      6.97  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       5.96

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        5.96   14.20    1.243  0.30( 0.30) 1.00       7.0      21.00
      2        4.85   21.45    0.981  0.30( 0.30) 1.00       7.9      23.10
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix F

Existing Q_{10} Hydrology Calculations

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2008 Advanced Engineering Software (aes)
              Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                              Analysis prepared by:

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                                 (949) 474-2330

 ************************** DESCRIPTION OF STUDY **************************
* 10-YEAR STORM EVENT HYDROLOGY ANALYSIS                                  *
* OAKCREEK COMMUNITY PARK, IRVINE CALIFORNIA                              *
* EXISTING CONDITION                                                      *
 **************************************************************************

  FILE NAME: OAK10EXA.DAT
  TIME/DATE OF STUDY: 16:11 04/04/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  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   0.50    2.00 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) =   251.00
  ELEVATION DATA: UPSTREAM(FEET) =    157.60  DOWNSTREAM(FEET) =    151.80
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.355
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.835
  SUBAREA Tc 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                B        0.07      0.30     0.850    56    9.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =    49.40   MANNING'S N =  0.010
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.35
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.16
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     300.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.793
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.24      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    0.55
  EFFECTIVE AREA(ACRES) =      0.31   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       0.71

****************************************************************************
  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)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   363.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.91
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.71
```

```
 PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   10.83
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     663.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.83
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.607
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.46      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    0.97
 EFFECTIVE AREA(ACRES) =      0.77   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.63

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =    97.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.63
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =   11.11
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     760.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE 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
 PUBLIC PARK                B        0.11      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.23
 EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       1.83

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.25
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.83
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   11.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     895.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.53
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.515
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.77      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    1.57
  EFFECTIVE AREA(ACRES) =      1.65   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        1.6       PEAK FLOW RATE(CFS) =       3.36

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.36
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.55
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     900.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.55
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.513
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        3.91      0.30     0.850    56
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    3.91      SUBAREA RUNOFF(CFS) =    7.95
  EFFECTIVE AREA(ACRES) =      5.56   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.6       PEAK FLOW RATE(CFS) =      11.30

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0111
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.20
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.30
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   12.08
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   12.08
  RAINFALL INTENSITY(INCH/HR) =   2.45
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       5.56
  TOTAL STREAM AREA(ACRES) =       5.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.30

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    150.00  DOWNSTREAM(FEET) =    144.55

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.542
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.648
  SUBAREA Tc 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                B        0.76      0.30     0.850    56   10.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.64
```

```
 TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      1.64

****************************************************************************
 FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.64
 PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   11.01
 LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     467.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.01
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.582
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.60      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.38
 EFFECTIVE AREA(ACRES) =      1.36   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
 TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       2.97

****************************************************************************
 FLOW PROCESS FROM NODE      8.30 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0077
 FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.97
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   11.15
 LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.00 =     504.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   11.15
  RAINFALL INTENSITY(INCH/HR) =   2.56
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.52
  EFFECTIVE STREAM AREA(ACRES) =       1.36
  TOTAL STREAM AREA(ACRES) =       1.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.97

****************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   252.00
  ELEVATION DATA: UPSTREAM(FEET) =    147.00  DOWNSTREAM(FEET) =    142.68

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.261
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.569
  SUBAREA Tc 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                 B        0.44      0.30     0.100    56    6.26
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0557
  FLOW LENGTH(FEET) =    37.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.40
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.35
  LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.00 =     289.70 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 =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.35
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.44
 TOTAL STREAM AREA(ACRES) =       0.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.40

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.30   12.08    2.449  0.30( 0.26) 0.85       5.6       1.00
     2        2.97   11.15    2.564  0.30( 0.16) 0.52       1.4       8.10
     3        1.40    6.35    3.541  0.30( 0.03) 0.10       0.4       8.40

 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       12.67    6.35    3.541  0.30( 0.21) 0.71       4.1       8.40
     2       14.96   11.15    2.564  0.30( 0.22) 0.74       6.9       8.10
     3       15.09   12.08    2.449  0.30( 0.22) 0.74       7.4       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.09    Tc(MIN.) =    12.08
 EFFECTIVE AREA(ACRES) =       7.36   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =        7.4
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   261.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.09
 PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   12.87
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    1392.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.87
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.362
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.52      0.30     0.100    56
 PUBLIC PARK                B        3.04      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.740
  SUBAREA AREA(ACRES) =    3.56      SUBAREA RUNOFF(CFS) =    6.85
  EFFECTIVE AREA(ACRES) =     10.92   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      21.02

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       21.40    7.15    3.307  0.30( 0.22) 0.72       7.7       8.40
      2       21.19   11.94    2.465  0.30( 0.22) 0.74      10.5       8.10
      3       21.02   12.87    2.362  0.30( 0.22) 0.74      10.9       1.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      21.40  Tc(MIN.) =    7.15
  AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.72  EFFECTIVE AREA(ACRES) =       7.70

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.307
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.31      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    0.85
  EFFECTIVE AREA(ACRES) =      8.01   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      22.25

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.08
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.25
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1437.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    43.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.25
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.35
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1481.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    93.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.25
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.54
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    1575.00 FEET.
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
  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) =     2.35
  ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    149.00

  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.)
  NATURAL POOR COVER
  "BARREN"                    B        0.63      0.30     1.000    86    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.13
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.13

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    149.00  DOWNSTREAM(FEET) =    139.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   858.00   CHANNEL SLOPE =  0.0106
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.13
  FLOW VELOCITY(FEET/SEC) =   1.80 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   7.96   Tc(MIN.) =   12.96
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     860.35 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.352
  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"                    B        4.59      0.30     1.000    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.59      SUBAREA RUNOFF(CFS) =    8.48
  EFFECTIVE AREA(ACRES) =      5.22   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.2       PEAK FLOW RATE(CFS) =       9.64

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

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.96
  RAINFALL INTENSITY(INCH/HR) =   2.35
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.22
  TOTAL STREAM AREA(ACRES) =       5.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.64

******************************************************************************
  FLOW PROCESS FROM NODE     23.10 TO NODE     23.20 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) =    150.80  DOWNSTREAM(FEET) =    147.80

  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"                   B        0.84      0.30     1.000    86   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      1.59

******************************************************************************
  FLOW PROCESS FROM NODE     23.20 TO NODE     23.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    147.80  DOWNSTREAM(FEET) =    139.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   791.00   CHANNEL SLOPE =  0.0100
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.59
  FLOW VELOCITY(FEET/SEC) =   1.64 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   8.04   Tc(MIN.) =   20.56
  LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1076.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   20.56
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.806
  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"                  B        1.81      0.30      1.000    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOFF(CFS) =    2.45
 EFFECTIVE AREA(ACRES) =      2.65   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       3.59

****************************************************************************
 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 =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   20.56
 RAINFALL INTENSITY(INCH/HR) =   1.81
 AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       2.65
 TOTAL STREAM AREA(ACRES) =       2.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.59

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        9.64   12.96    2.352  0.30( 0.30) 1.00       5.2      21.00
     2        3.59   20.56    1.806  0.30( 0.30) 1.00       2.6      23.10

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       12.73   12.96    2.352  0.30( 0.30) 1.00       6.9      21.00
     2       10.66   20.56    1.806  0.30( 0.30) 1.00       7.9      23.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.73    Tc(MIN.) =    12.96
 EFFECTIVE AREA(ACRES) =       6.89   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        7.9
 LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1076.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    45.70   MANNING'S N =  0.013
```

```
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.20
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.73
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   13.07
  LONGEST FLOWPATH FROM NODE     23.10 TO NODE     24.00 =    1121.70 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.9  TC(MIN.) =     13.07
  EFFECTIVE AREA(ACRES) =      6.89  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      12.73

  ** 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   13.07    2.341  0.30( 0.30) 1.00       6.9      21.00
      2       10.66   20.69    1.799  0.30( 0.30) 1.00       7.9      23.10
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix G

Existing Q_{25} Hydrology Calculations

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2008 Advanced Engineering Software (aes)
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                              Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* 25-YEAR STORM EVENT HYDROLOGY ANALYSIS                                  *
* OAKCREEK COMMUNITY PARK, IRVINE CALIFORNIA                              *
* EXISTING CONDITION                                                      *
 **************************************************************************

  FILE NAME: OAK25EXA.DAT
  TIME/DATE OF STUDY: 16:19 04/04/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  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   0.50    2.00 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) =   251.00
  ELEVATION DATA: UPSTREAM(FEET) =    157.60  DOWNSTREAM(FEET) =    151.80
```

```
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.355
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.384
 SUBAREA Tc 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                B        0.07      0.30     0.850    56    9.36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA RUNOFF(CFS) =      0.20
 TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =    49.40   MANNING'S N =  0.010
 DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.51
 GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.20
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    9.59
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     300.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.59
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.336
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.24      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    0.67
 EFFECTIVE AREA(ACRES) =      0.31   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       0.86

****************************************************************************
 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)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =   363.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.86
```

```
 PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =   10.77
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     663.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.77
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.125
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.46      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.46      SUBAREA RUNOFF(CFS) =    1.19
 EFFECTIVE AREA(ACRES) =      0.77   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       1.99

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =    97.00   MANNING'S N =  0.010
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.99
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.05
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     760.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.05
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.079
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.11      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.28
 EFFECTIVE AREA(ACRES) =      0.88   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       2.24

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.24
  PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =   11.40
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     895.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.40
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.025
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.77      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.77      SUBAREA RUNOFF(CFS) =    1.92
  EFFECTIVE AREA(ACRES) =      1.65   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        1.6       PEAK FLOW RATE(CFS) =       4.11

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.11
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     900.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.41
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.023
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  PUBLIC PARK                B        3.91      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    3.91      SUBAREA RUNOFF(CFS) =    9.74
  EFFECTIVE AREA(ACRES) =      5.56   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.6       PEAK FLOW RATE(CFS) =      13.85

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0111
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.56
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.85
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   11.92
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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) =   2.95
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       5.56
  TOTAL STREAM AREA(ACRES) =       5.56
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.85

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    150.00  DOWNSTREAM(FEET) =    144.55

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.542
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.162
  SUBAREA Tc 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                B        0.76      0.30     0.850    56   10.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
```

```
  SUBAREA RUNOFF(CFS) =      1.99
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      1.99

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.99
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.03
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.082
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.60      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.65
  EFFECTIVE AREA(ACRES) =      1.36   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       3.58

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0077
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.71
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.58
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.16
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.00 =     504.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   11.16
 RAINFALL INTENSITY(INCH/HR) =   3.06
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.52
 EFFECTIVE STREAM AREA(ACRES) =       1.36
 TOTAL STREAM AREA(ACRES) =       1.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.58

****************************************************************************
 FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   252.00
 ELEVATION DATA: UPSTREAM(FEET) =    147.00  DOWNSTREAM(FEET) =    142.68

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.261
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.247
 SUBAREA Tc 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                 B        0.44      0.30      0.100    56    6.26
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.67
 TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      1.67

****************************************************************************
 FLOW PROCESS FROM NODE      8.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0557
 FLOW LENGTH(FEET) =    37.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.68
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.67
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.34
 LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.00 =     289.70 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 =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.34
 RAINFALL INTENSITY(INCH/HR) =   4.22
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.44
 TOTAL STREAM AREA(ACRES) =       0.44
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.67

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       13.85   11.92    2.949  0.30( 0.26) 0.85       5.6       1.00
     2        3.58   11.16    3.062  0.30( 0.16) 0.52       1.4       8.10
     3        1.67    6.34    4.216  0.30( 0.03) 0.10       0.4       8.40

 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       15.35    6.34    4.216  0.30( 0.21) 0.71       4.2       8.40
     2       18.30   11.16    3.062  0.30( 0.22) 0.74       7.0       8.10
     3       18.46   11.92    2.949  0.30( 0.22) 0.74       7.4       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      18.46    Tc(MIN.) =    11.92
 EFFECTIVE AREA(ACRES) =       7.36   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =        7.4
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   261.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      18.46
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   12.66
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    1392.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.66
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.851
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
 COMMERCIAL                 B        0.52      0.30     0.100    56
 PUBLIC PARK                B        3.04      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.740
 SUBAREA AREA(ACRES) =    3.56      SUBAREA RUNOFF(CFS) =    8.42
 EFFECTIVE AREA(ACRES) =     10.92   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      25.83

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       25.72    7.23    3.914  0.30( 0.22) 0.72       7.7       8.40
     2       25.96   11.91    2.952  0.30( 0.22) 0.74      10.6       8.10
     3       25.83   12.66    2.851  0.30( 0.22) 0.74      10.9       1.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      25.96  Tc(MIN.) =   11.91
 AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.74  EFFECTIVE AREA(ACRES) =      10.56

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.91
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.952
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.31      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    0.75
 EFFECTIVE AREA(ACRES) =     10.87   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      26.71

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       26.74    7.23    3.914  0.30( 0.22) 0.73       8.0       8.40
     2       26.71   11.91    2.952  0.30( 0.22) 0.74      10.9       8.10
     3       26.55   12.66    2.851  0.30( 0.22) 0.75      11.2       1.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      26.74  Tc(MIN.) =    7.23
 AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.73  EFFECTIVE AREA(ACRES) =       8.04

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
```

```
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.74
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1437.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    43.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.58
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.74
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1481.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    93.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.58
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.74
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    1575.00 FEET.
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
  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) =     2.35
  ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    149.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc 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"                    B        0.63      0.30     1.000    86    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.56
  TOTAL AREA(ACRES) =      0.63   PEAK FLOW RATE(CFS) =      2.56

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    149.00  DOWNSTREAM(FEET) =    139.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   858.00   CHANNEL SLOPE =  0.0106
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.56
  FLOW VELOCITY(FEET/SEC) =   1.87 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   7.65   Tc(MIN.) =   12.65
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     860.35 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.852
  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"                    B        4.59      0.30     1.000    86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    4.59      SUBAREA RUNOFF(CFS) =   10.54
  EFFECTIVE AREA(ACRES) =      5.22   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        5.2       PEAK FLOW RATE(CFS) =      11.99

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS 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) =   2.85
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       5.22
  TOTAL STREAM AREA(ACRES) =       5.22
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.99

******************************************************************************
  FLOW PROCESS FROM NODE     23.10 TO NODE     23.20 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) =    150.80  DOWNSTREAM(FEET) =    147.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.869
  SUBAREA Tc 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"                   B        0.84      0.30     1.000    86   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      1.94

******************************************************************************
  FLOW PROCESS FROM NODE     23.20 TO NODE     23.00 IS CODE =  52
------------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    147.80  DOWNSTREAM(FEET) =    139.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   791.00   CHANNEL SLOPE =  0.0100
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.94
  FLOW VELOCITY(FEET/SEC) =   1.71 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   7.71   Tc(MIN.) =   20.23
  LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1076.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   20.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.187
  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"                  B        1.81      0.30      1.000    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOFF(CFS) =    3.07
 EFFECTIVE AREA(ACRES) =      2.65   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       4.50

****************************************************************************
 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 =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   20.23
 RAINFALL INTENSITY(INCH/HR) =   2.19
 AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       2.65
 TOTAL STREAM AREA(ACRES) =       2.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.50

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       11.99   12.65    2.852  0.30( 0.30) 1.00       5.2      21.00
     2        4.50   20.23    2.187  0.30( 0.30) 1.00       2.6      23.10

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       15.80   12.65    2.852  0.30( 0.30) 1.00       6.9      21.00
     2       13.36   20.23    2.187  0.30( 0.30) 1.00       7.9      23.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.80    Tc(MIN.) =    12.65
 EFFECTIVE AREA(ACRES) =       6.88   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        7.9
 LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1076.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    45.70   MANNING'S N =  0.013
```

```
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.94
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.80
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   12.74
  LONGEST FLOWPATH FROM NODE     23.10 TO NODE     24.00 =    1121.70 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        7.9  TC(MIN.) =     12.74
  EFFECTIVE AREA(ACRES) =      6.88  AREA-AVERAGED Fm(INCH/HR)=  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      15.80

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.80   12.74    2.841  0.30( 0.30) 1.00       6.9      21.00
      2       13.36   20.33    2.180  0.30( 0.30) 1.00       7.9      23.10
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix H

Proposed Q_2 Hydrology Calculations

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2008 Advanced Engineering Software (aes)
              Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                              Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* 2-YEAR STORM EVENT HYDROLOGY ANYLYSIS                                  *
* OAKCREEK COMMUNITY PARK, IRVINE CALIFORNIA                             *
* PROPOSED CONDITION                                                     *
 **************************************************************************

  FILE NAME: OAK02PRA.DAT
  TIME/DATE OF STUDY: 16:01 04/04/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  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   0.50    2.00 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) =   251.00
  ELEVATION DATA: UPSTREAM(FEET) =    157.00  DOWNSTREAM(FEET) =    151.80
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.562
  *   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.)
  PUBLIC PARK                B        0.07      0.30     0.850    36    9.56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.08
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.08

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
  ** WARNING: Computed Flowrate is less than 0.1 cfs,
               Routing Algorithm is UNAVAILABLE.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.560
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.24      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    0.28
  EFFECTIVE AREA(ACRES) =      0.31   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       0.36

****************************************************************************
  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)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   363.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.06
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.36
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   11.05
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.05
```

```
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.436
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        2.53      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    2.53      SUBAREA RUNOFF(CFS) =    2.69
  EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       3.02

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =    97.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.65
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.02
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   11.24
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     711.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.24
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.422
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        0.25      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      3.09   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =       3.25

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.30
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
```

```
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.25
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   11.48
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     846.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.48
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.405
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.71      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.71      SUBAREA RUNOFF(CFS) =    0.73
 EFFECTIVE AREA(ACRES) =      3.80   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       3.93

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.93
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.49
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     851.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   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
 PUBLIC PARK                B        2.01      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    2.01      SUBAREA RUNOFF(CFS) =    2.08
 EFFECTIVE AREA(ACRES) =      5.81   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =       6.01

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

```
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0111
 FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS   8.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.01
 PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   12.12
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1082.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   12.12
 RAINFALL INTENSITY(INCH/HR) =   1.36
 AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.85
 EFFECTIVE STREAM AREA(ACRES) =       5.81
 TOTAL STREAM AREA(ACRES) =       5.81
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.01

****************************************************************************
 FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    150.00  DOWNSTREAM(FEET) =    144.55

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.542
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.475
 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                B        0.76      0.30     0.850    36   10.54
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA RUNOFF(CFS) =      0.83
 TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      0.83

****************************************************************************
 FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.010
 DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.83
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =   11.09
 LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     467.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.09
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.433
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.51      0.30     0.100    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.51      SUBAREA RUNOFF(CFS) =    0.64
 EFFECTIVE AREA(ACRES) =      1.27   AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
 TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       1.45

****************************************************************************
 FLOW PROCESS FROM NODE      8.30 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0077
 FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.66
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.45
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   11.26
 LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.00 =     504.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   11.26
 RAINFALL INTENSITY(INCH/HR) =   1.42
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       1.27
 TOTAL STREAM AREA(ACRES) =       1.27
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.45
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 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) =    147.00  DOWNSTREAM(FEET) =    142.68

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.305
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.982
 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                 B        0.45      0.30      0.100    36    6.31
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.79
 TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      0.79

****************************************************************************
 FLOW PROCESS FROM NODE      8.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0557
 FLOW LENGTH(FEET) =    37.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.79
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.41
 LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.00 =     292.70 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 =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.41
 RAINFALL INTENSITY(INCH/HR) =   1.96
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.45
 TOTAL STREAM AREA(ACRES) =       0.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.79

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
```

```
     1        6.01   12.12    1.361  0.30( 0.26) 0.85       5.8       1.00
     2        1.45   11.26    1.421  0.30( 0.16) 0.55       1.3       8.10
     3        0.79    6.41    1.963  0.30( 0.03) 0.10       0.4       8.40

  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        6.87    6.41    1.963  0.30( 0.22) 0.72       4.2       8.40
     2        7.90   11.26    1.421  0.30( 0.22) 0.75       7.1       8.10
     3        7.93   12.12    1.361  0.30( 0.23) 0.75       7.5       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.93    Tc(MIN.) =    12.12
  EFFECTIVE AREA(ACRES) =       7.53   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =        7.5
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1082.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   261.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.93
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   13.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    1343.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.01
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.307
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      0.30     0.100    36
  PUBLIC PARK                B        3.13      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.747
  SUBAREA AREA(ACRES) =    3.63      SUBAREA RUNOFF(CFS) =    3.54
  EFFECTIVE AREA(ACRES) =     11.16   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      10.86

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       11.32    7.33    1.817  0.30( 0.22) 0.73       7.9       8.40
    2       10.98   12.15    1.360  0.30( 0.22) 0.75      10.7       8.10
    3       10.86   13.01    1.307  0.30( 0.23) 0.75      11.2       1.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      11.32  Tc(MIN.) =    7.33
 AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.73  EFFECTIVE AREA(ACRES) =       7.87

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.33
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.817
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.33      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    0.46
 EFFECTIVE AREA(ACRES) =      8.20   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =       11.5       PEAK FLOW RATE(CFS) =      11.79

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.33
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.817
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.22      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.31
 EFFECTIVE AREA(ACRES) =      8.42   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      12.10

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.36
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.10
```

```
 PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.47
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1388.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    43.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.90
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.10
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.58
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1431.70 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    93.90   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  10.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.90
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.10
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.80
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    1525.60 FEET.
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
 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) =   314.00
 ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    148.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.799
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.383
 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"                   B        0.88      0.30     1.000    72   11.80
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      0.86
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.50 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    148.60  DOWNSTREAM(FEET) =    143.90
 CHANNEL LENGTH THRU SUBAREA(FEET) =   472.00   CHANNEL SLOPE =  0.0100
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.86
 FLOW VELOCITY(FEET/SEC) =   1.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   5.26   Tc(MIN.) =   17.05
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     22.50 =     786.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.05
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.119
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.48      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    0.37
 EFFECTIVE AREA(ACRES) =      1.36   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       1.02

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.05
  RAINFALL INTENSITY(INCH/HR) =   1.12
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =       1.36
  TOTAL STREAM AREA(ACRES) =       1.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.02

********************************************************************************
  FLOW PROCESS FROM NODE     22.51 TO NODE     22.52 IS CODE =  21
--------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
================================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   283.30
  ELEVATION DATA: UPSTREAM(FEET) =    150.40  DOWNSTREAM(FEET) =    147.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.224
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.833
  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                 B        0.71      0.30     0.100    36    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.15
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      1.15

********************************************************************************
  FLOW PROCESS FROM NODE     22.52 TO NODE     22.53 IS CODE =  61
--------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   220.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.90
```

```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.51
  STREET FLOW TRAVEL TIME(MIN.) =   2.33   Tc(MIN.) =    9.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.561
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.84      0.30     0.100    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    1.16
  EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       2.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.82
  FLOW VELOCITY(FEET/SEC.) =  1.66   DEPTH*VELOCITY(FT*FT/SEC.) =   0.57
  LONGEST FLOWPATH FROM NODE     22.51 TO NODE     22.53 =     504.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.53 TO NODE     22.53 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.56
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.561
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.15      0.30     0.100    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.21
  EFFECTIVE AREA(ACRES) =      1.70   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.7       PEAK FLOW RATE(CFS) =       2.34

****************************************************************************
  FLOW PROCESS FROM NODE     22.53 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.64
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.34
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    9.74
  LONGEST FLOWPATH FROM NODE     22.51 TO NODE     22.50 =     554.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.74
  RAINFALL INTENSITY(INCH/HR) =   1.54
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.70
  TOTAL STREAM AREA(ACRES) =       1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.34

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.02   17.05    1.119  0.30( 0.28) 0.95       1.4      21.00
      2        2.34    9.74    1.544  0.30( 0.03) 0.10       1.7      22.51

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.22    9.74    1.544  0.30( 0.11) 0.37       2.5      22.51
      2        2.71   17.05    1.119  0.30( 0.14) 0.48       3.1      21.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.22    Tc(MIN.) =     9.74
  EFFECTIVE AREA(ACRES) =       2.48   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     22.50 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.50 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    143.90  DOWNSTREAM(FEET) =    139.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.40   CHANNEL SLOPE =  0.0126
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.22
  FLOW VELOCITY(FEET/SEC) =   2.14 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.53   Tc(MIN.) =   12.27
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1111.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.352
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  PUBLIC PARK              B        0.25      0.30     0.850    36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.25
  EFFECTIVE AREA(ACRES) =      2.73   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       3.22
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS 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) =   1.35
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =       2.73
  TOTAL STREAM AREA(ACRES) =       3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.22

****************************************************************************
  FLOW PROCESS FROM NODE     23.10 TO NODE     23.20 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) =    150.80  DOWNSTREAM(FEET) =    147.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.337
  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"                   B        0.84      0.30     1.000    72   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     23.20 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    147.80  DOWNSTREAM(FEET) =    139.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   815.80   CHANNEL SLOPE =  0.0101
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
```

```
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.78
 FLOW VELOCITY(FEET/SEC) =   1.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   9.04   Tc(MIN.) =   21.56
 LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1100.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   21.56
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.978
 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"                    B        1.81      0.30     1.000    72
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOFF(CFS) =    1.11
 EFFECTIVE AREA(ACRES) =      2.65   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       1.62

****************************************************************************
 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 =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   21.56
 RAINFALL INTENSITY(INCH/HR) =   0.98
 AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       2.65
 TOTAL STREAM AREA(ACRES) =       2.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.62

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.22   12.27    1.352  0.30( 0.12) 0.41       2.7      22.51
     1        2.71   19.69    1.031  0.30( 0.15) 0.50       3.3      21.00
     2        1.62   21.56    0.978  0.30( 0.30) 1.00       2.6      23.10

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.65   12.27    1.352  0.30( 0.19) 0.62       4.2      22.51
     2        4.30   19.69    1.031  0.30( 0.21) 0.71       5.7      21.00
     3        4.16   21.56    0.978  0.30( 0.22) 0.72       6.0      23.10
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.65    Tc(MIN.) =    12.27
 EFFECTIVE AREA(ACRES) =       4.23   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =        6.0
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1111.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.27
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.352
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        1.49      0.30     0.850    36
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    1.47
 EFFECTIVE AREA(ACRES) =      5.72   AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
 TOTAL AREA(ACRES) =        7.4       PEAK FLOW RATE(CFS) =       5.92

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    45.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.92
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   12.40
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1157.10 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        7.4  TC(MIN.) =     12.40
 EFFECTIVE AREA(ACRES) =      5.72  AREA-AVERAGED Fm(INCH/HR)=  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.680
 PEAK FLOW RATE(CFS)   =       5.92

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1        5.92   12.40    1.344  0.30( 0.20) 0.68       5.7       22.51
     2        5.25   19.82    1.027  0.30( 0.22) 0.74       7.2       21.00
     3        5.05   21.70    0.975  0.30( 0.22) 0.75       7.4       23.10
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Appendix I

Proposed Q_{10} Hydrology Calculations

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2008 Advanced Engineering Software (aes)
              Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                              Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* 10-YEAR STORM EVENT HYDROLOGY ANALYSIS                                  *
* OAKCREEK COMMUNITY PARK, IRVINE CALIFORNIA                              *
* PROPOSED CONDITION                                                      *
 **************************************************************************

  FILE NAME: OAK10PRA.DAT
  TIME/DATE OF STUDY: 16:13 04/04/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  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   0.50    2.00 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) =   251.00
  ELEVATION DATA: UPSTREAM(FEET) =    157.00  DOWNSTREAM(FEET) =    151.80
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.562
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.800
  SUBAREA Tc 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                B        0.07      0.30     0.850    56    9.56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =    49.40   MANNING'S N =  0.010
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.30
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.16
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    9.81
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     300.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.759
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.24      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    0.54
  EFFECTIVE AREA(ACRES) =      0.31   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       0.70

****************************************************************************
  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)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   363.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.70
```

```
 PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =   11.05
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     663.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.05
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.577
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        2.53      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    2.53      SUBAREA RUNOFF(CFS) =    5.29
 EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       5.94

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =    97.00   MANNING'S N =  0.010
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.00
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.94
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.15
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     760.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.15
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.564
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.25      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.52
 EFFECTIVE AREA(ACRES) =      3.09   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =       6.42

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.40
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.42
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   11.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     895.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.548
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.71      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.71      SUBAREA RUNOFF(CFS) =    1.47
  EFFECTIVE AREA(ACRES) =      3.80   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       7.84

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.99
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.84
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     900.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.28
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.547
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK              B        2.01      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    2.01      SUBAREA RUNOFF(CFS) =    4.15
  EFFECTIVE AREA(ACRES) =      5.81   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      11.99

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0111
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  12.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.30
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.99
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   11.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   11.80
  RAINFALL INTENSITY(INCH/HR) =   2.48
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       5.81
  TOTAL STREAM AREA(ACRES) =       5.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.99

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    150.00  DOWNSTREAM(FEET) =    144.55

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.542
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.648
  SUBAREA Tc 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              B        0.76      0.30      0.850    56   10.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.64
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      1.64

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.64
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   11.01
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.01
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.582
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.51      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.51      SUBAREA RUNOFF(CFS) =    1.17
  EFFECTIVE AREA(ACRES) =      1.27   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       2.76

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0077
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.39
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.76
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   11.15
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.00 =     504.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   11.15
 RAINFALL INTENSITY(INCH/HR) =   2.56
 AREA-AVERAGED Fm(INCH/HR) =  0.16
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.55
 EFFECTIVE STREAM AREA(ACRES) =       1.27
 TOTAL STREAM AREA(ACRES) =       1.27
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.76

****************************************************************************
 FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 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) =    147.00  DOWNSTREAM(FEET) =    142.68

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.305
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.554
 SUBAREA Tc 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                 B        0.45      0.30      0.100    56    6.31
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      1.43
 TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.43

****************************************************************************
 FLOW PROCESS FROM NODE      8.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0557
 FLOW LENGTH(FEET) =    37.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.34
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.43
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.39
 LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.00 =     292.70 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 =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.39
 RAINFALL INTENSITY(INCH/HR) =   3.53
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.45
 TOTAL STREAM AREA(ACRES) =       0.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.43

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       11.99   11.80    2.482  0.30( 0.26) 0.85       5.8       1.00
     2        2.76   11.15    2.563  0.30( 0.16) 0.55       1.3       8.10
     3        1.43    6.39    3.527  0.30( 0.03) 0.10       0.4       8.40

 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       13.18    6.39    3.527  0.30( 0.22) 0.72       4.3       8.40
     2       15.54   11.15    2.563  0.30( 0.23) 0.75       7.2       8.10
     3       15.66   11.80    2.482  0.30( 0.23) 0.75       7.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      15.66    Tc(MIN.) =    11.80
 EFFECTIVE AREA(ACRES) =       7.53   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
 TOTAL AREA(ACRES) =        7.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   261.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.98
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.66
 PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   12.68
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    1392.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.68
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.382
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
 COMMERCIAL                 B        0.50      0.30     0.100    56
 PUBLIC PARK                B        3.13      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.747
 SUBAREA AREA(ACRES) =    3.63      SUBAREA RUNOFF(CFS) =    7.05
 EFFECTIVE AREA(ACRES) =     11.16   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
 TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      21.66

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       22.02    7.19    3.297  0.30( 0.22) 0.73       8.0       8.40
     2       21.75   12.03    2.454  0.30( 0.22) 0.75      10.8       8.10
     3       21.66   12.68    2.382  0.30( 0.23) 0.75      11.2       1.00
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      22.02  Tc(MIN.) =    7.19
 AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.73  EFFECTIVE AREA(ACRES) =       7.95

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.19
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.297
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.33      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    0.90
 EFFECTIVE AREA(ACRES) =      8.28   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =       11.5       PEAK FLOW RATE(CFS) =      22.93

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.19
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.297
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.22      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.60
 EFFECTIVE AREA(ACRES) =      8.50   AREA-AVERAGED Fm(INCH/HR) =  0.22
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.74
 TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      23.53

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

```
 FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.49
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.53
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.29
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1437.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    43.70   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.29
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.53
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.38
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1481.10 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    93.90   MANNING'S N =  0.013
 DEPTH OF FLOW IN  36.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.29
 GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.53
 PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    7.57
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    1575.00 FEET.
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
 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) =   314.00
 ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    148.60

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.799
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.482
 SUBAREA Tc 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"                   B        0.88      0.30     1.000    86   11.80
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      1.73
 TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      1.73

****************************************************************************
 FLOW PROCESS FROM NODE     22.00 TO NODE     22.50 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    148.60  DOWNSTREAM(FEET) =    143.90
 CHANNEL LENGTH THRU SUBAREA(FEET) =   472.00   CHANNEL SLOPE =  0.0100
 CHANNEL FLOW THRU SUBAREA(CFS) =       1.73
 FLOW VELOCITY(FEET/SEC) =   1.67 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   4.72   Tc(MIN.) =   16.52
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     22.50 =     786.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.52
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.047
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.48      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    0.77
 EFFECTIVE AREA(ACRES) =      1.36   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
 TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       2.16

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.52
  RAINFALL INTENSITY(INCH/HR) =   2.05
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =       1.36
  TOTAL STREAM AREA(ACRES) =       1.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.16

****************************************************************************
  FLOW PROCESS FROM NODE     22.51 TO NODE     22.52 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   283.30
  ELEVATION DATA: UPSTREAM(FEET) =    150.40  DOWNSTREAM(FEET) =    147.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.224
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.288
  SUBAREA Tc 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                 B        0.71      0.30     0.100    56    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.08
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.08

****************************************************************************
  FLOW PROCESS FROM NODE     22.52 TO NODE     22.53 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   220.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.70
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.82
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
 STREET FLOW TRAVEL TIME(MIN.) =   2.02   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
 COMMERCIAL                 B        0.84      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    2.14
 EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       3.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.95
 FLOW VELOCITY(FEET/SEC.) =  1.91   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
 LONGEST FLOWPATH FROM NODE     22.51 TO NODE     22.53 =     504.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.53 TO NODE     22.53 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE 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
 COMMERCIAL                 B        0.15      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.38
 EFFECTIVE AREA(ACRES) =      1.70   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.7       PEAK FLOW RATE(CFS) =       4.32

****************************************************************************
 FLOW PROCESS FROM NODE     22.53 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.41
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.32
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.40
 LONGEST FLOWPATH FROM NODE     22.51 TO NODE     22.50 =     554.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.40
  RAINFALL INTENSITY(INCH/HR) =   2.83
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.70
  TOTAL STREAM AREA(ACRES) =       1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.32

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.16   16.52    2.047  0.30( 0.28) 0.95       1.4      21.00
      2        4.32    9.40    2.828  0.30( 0.03) 0.10       1.7      22.51

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.09    9.40    2.828  0.30( 0.11) 0.36       2.5      22.51
      2        5.27   16.52    2.047  0.30( 0.14) 0.48       3.1      21.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.09    Tc(MIN.) =     9.40
  EFFECTIVE AREA(ACRES) =       2.47   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.36
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     22.50 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.50 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    143.90  DOWNSTREAM(FEET) =    139.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.40   CHANNEL SLOPE =  0.0126
  CHANNEL FLOW THRU SUBAREA(CFS) =       6.09
  FLOW VELOCITY(FEET/SEC) =   2.48 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.18   Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1111.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE 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
```

```
  PUBLIC PARK                B        0.25      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.51
  EFFECTIVE AREA(ACRES) =      2.72   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       6.09
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   2.51
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =       2.72
  TOTAL STREAM AREA(ACRES) =       3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.09

****************************************************************************
  FLOW PROCESS FROM NODE     23.10 TO NODE     23.20 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) =    150.80  DOWNSTREAM(FEET) =    147.80

  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"                   B        0.84      0.30     1.000    86   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.59
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      1.59

****************************************************************************
  FLOW PROCESS FROM NODE     23.20 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    147.80  DOWNSTREAM(FEET) =    139.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   815.80   CHANNEL SLOPE =  0.0101
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.59
  FLOW VELOCITY(FEET/SEC) =   1.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
 TRAVEL TIME(MIN.) =   8.26   Tc(MIN.) =   20.78
 LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1100.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.78
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.794
 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"                    B        1.81      0.30     1.000    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOFF(CFS) =    2.43
 EFFECTIVE AREA(ACRES) =      2.65   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       3.56

****************************************************************************
 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 =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   20.78
 RAINFALL INTENSITY(INCH/HR) =   1.79
 AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       2.65
 TOTAL STREAM AREA(ACRES) =       2.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.56

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.09   11.58    2.508  0.30( 0.12) 0.41       2.7      22.51
     1        5.27   18.78    1.902  0.30( 0.15) 0.50       3.3      21.00
     2        3.56   20.78    1.794  0.30( 0.30) 1.00       2.6      23.10

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        9.03   11.58    2.508  0.30( 0.19) 0.62       4.2      22.51
     2        8.72   18.78    1.902  0.30( 0.21) 0.71       5.7      21.00
     3        8.51   20.78    1.794  0.30( 0.22) 0.72       6.0      23.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =       9.03    Tc(MIN.) =    11.58
 EFFECTIVE AREA(ACRES) =       4.20   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =        6.0
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1111.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE 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
 PUBLIC PARK                B        1.49      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.02
 EFFECTIVE AREA(ACRES) =      5.69   AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
 TOTAL AREA(ACRES) =        7.4       PEAK FLOW RATE(CFS) =      11.81

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    45.70   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.68
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.81
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   11.70
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1157.10 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        7.4  TC(MIN.) =     11.70
 EFFECTIVE AREA(ACRES) =      5.69  AREA-AVERAGED Fm(INCH/HR)=  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.678
 PEAK FLOW RATE(CFS)   =      11.81

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       11.81   11.70    2.494  0.30( 0.20) 0.68       5.7       22.51
     2       10.87   18.91    1.895  0.30( 0.22) 0.74       7.2       21.00
     3       10.52   20.91    1.788  0.30( 0.22) 0.75       7.4       23.10
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Appendix J

Proposed Q_{25} Hydrology Calculations

```
**************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
          (c) Copyright 1983-2008 Advanced Engineering Software (aes)
              Ver. 15.0  Release Date: 04/01/2008  License ID 1204

                              Analysis prepared by:

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 ************************** DESCRIPTION OF STUDY **************************
* 25-YEAR STORM EVENT HYDROLOGY ANALYSIS                                  *
* OAKCREEK COMMUNITY PARK, IRVINE CALIFORNIA                              *
* PROPOSED CONDITION                                                      *
 **************************************************************************

  FILE NAME: OAK25PRA.DAT
  TIME/DATE OF STUDY: 16:23 04/04/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   8.00
  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   0.50    2.00 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) =   251.00
  ELEVATION DATA: UPSTREAM(FEET) =    157.00  DOWNSTREAM(FEET) =    151.80
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.562
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.342
  SUBAREA Tc 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                B        0.07      0.30     0.850    56    9.56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.07   PEAK FLOW RATE(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =    49.40   MANNING'S N =  0.010
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.46
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.19
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    9.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     300.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.80
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.296
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.24      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    0.66
  EFFECTIVE AREA(ACRES) =      0.31   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       0.85

****************************************************************************
  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)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   363.00   MANNING'S N =  0.010
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.13
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.85
```

```
 PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =   10.98
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     663.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.98
 *  25 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
 PUBLIC PARK                B        2.53      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    2.53      SUBAREA RUNOFF(CFS) =    6.46
 EFFECTIVE AREA(ACRES) =      2.84   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       7.25

****************************************************************************
 FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0150
 FLOW LENGTH(FEET) =    97.00   MANNING'S N =  0.010
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.76
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.25
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.06
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     760.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.06
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.078
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        0.25      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.64
 EFFECTIVE AREA(ACRES) =      3.09   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =        3.1       PEAK FLOW RATE(CFS) =       7.85

****************************************************************************
 FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  41
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.49
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.85
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =     895.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.16
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.062
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.71      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.71      SUBAREA RUNOFF(CFS) =    1.79
  EFFECTIVE AREA(ACRES) =      3.80   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       9.60

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.22
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.60
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     900.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.16
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.061
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK               B        2.01      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    2.01      SUBAREA RUNOFF(CFS) =    5.08
  EFFECTIVE AREA(ACRES) =      5.81   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        5.8       PEAK FLOW RATE(CFS) =      14.67

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0111
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.66
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.67
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   11.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.85
  EFFECTIVE STREAM AREA(ACRES) =       5.81
  TOTAL STREAM AREA(ACRES) =       5.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.67

****************************************************************************
  FLOW PROCESS FROM NODE      8.10 TO NODE      8.20 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    150.00  DOWNSTREAM(FEET) =    144.55

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.542
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.162
  SUBAREA Tc 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               B        0.76      0.30      0.850    56   10.54
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.99
  TOTAL AREA(ACRES) =      0.76   PEAK FLOW RATE(CFS) =      1.99

****************************************************************************
  FLOW PROCESS FROM NODE      8.20 TO NODE      8.30 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =   167.00   MANNING'S N =  0.010
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.99
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.30 =     467.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.30 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.03
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.082
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.51      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.51      SUBAREA RUNOFF(CFS) =    1.40
  EFFECTIVE AREA(ACRES) =      1.27   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.55
  TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       3.33

****************************************************************************
  FLOW PROCESS FROM NODE      8.30 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0077
  FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.62
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.33
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.16
  LONGEST FLOWPATH FROM NODE      8.10 TO NODE      8.00 =     504.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 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.) =   11.16
  RAINFALL INTENSITY(INCH/HR) =   3.06
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.55
  EFFECTIVE STREAM AREA(ACRES) =       1.27
  TOTAL STREAM AREA(ACRES) =       1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.33

****************************************************************************
  FLOW PROCESS FROM NODE      8.40 TO NODE      8.50 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) =    147.00  DOWNSTREAM(FEET) =    142.68

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.305
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.230
  SUBAREA Tc 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                 B        0.45      0.30     0.100    56    6.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      0.45   PEAK FLOW RATE(CFS) =      1.70

****************************************************************************
  FLOW PROCESS FROM NODE      8.50 TO NODE      8.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0557
  FLOW LENGTH(FEET) =    37.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.75
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.70
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.39
  LONGEST FLOWPATH FROM NODE      8.40 TO NODE      8.00 =     292.70 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 =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.39
```

```
 RAINFALL INTENSITY(INCH/HR) =   4.20
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.45
 TOTAL STREAM AREA(ACRES) =       0.45
 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       14.67   11.67    2.986  0.30( 0.26) 0.85       5.8       1.00
     2        3.33   11.16    3.061  0.30( 0.16) 0.55       1.3       8.10
     3        1.70    6.39    4.200  0.30( 0.03) 0.10       0.4       8.40

 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       15.96    6.39    4.200  0.30( 0.22) 0.72       4.4       8.40
     2       19.00   11.16    3.061  0.30( 0.23) 0.75       7.3       8.10
     3       19.13   11.67    2.986  0.30( 0.23) 0.75       7.5       1.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      19.13    Tc(MIN.) =    11.67
 EFFECTIVE AREA(ACRES) =       7.53   AREA-AVERAGED Fm(INCH/HR) =  0.23
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
 TOTAL AREA(ACRES) =        7.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =    1131.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   261.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.09
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      19.13
 PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   12.38
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      9.00 =    1392.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.38
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.887
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL               B        0.50      0.30      0.100    56
  PUBLIC PARK              B        3.13      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.747
  SUBAREA AREA(ACRES) =    3.63      SUBAREA RUNOFF(CFS) =    8.70
  EFFECTIVE AREA(ACRES) =     11.16   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       11.2       PEAK FLOW RATE(CFS) =      26.73

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       26.53    7.24    3.911  0.30( 0.22) 0.73       8.0       8.40
      2       26.81   11.88    2.955  0.30( 0.22) 0.75      10.9       8.10
      3       26.73   12.38    2.887  0.30( 0.23) 0.75      11.2       1.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      26.81  Tc(MIN.) =   11.88
  AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.75  EFFECTIVE AREA(ACRES) =      10.91

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.955
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK              B        0.33      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    0.80
  EFFECTIVE AREA(ACRES) =     11.24   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       11.5       PEAK FLOW RATE(CFS) =      27.61

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.955
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK              B        0.22      0.30      0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.53
  EFFECTIVE AREA(ACRES) =     11.46   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.75
  TOTAL AREA(ACRES) =       11.7       PEAK FLOW RATE(CFS) =      28.14
```

```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       28.34    7.24    3.911  0.30( 0.22) 0.74       8.5       8.40
      2       28.14   11.88    2.955  0.30( 0.23) 0.75      11.5       8.10
      3       28.04   12.38    2.887  0.30( 0.23) 0.76      11.7       1.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      28.34  Tc(MIN.) =    7.24
  AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.74  EFFECTIVE AREA(ACRES) =       8.54

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.02
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.34
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.33
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1437.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    43.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.71
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.34
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    1481.10 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    93.90   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.71
  GIVEN PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.34
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    1575.00 FEET.
============================================================================
```

==========

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
  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) =   314.00
  ELEVATION DATA: UPSTREAM(FEET) =    154.00  DOWNSTREAM(FEET) =    148.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.799
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.967
  SUBAREA Tc 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"                   B        0.88      0.30     1.000    86   11.80
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.11
  TOTAL AREA(ACRES) =      0.88   PEAK FLOW RATE(CFS) =      2.11

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.50 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    148.60  DOWNSTREAM(FEET) =    143.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =   472.00   CHANNEL SLOPE =  0.0100
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.11
  FLOW VELOCITY(FEET/SEC) =   1.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.53   Tc(MIN.) =   16.33
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     22.50 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.469
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                B        0.48      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.48      SUBAREA RUNOFF(CFS) =    0.96
  EFFECTIVE AREA(ACRES) =      1.36   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.95
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       2.67

****************************************************************************
  FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.33
  RAINFALL INTENSITY(INCH/HR) =   2.47
  AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.95
  EFFECTIVE STREAM AREA(ACRES) =       1.36
  TOTAL STREAM AREA(ACRES) =       1.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.67

****************************************************************************
  FLOW PROCESS FROM NODE     22.51 TO NODE     22.52 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   283.30
  ELEVATION DATA: UPSTREAM(FEET) =    150.40  DOWNSTREAM(FEET) =    147.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.224
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.917
  SUBAREA Tc 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                 B        0.71      0.30     0.100    56    7.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.48
  TOTAL AREA(ACRES) =      0.71   PEAK FLOW RATE(CFS) =      2.48

****************************************************************************
  FLOW PROCESS FROM NODE     22.52 TO NODE     22.53 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  STREET LENGTH(FEET) =   220.70   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  10.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.91
```

```
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   1.93   Tc(MIN.) =    9.15
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.84      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.84      SUBAREA RUNOFF(CFS) =    2.57
 EFFECTIVE AREA(ACRES) =      1.55    AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.74

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
 FLOW VELOCITY(FEET/SEC.) =  2.01   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
 LONGEST FLOWPATH FROM NODE     22.51 TO NODE     22.53 =     504.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.53 TO NODE     22.53 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.15
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.426
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.15      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.46
 EFFECTIVE AREA(ACRES) =      1.70   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        1.7       PEAK FLOW RATE(CFS) =       5.20

****************************************************************************
 FLOW PROCESS FROM NODE     22.53 TO NODE     22.50 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.20
 PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.30
 LONGEST FLOWPATH FROM NODE     22.51 TO NODE     22.50 =     554.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     22.50 TO NODE     22.50 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
```

```
==========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.30
  RAINFALL INTENSITY(INCH/HR) =   3.39
  AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       1.70
  TOTAL STREAM AREA(ACRES) =       1.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.20

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.67   16.33    2.469  0.30( 0.28) 0.95       1.4      21.00
      2        5.20    9.30    3.394  0.30( 0.03) 0.10       1.7      22.51

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 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    9.30    3.394  0.30( 0.11) 0.37       2.5      22.51
      2        6.44   16.33    2.469  0.30( 0.14) 0.48       3.1      21.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.36    Tc(MIN.) =     9.30
  EFFECTIVE AREA(ACRES) =       2.47   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =        3.1
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     22.50 =     786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.50 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    143.90  DOWNSTREAM(FEET) =    139.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   325.40   CHANNEL SLOPE =  0.0126
  CHANNEL FLOW THRU SUBAREA(CFS) =       7.36
  FLOW VELOCITY(FEET/SEC) =   2.60 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.09   Tc(MIN.) =   11.39
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1111.40 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.027
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  PUBLIC PARK                B        0.25      0.30     0.850    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.62
  EFFECTIVE AREA(ACRES) =      2.72   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =        3.3       PEAK FLOW RATE(CFS) =       7.36
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS 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) =   3.03
  AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =       2.72
  TOTAL STREAM AREA(ACRES) =       3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.36

****************************************************************************
  FLOW PROCESS FROM NODE     23.10 TO NODE     23.20 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) =    150.80  DOWNSTREAM(FEET) =    147.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.521
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.869
  SUBAREA Tc 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"                   B        0.84      0.30     1.000    86   12.52
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.94
  TOTAL AREA(ACRES) =      0.84   PEAK FLOW RATE(CFS) =      1.94

****************************************************************************
  FLOW PROCESS FROM NODE     23.20 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    147.80  DOWNSTREAM(FEET) =    139.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   815.80   CHANNEL SLOPE =  0.0101
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.94
  FLOW VELOCITY(FEET/SEC) =   1.71 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
```

```
 TRAVEL TIME(MIN.) =   7.93   Tc(MIN.) =   20.45
 LONGEST FLOWPATH FROM NODE     23.10 TO NODE     23.00 =    1100.80 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.45
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.173
 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"                    B        1.81      0.30     1.000    86
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    1.81      SUBAREA RUNOFF(CFS) =    3.05
 EFFECTIVE AREA(ACRES) =      2.65   AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        2.6       PEAK FLOW RATE(CFS) =       4.47

****************************************************************************
 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 =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =   20.45
 RAINFALL INTENSITY(INCH/HR) =   2.17
 AREA-AVERAGED Fm(INCH/HR) =  0.30
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  1.00
 EFFECTIVE STREAM AREA(ACRES) =       2.65
 TOTAL STREAM AREA(ACRES) =       2.65
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.47

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.36   11.39    3.027  0.30( 0.12) 0.41       2.7      22.51
     1        6.44   18.48    2.301  0.30( 0.15) 0.50       3.3      21.00
     2        4.47   20.45    2.173  0.30( 0.30) 1.00       2.6      23.10

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       10.99   11.39    3.027  0.30( 0.19) 0.62       4.2      22.51
     2       10.75   18.48    2.301  0.30( 0.21) 0.71       5.7      21.00
     3       10.52   20.45    2.173  0.30( 0.22) 0.72       6.0      23.10

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
 PEAK FLOW RATE(CFS) =      10.99    Tc(MIN.) =    11.39
 EFFECTIVE AREA(ACRES) =       4.20   AREA-AVERAGED Fm(INCH/HR) =  0.19
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =        6.0
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =    1111.40 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.39
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.027
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                B        1.49      0.30     0.850    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.72
 EFFECTIVE AREA(ACRES) =      5.69   AREA-AVERAGED Fm(INCH/HR) =  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.68
 TOTAL AREA(ACRES) =        7.4       PEAK FLOW RATE(CFS) =      14.46

****************************************************************************
 FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =    45.70   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.18
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.46
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.48
 LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =    1157.10 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        7.4  TC(MIN.) =     11.48
 EFFECTIVE AREA(ACRES) =      5.69  AREA-AVERAGED Fm(INCH/HR)=  0.20
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.678
 PEAK FLOW RATE(CFS)   =      14.46

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       14.46   11.48    3.013  0.30( 0.20) 0.68       5.7       22.51
     2       13.46   18.58    2.294  0.30( 0.22) 0.74       7.2       21.00
     3       13.06   20.55    2.167  0.30( 0.22) 0.75       7.4       23.10
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

Appendix K

Hydrology Map - Existing Condition

VALLEY OAK DRIVE

SAND CANYON AVENUE

SOUTHERN CALIFORNIA EDISON COMPANY

BARRANCA PKWY

LINE 'A'

LINE 'B'

LINE 'C'

A-1 0.07

A-2 0.24

A-3 0.46

A-4 0.11

A-5 0.77

A-6 3.91

A-7 0.76

A-8 0.60

A-9 0.44

A-10 0.52

A-11 3.04

A-12 0.31

B-1 0.63

B-2 4.59

B-3 0.84

B-4 1.81

1.0 157.6 FL HIGH POINT

2.0 151.8 TG
149.8 INV.
T_{C25}=9.36 min
Q_2=0.08 cfs
Q_{10}=0.16 cfs
Q_{25}=0.20 cfs

3.0 151.08 TG
148.99 INV.
T_{C25}=9.59 min
Q_2=0.37 cfs
Q_{10}=0.71 cfs
Q_{25}=0.86 cfs

4.0 146.93 TG/LP
143.28 INV.
T_{C25}=10.77 min
Q_2=0.83 cfs
Q_{10}=1.63 cfs
Q_{25}=1.99 cfs

5.0 145.83 TG
141.83 INV.
T_{C25}=11.05 min
Q_2=0.93 cfs
Q_{10}=1.83 cfs
Q_{25}=2.24 cfs

6.0 139.80 INV.
T_{C25}=11.40 min
Q_2=1.70 cfs
Q_{10}=3.36 cfs
Q_{25}=4.11 cfs

7.0 EXISTING GRATE INLET
144.43 TG/LP
138.43 INV.
T_{C25}=11.41 min
Q_2=5.72 cfs
Q_{10}=11.30 cfs
Q_{25}=13.85 cfs

8.1 150.0 FL HIGH POINT

8.2 144.55 TG/LP
143.05 INV.
T_{C25}=10.54 min
Q_2=0.83 cfs
Q_{10}=1.64 cfs
Q_{25}=1.99 cfs

8.3 143.2 FL/LP
140.55 INV-8" PVC
136.54 INV. 18" RCP
T_{C25}=11.03 min
Q_2=1.56 cfs
Q_{10}=2.97 cfs
Q_{25}=3.58 cfs

8.4 147.0 FL HIGH POINT

8.0 136.10 INV.
T_{C25}=11.92 min
Q_2=7.73 cfs
Q_{10}=15.09 cfs
Q_{25}=18.46 cfs

8.5 142.68 FL/LP
138.30 INV
T_{C25}=6.26 min
Q_2=0.78 cfs
Q_{10}=1.40 cfs
Q_{25}=1.67 cfs

9.0 133.96 INV.
T_{C25}=7.23 min
Q_2=11.51 cfs
Q_{10}=22.25 cfs
Q_{25}=26.74 cfs

10.0 133.76 INV.
132.76 INV.
T_{C25}=7.32 min
Q_2=11.51 cfs
Q_{10}=22.25 cfs
Q_{25}=26.74 cfs

11.0 136.10 INV.
T_{C25}=7.41 min
Q_2=11.51 cfs
Q_{10}=22.25 cfs
Q_{25}=26.74 cfs

12.0 131.41 INV.
T_{C25}=7.59 min
Q_2=11.51 cfs
Q_{10}=22.25 cfs
Q_{25}=26.74 cfs

21.0 154.0 FL HIGH POINT

22.0 149.0 INV.
T_{C25}=5.00 min
Q_2=1.11 cfs
Q_{10}=2.13 cfs
Q_{25}=2.56 cfs

23.0 CONFLUENCE
133.26 INV.
T_{C25}=12.65 min
Q_2= 5.96 cfs
Q_{10}=12.73 cfs
Q_{25}=15.80 cfs

23.0 139.9 FL/LP
T_{C25}=20.23 min
Q_2=1.63 cfs
Q_{10}=3.59 cfs
Q_{25}=4.50 cfs

23.1 150.8 FL HIGH POINT

23.2 147.8 FL
T_{C25}=12.52 min
Q_2=0.78 cfs
Q_{10}=1.59 cfs
Q_{25}=1.94 cfs

24.0 132.43 INV.
T_{C25}=12.74 min
Q_2=5.98 cfs
Q_{10}=12.73 cfs
Q_{25}=15.80 cfs

139.9 FL/LP
133.26 INV.
T_{C25}=12.65 min
Q_2=4.46 cfs
Q_{10}=9.64 cfs
Q_{25}=11.99 cfs

L=251'
EX. 6" PVC

L=49'

L=300'

L=363'
EX. 8" PVC @ S=0.0150

EX. 8" PVC @ S=0.0150

EX. 8" PVC @ S=0.0150
L=167'

EX. 18" RCP
@ S=0.0077
L=37.0'

EX. 18" RCP
@ S=0.0557
L=37.7'

L=252.7'

L=261'
EX. 24" RCP @ S=0.0050

L=231'
EX. 24" RCP @ S=0.0111

L=135'
EX. 8" PVC @ S=0.0150

L=97'
8" PVC @ S=0.0150

EX. 8" PVC

EX. 6" PCV

L=5' EX. 12" PVC @
S=0.0150

EX. 36" RCP
@ S=0.0100
L=93.9'

EX. 36" RCP
@ S=0.010
L=43.7'

EX. 36" RCP
@ S=0.010

EX. 24" RCP
@ S=0.0050
L=45'

EX. 78" RCP

EX. 18" RCP @
S=0.0325

EX. 18" RCP
@ S=0.0100
L=45.7'

EX. 24" CSP RISER

L=858'

L=791'

L=235'

L=285'

L=80'

LEGEND:

- FLOW PATH
- BOUNDARY LINE
- 1520 CONTOURS
- DRAINAGE AREA BOUNDARY
- DRAINAGE SUB-AREA BOUNDARY
- 10.0 100.0 ELEV. FLOW PROCESS NODE / ELEVATION
- T_c = 3.00 min TIME OF CONCENTRATION
- Q_{10}= 0.1 cfs PEAK FLOW RATE FOR 10 YEAR STORM
- Q_{25}= 0.1 cfs PEAK FLOW RATE FOR 25 YEAR STORM
- Q_{100}= 0.2 cfs PEAK FLOW RATE FOR 100 YEAR STORM
- A-1 / 1.0 DRAINAGE SUB-AREA DESIGNATION / DRAINAGE SUB-AREA ACREAGE

50' 25' 0' 50' 100'

GRAPHIC SCALE: 1"=50'

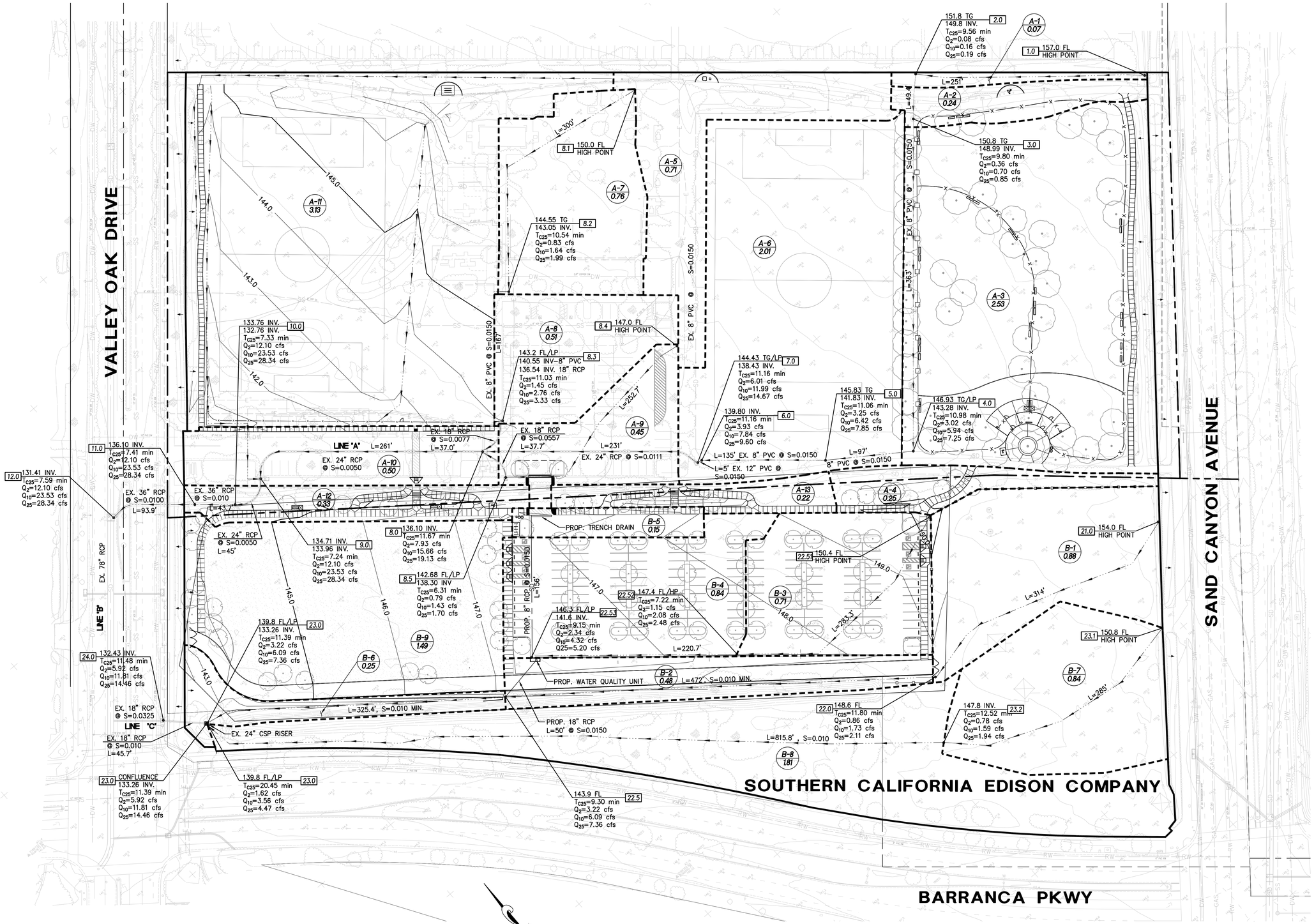
CITY OF IRVINE
OAK CREEK COMMUNITY PARK

PRELIMINARY HYDROLOGY MAP
EXISTING CONDITION

JOB NO.:	19-2260
DATE:	04/05/2022
DRAWNED BY:	GC
DESIGNED BY:	GC
APPROVED BY:	MO
SHEET	1 OF 1

Appendix L

Hydrology Map – Proposed Condition



LEGEND:

- FLOW PATH
- BOUNDARY LINE
- 1520 — CONTOURS
- DRAINAGE AREA BOUNDARY
- DRAINAGE SUB-AREA BOUNDARY
- 10.0 — FLOW PROCESS NODE
- 100.0 ELEV. — ELEVATION
- T_c = 3.00 min — TIME OF CONCENTRATION
- Q_{10}= 0.1 cfs — PEAK FLOW RATE FOR 10 YEAR STORM
- Q_{25}= 0.1 cfs — PEAK FLOW RATE FOR 25 YEAR STORM
- Q_{100}= 0.2 cfs — PEAK FLOW RATE FOR 100 YEAR STORM
- A-1 / 1.0 — DRAINAGE SUB-AREA DESIGNATION / DRAINAGE SUB-AREA ACREAGE

50' 25' 0' 50' 100'
GRAPHIC SCALE: 1"=50'

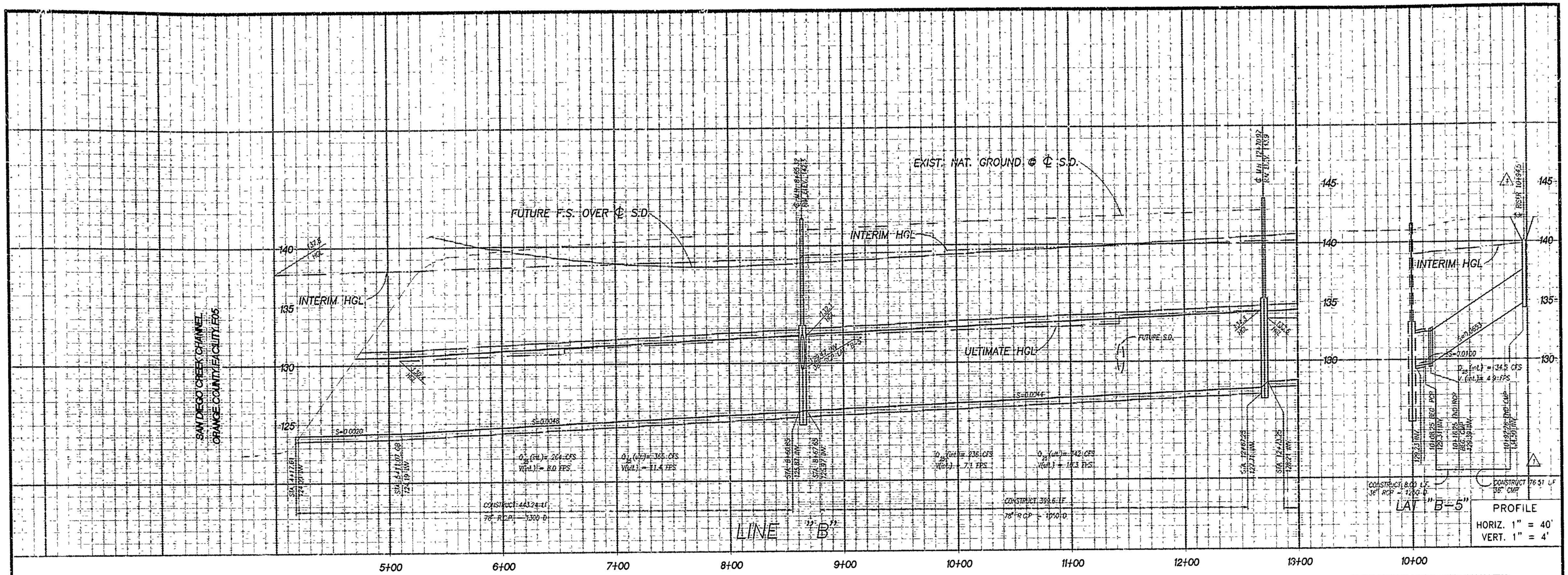
CITY OF IRVINE
OAK CREEK COMMUNITY PARK

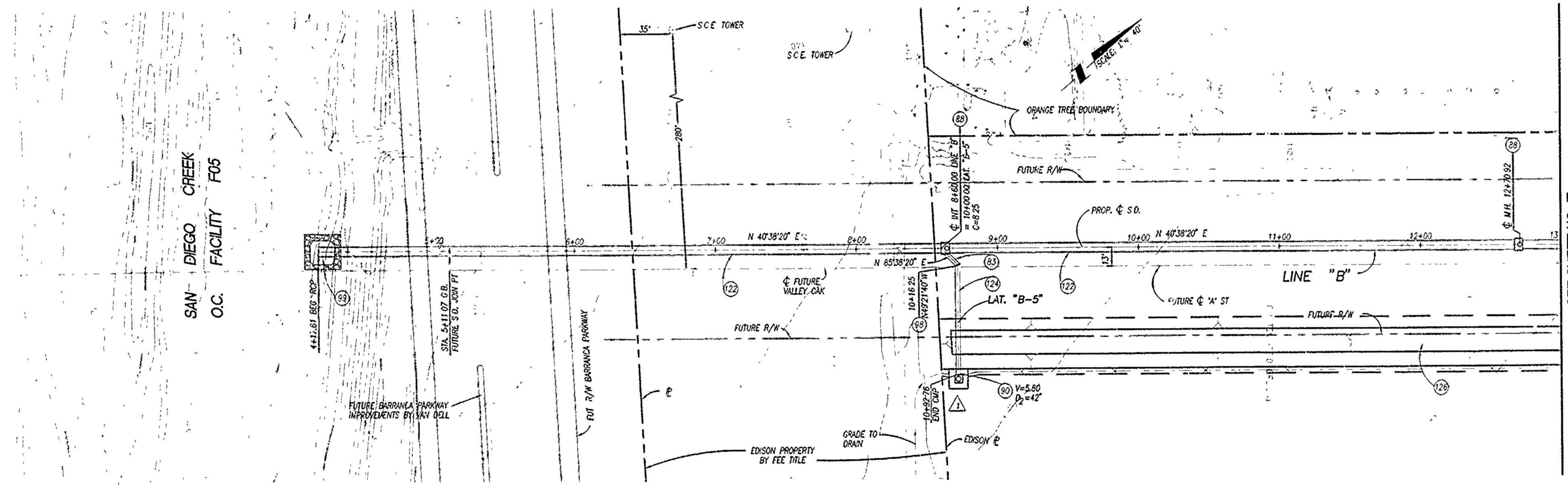
PRELIMINARY HYDROLOGY MAP PROPOSED CONDITION

JOB NO.:	19-2260
DATE:	04/05/2022
DRAWNED BY:	GC
DESIGNED BY:	GC
APPROVED BY:	MO
SHEET	1 OF 1

Appendix M

Record Drawing Permit No. 30010-TC Storm Drain Improvement Line "B" sheet 16 of 40.





STORM DRAIN CONSTRUCTION NOTES

(83) CONSTRUCT 36" RCP (D-LOAD PER PLAN) BEDDING AND BACKFILL PER CITY OF IRVINE STD. NO. 318
(88) CONSTRUCT JUNCTION STRUCTURE TYPE 'H' PER CITY OF IRVINE STD. NO. 308
(90) CONSTRUCT CSP DROP INLET PER CITY OF IRVINE STD. NO. 304
(98) CONSTRUCT CONCRETE COLLAR PER CITY OF IRVINE STD. NO. 310
(99) CONSTRUCT PIPE OUTLET AND R.P. RAP PER DETAIL C/20
(122) CONSTRUCT 78" RCP (D-LOAD PER PLAN) BEDDING AND BACKFILL PER CITY OF IRVINE STD. NO. 318
(124) CONSTRUCT 36" CMP
(126) CONSTRUCT EARTH BERM PER TYPICAL SECTION ON SHEET 18

RECORD DRAWING

NO	DATE	REVISIONS	APP	DATE
6				
5				
4				
3				
2				
1				

CITY OF IRVINE

DOUGLAS J. JOHNSON No. 47447 12/31/99

THE KEITH COMPANIES
Civil Engineering • Land Surveying
Mapping • Environmental Services
Water Resources • Land Planning
2955 Red Hill Avenue
Costa Mesa, CA 92626
(714)540-0800

DOUGLAS J. JOHNSON RCE 47447 — 10/26/98 (EXP. 12/31/99)

DEVELOPER:
THE IRVINE COMPANY
550 NEWPORT CENTER DRIVE
NEWPORT BEACH, CALIFORNIA 92658
(714) 720-2200

SOILS ENGINEER:
GOFFMAN McCORMICK AND URBAN, INC.
23241 ARROYO VISTA
RANCHO SANTA MARGARITA, CA 92688
(714) 888-6513

JOB NO: 12962.000
DATE APPROVED:
LAST REVISED 1/21/98

STREET IMPROVEMENT PLAN - PHASE 1
STORM DRAIN - LINE "B"
FROM STA. 4+17.61 TO STA. 13+00.00
CITY OF IRVINE
COMMUNITY DEVELOPMENT DEPARTMENT

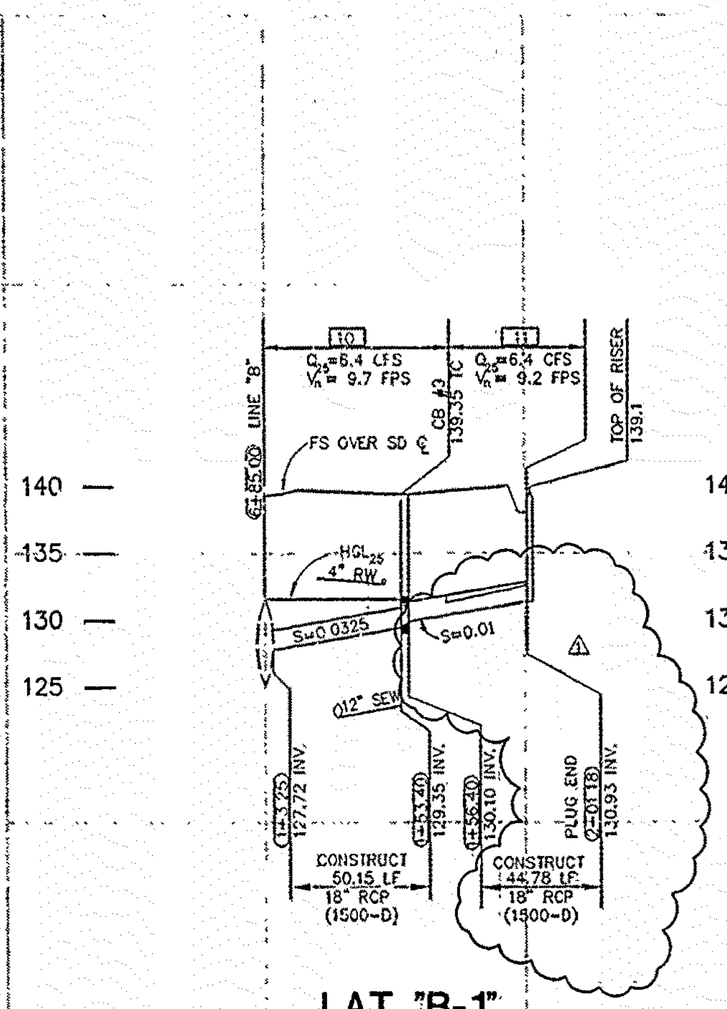
PERMIT NO. 30010-TC
SHEET 16 OF 40
JOB NO. 12962.000

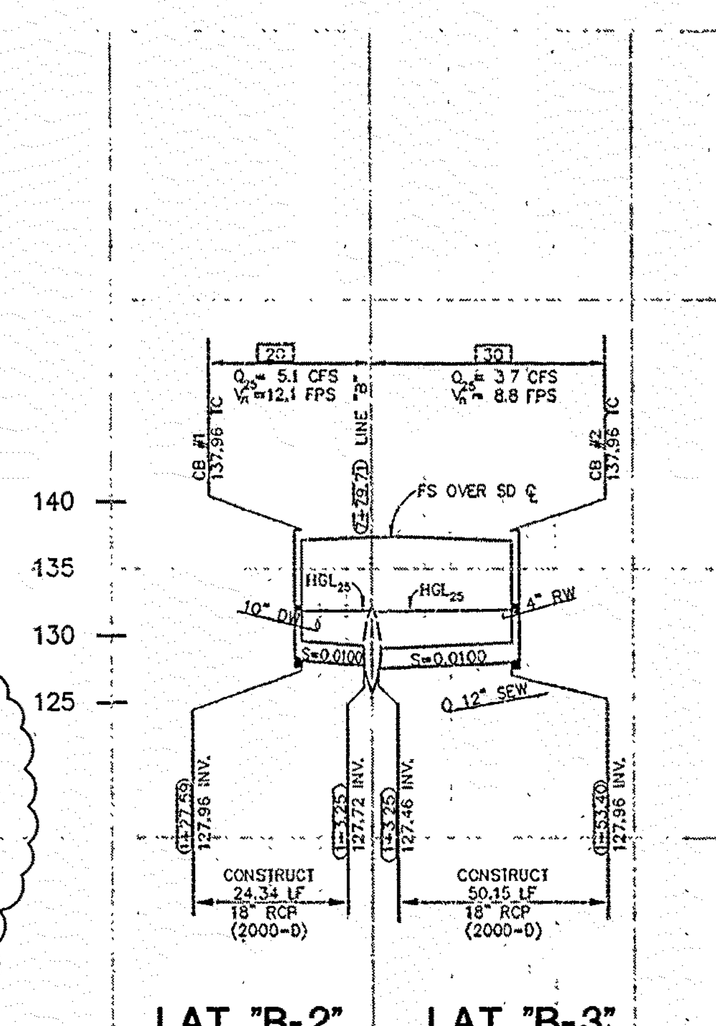
PLAN # 887

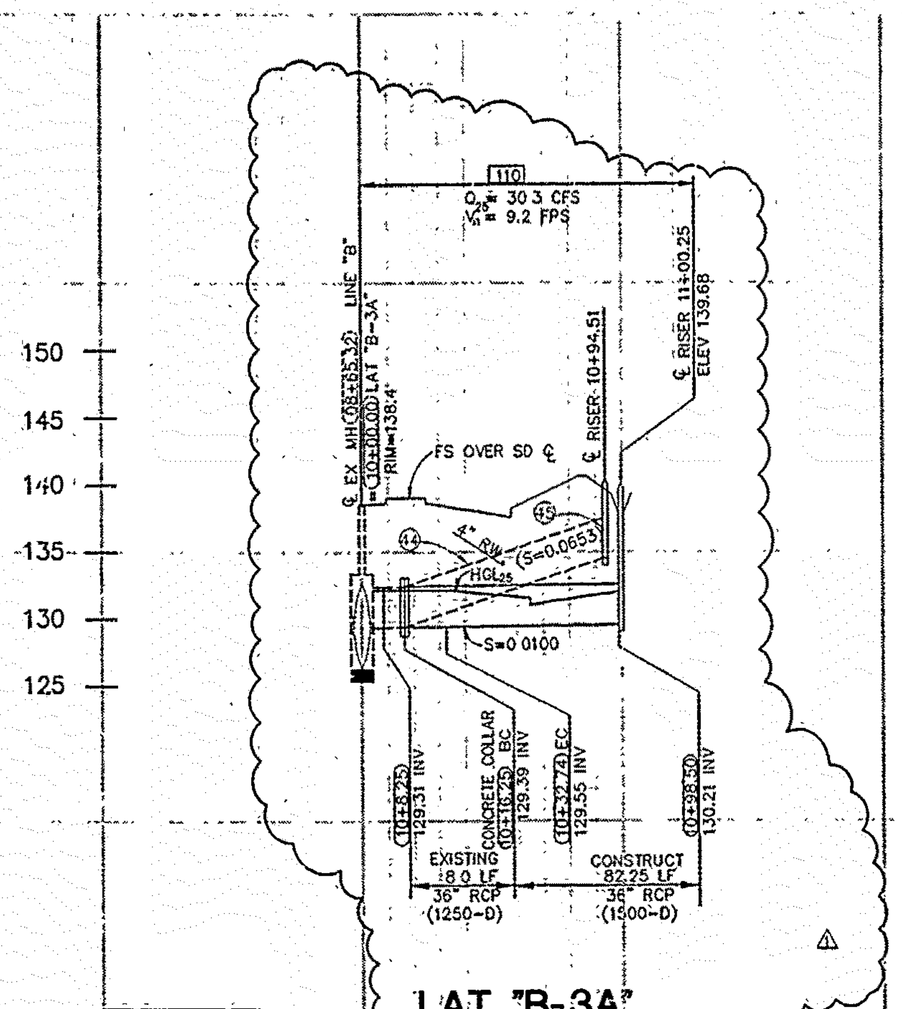
F-121

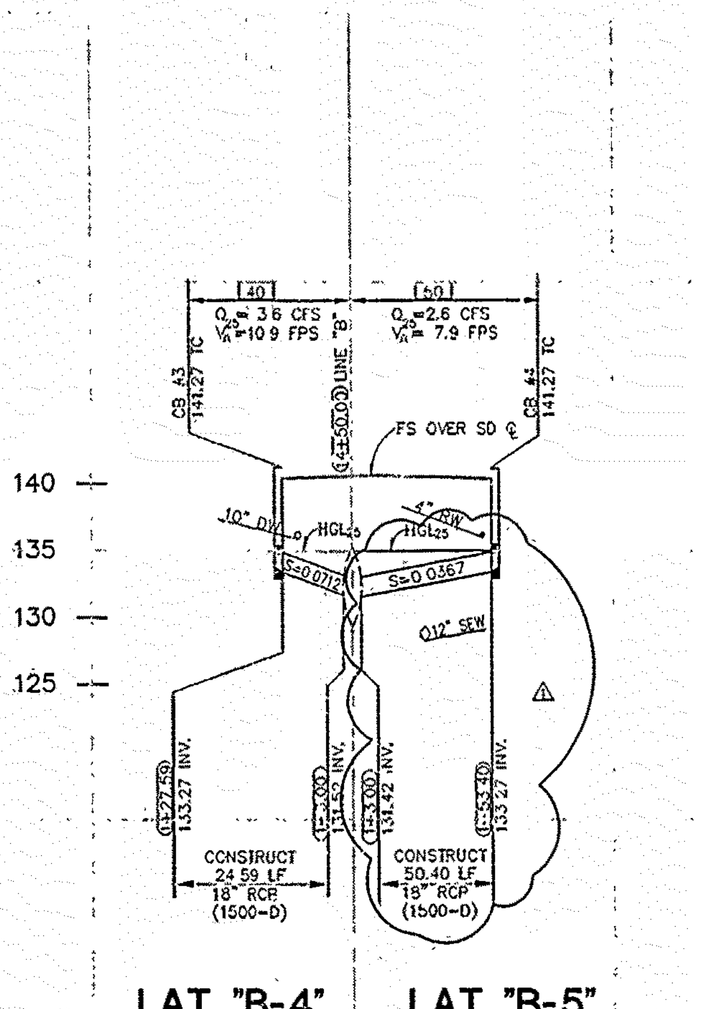
Appendix N

Record Drawing Project No. 34071-MC Valley Oak Plan And Profile Storm Drain Improvement Plan for Line “B” Laterals sheet 7 of 15.

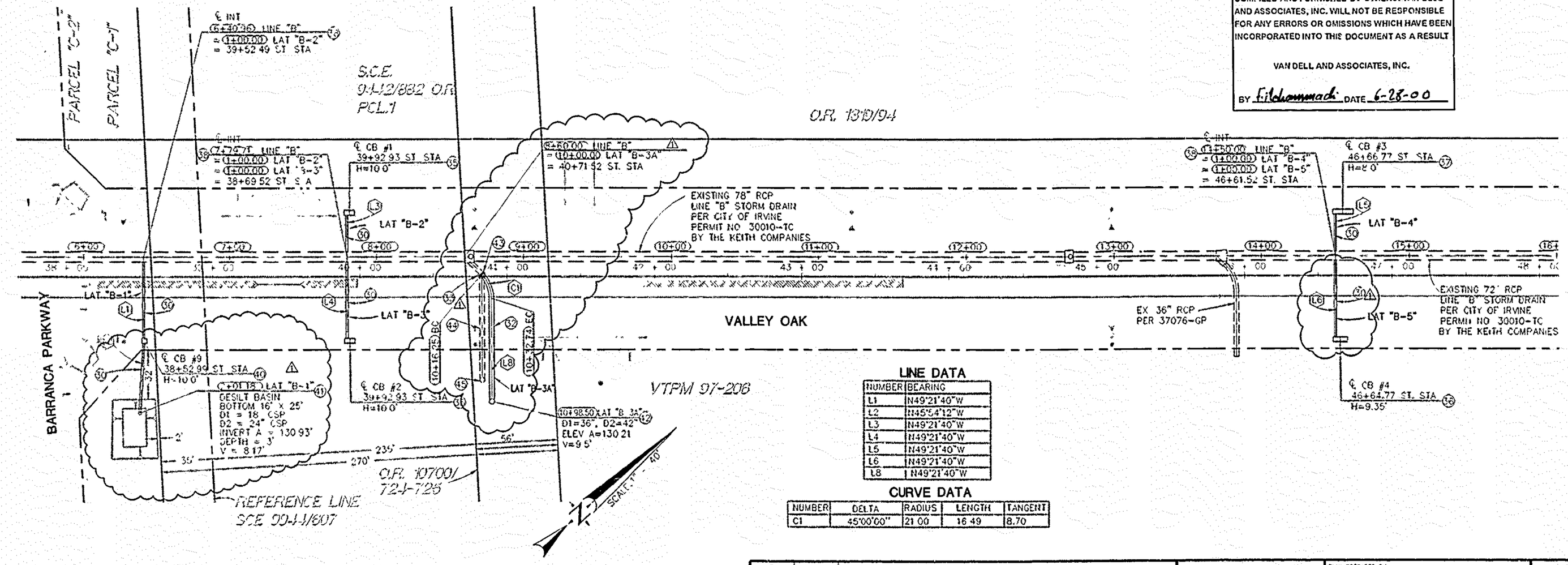








PROFILE
PLAN 1"=40'
VERT 1"=8'
HORIZ 1"=40'



LINE DATA

NUMBER	BEARING
L1	N49°21'40"W
L2	N45°54'12"W
L3	N49°21'40"W
L4	N49°21'40"W
L5	N49°21'40"W
L6	N49°21'40"W
L8	N49°21'40"W

CURVE DATA

NUMBER	DELTA	RADIUS	LENGTH	TANGENT
C1	45°00'00"	21.00	16.49	8.70

RECORD DRAWINGS

THESE AS-BUILT OR RECORD DRAWINGS HAVE BEEN PREPARED IN PART ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. VAN DELL AND ASSOCIATES, INC. WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT

VAN DELL AND ASSOCIATES, INC.

BY Fildcommach DATE 6-28-00

CONSTRUCTION NOTES:

(30) CONSTRUCT 18" RCP (D-LOAD PER PROFILE) WITH BEDDING AND BACKFILL PER CITY OF IRVINE STANDARD PLAN NO. 318.

(31) CONSTRUCT 30" RCP (D-LOAD PER PROFILE) WITH BEDDING AND BACKFILL PER CITY OF IRVINE STANDARD PLAN NO. 318.

(32) CONSTRUCT 36" RCP (D-LOAD PER PROFILE) WITH BEDDING AND BACKFILL PER CITY OF IRVINE STANDARD PLAN NO. 318.

(33) REMOVE EXISTING CONCRETE COLLAR.

(35) CONSTRUCT 7' CATCH BASIN TYPE I PER CITY OF IRVINE STANDARD PLAN NO. 301.

(36) CONSTRUCT 10' CATCH BASIN TYPE II PER CITY OF IRVINE STANDARD PLAN NO 301

(37) CONSTRUCT 14' CATCH BASIN TYPE II PER CITY OF IRVINE STANDARD PLAN NO. 301.

(38) CONSTRUCT JUNCTION STRUCTURE TYPE V PER CITY OF IRVINE STANDARD PLAN NO. 309B.

(40) CONSTRUCT 3.5' CATCH BASIN TYPE I PER CITY OF IRVINE STANDARD PLAN NO. 300

(41) CONSTRUCT 24" RISER PER CITY OF IRVINE STANDARD PLAN NO. 304.

(42) CONSTRUCT 42" RISER PER CITY OF IRVINE STANDARD PLAN NO. 304.

(43) CONSTRUCT CONCRETE COLLAR PER CITY OF IRVINE STANDARD PLAN NO. 310

(44) REMOVE EXISTING 36" CMP PIPE.

(45) REMOVE EXISTING RISER.

GRAPHIC SCALE IN FEET (0, 20, 40, 80, 120)

PREPARED FOR
IRVINE COMMUNITY DEVELOPMENT COMPANY

REGISTERED PROFESSIONAL ENGINEER JAMIE C. YOSHIDA No. 54758 Exp. 12/31/99 STATE OF CALIFORNIA CIVIL

NO	DATE	REVISIONS
7		
6		
5		
4		
3		
2		
1	8-19-99	REVISED DESILT BASIN, LAT"B-1", LAT"B-3A", LAT"B-5".

DRAWN BY: KAE DATE 8-5-99
DESIGNED BY: KAE DATE 8-5-99
CHECKED BY: JCY DATE 8-5-99

PLAN PREPARED BY
VAN DELL AND ASSOCIATES, INC.
CIVIL ENGINEERS
SURVEYORS LAND PLANNERS
3700 CARTWRIGHT ROAD, IRVINE, CA 92714 (714) 474-1600

UNDER THE SUPERVISION OF:
JAMIE C. YOSHIDA R.C.E. 54758 DATE

PLAN AND PROFILE STORM DRAIN IMPROVEMENT PLANS FOR:
VALLEY OAK
LINE "B" LATERALS
VTPM 97-206
CITY OF IRVINE
PUBLIC WORKS DEPARTMENT

PROJECT NO. 34071-MC

SHEET 7 OF 15

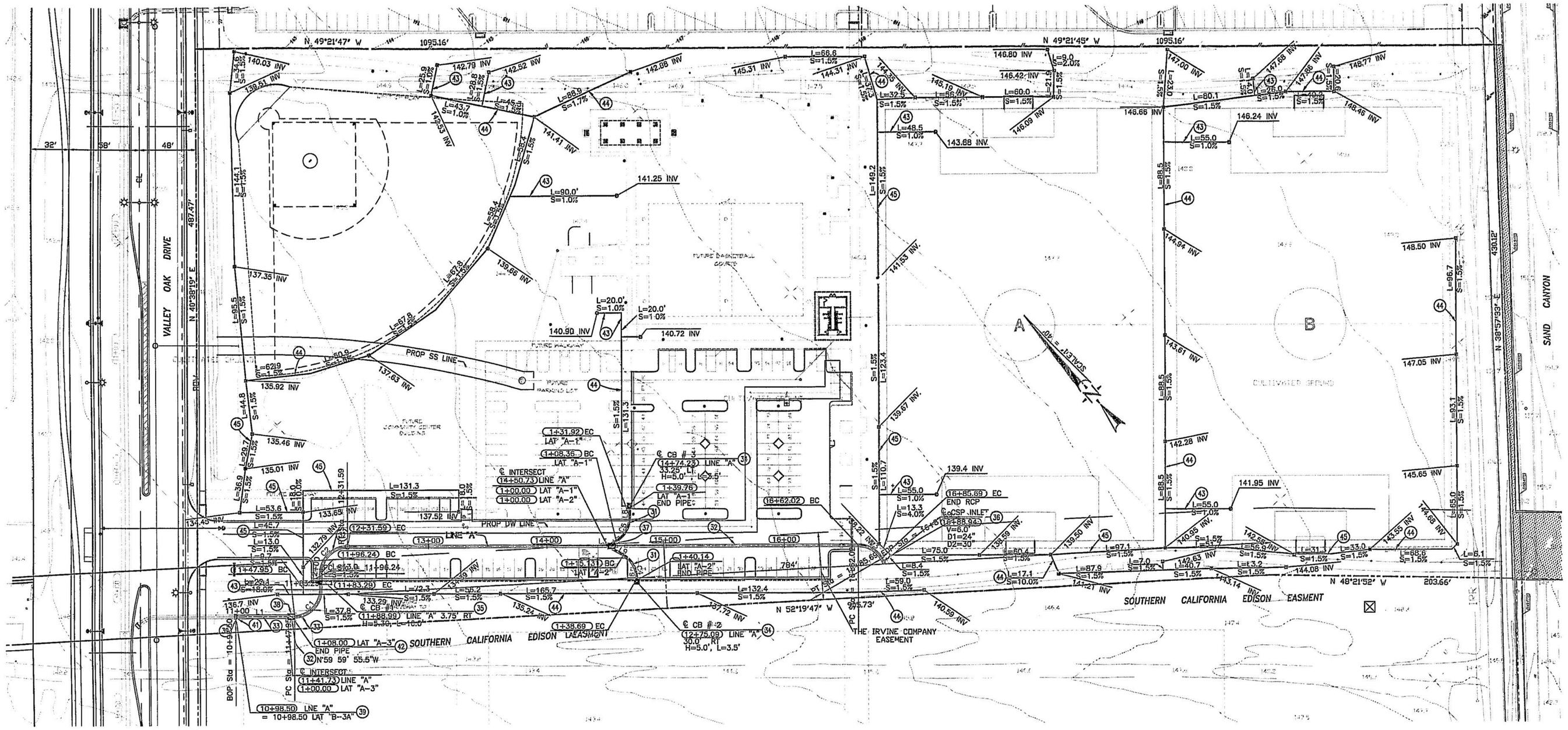
08/24/99 14:07 \PROJECTS\1276_4200\UTILITY\SDPLAN1.DWG

F-123

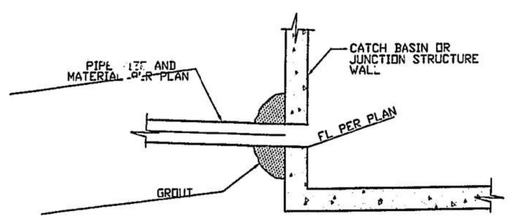
Appendix O

Record Drawing Grading Permit No. 4319-CCG
Sheet No. CE-09 and CE-10.

PLANS PREPARED BY:
VAN DELL AND ASSOCIATES, INC.
SURVEYORS CIVIL ENGINEERS LAND PLANNERS
17801 CARTWRIGHT ROAD IRVINE, CA 92614 (714) 474-1100
UNDER THE SUPERVISION OF:
DONALD R. GORDON R.C.E.024725 DATE



STREET IMPROVEMENTS
PER CDI #34071-MC



DETAIL A

NUMBER	DIRECTION	DISTANCE
L1	S 49°21'40" E	49.45 FT
L2	N 40°38'15" E	12.93 FT
L3	S 49°21'41" E	430.43 FT
L4	S 10°55'03" W	2.09 FT
L5	S 19°21'41" E	6.19 FT
L6	S 40°38'19" W	1.45 FT
L7	S 79°21'41" E	8.36 FT
L8	N 40°38'18" E	7.84 FT
L9	N 19°21'41" E	15.13 FT

NUMBER	DELTA ANGLE	TANGENT	RADIUS	ARC LENGTH
C1	90°00'05"	22.50	22.50	35.34
C2	90°00'05"	22.50	22.50	35.34
C3	59°16'43"	13.06	22.50	23.67
C4	65°00'05"	12.99	22.50	23.56
C5	60°00'05"	12.99	22.50	23.56

CONSTRUCTION NOTES:

(31) CONSTRUCT 18" RCP (D-LOAD PER PROFILE) WITH BEDDING AND BACKFILL PER CITY OF IRVINE STD. PLAN NO. 318.
(32) CONSTRUCT 24" RCP (D-LOAD PER PROFILE) WITH BEDDING AND BACKFILL PER CITY OF IRVINE STD. PLAN NO. 318.
(33) CONSTRUCT 36" RCP (D-LOAD PER PROFILE) WITH BEDDING AND BACKFILL PER CITY OF IRVINE STD. PLAN NO. 318.
(34) CONSTRUCT 3.5' CATCH BASIN TYPE I PER CITY OF IRVINE STD. PLAN NO 300.
(35) CONSTRUCT 10' CATCH BASIN TYPE II PER CITY OF IRVINE STD. PLAN NO. 301.
(36) CONSTRUCT BROOKS BOX 3636 CB OR EQUIVALENT
(37) CONSTRUCT JUNCTION STRUCTURE TYPE I PER CITY OF IRVINE STD. PLAN NO. 306.
(38) CONSTRUCT JUNCTION STRUCTURE TYPE I PER CITY OF IRVINE STD. PLAN NO. 306. WITHOUT MANHOLE SHAFT.
(39) CONSTRUCT CONCRETE COLLAR PER CITY OF IRVINE STD. PLAN NO. 310.
(40) CONSTRUCT DRAINPIPE TO CATCH BASIN/JUNCTION STRUCTURE CONNECTION PER DETAIL A .
(41) REMOVE CSP DROP INLET.
(42) CONSTRUCT BRICK AND MORTAR PLUG
(43) CONSTRUCT 4" PVC PER CDI STD PLAN NO. 318.
(44) CONSTRUCT 6" PVC PER CDI STD PLAN NO. 318.
(45) CONSTRUCT 8" PVC PER CDI STD PLAN NO. 318.
(46) CONSTRUCT 12" PVC PER CDI STD PLAN NO. 318.

AS-GRADED

RECORD DRAWINGS

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VAN DELL AND ASSOCIATES, INC.
BY: _____ DATE 12/26/01

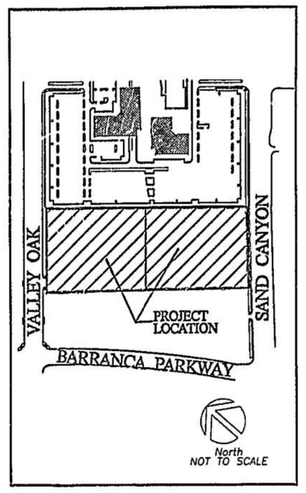
LEGEND

FG	FINISHED GRADE
FL	FLOW LINE
FS	FINISHED SURFACE
TG	TOP OF GRATE
INV	INVERT OF PIPE
TC	TOP OF CURB
HP	HIGH POINT
GB	GRADE BREAK
TW	TOP OF WALL
R/W	RIGHT OF WAY
TOP	TOP OF SLOPE
	RIGHT OF WAY/TRACT BOUNDARY
	LOT LINES
	SWALE FLOW LINE
	SLOPE
	LIMITS OF GRADING & PERMIT
	FENCE
	AREA DRAIN
	SUBSURFACE DRAIN
LA	LANDSCAPE AREA
TT	EXPLORATORY TRENCH

SEE SHEET CE-10 FOR STORM DRAIN PROFILES

Title Z:\PUBLIC\PROJECTS\176_6600\Drawings\SD\09SD766600.dwg 02/16/01 10:11:

EDAW
Landscape Architecture
Planning
Urban Design
Environmental Analysis
Site Engineering
Graphic Design
17875 Von Karman Ave., #400
Irvine, California 92614
TEL: (949) 660-8044
FAX: (949) 660-1046



IRVINE COMMUNITY DEVELOPMENT COMPANY
550 NEWPORT CENTER DRIVE
NEWPORT BEACH, CALIFORNIA 92660
TEL: (949) 720-2616 FAX: (949) 720-2285
TOM HEGGI, VICE PRESIDENT

No.	Date	Revision

REGISTERED PROFESSIONAL ENGINEER DONALD R. GORDON No. 024725 Exp.12/31/01 CIVIL STATE OF CALIFORNIA

OAKCREEK PARK

STORM DRAIN PLAN LINE "A"

PHASE ONE
LOT 259
ACCESSOR PARCEL NO. 97-206

OAKCREEK COMMUNITY PARK

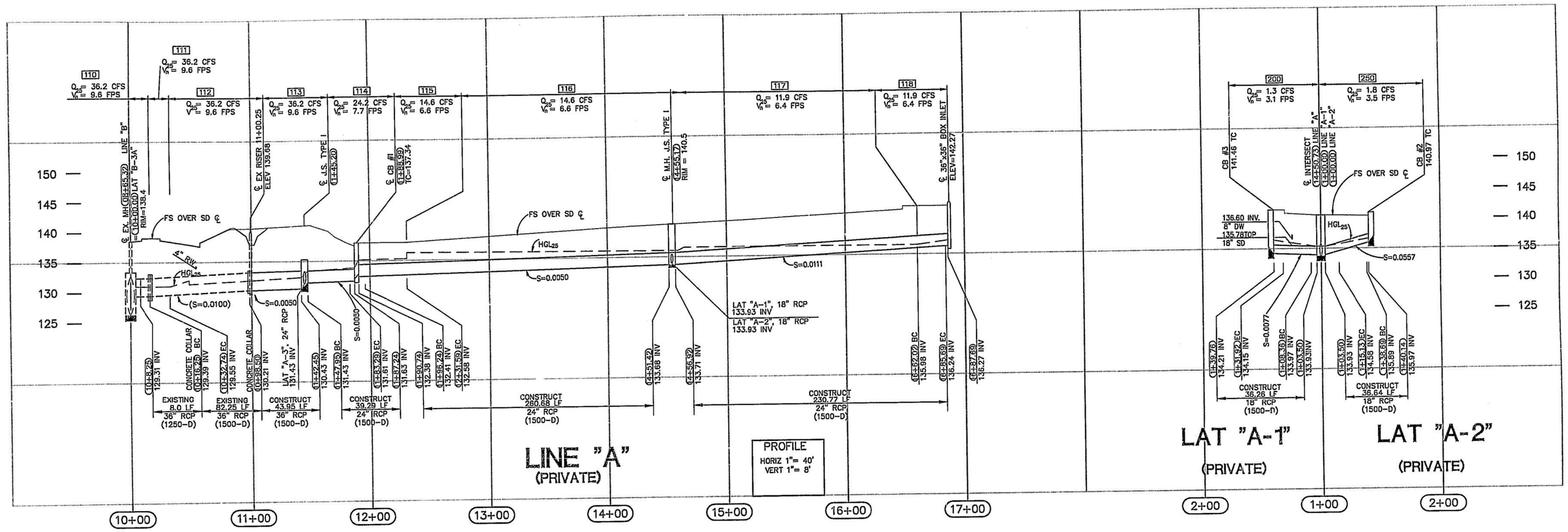
DEVELOPMENT CASE NO. 47070-PA

Project No.	
Scale:	1" = 40'
Date:	01/10/01
Drawn By:	FM
Checked By:	DRG
Sheet No:	9 OF 13

CE-09

GRADING PERMIT NO. 4319-CCG

GADD File No.



PLANS PREPARED BY:

VAN DELL AND ASSOCIATES, INC.
SURVEYORS CIVIL ENGINEERS LAND PLANNERS
17852 EASTMAN ROAD IRVINE, CA 92614 (714) 474-1400

UNDER THE SUPERVISION OF:

DONALD R. GORDON R.C.E.024725 DATE

AS-GRADED

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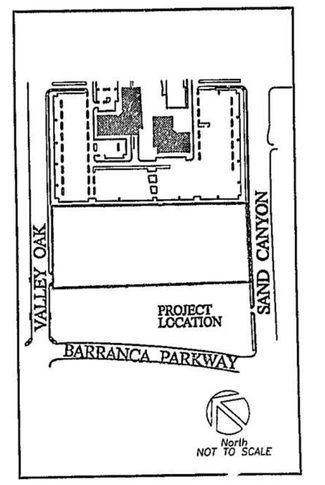
VAN DELL AND ASSOCIATES, INC.
BY _____ DATE 4/4/01

EDAW
Landscape Architecture
Planning
Urban Design
Environmental Analysis
Site Engineering
Graphic Design

17875 Von Karman Ave., #400
Irvine, California 92614
TEL: (949) 660-8044
FAX: (949) 660-1046



IRVINE COMMUNITY DEVELOPMENT COMPANY
550 NEWPORT CENTER DRIVE
NEWPORT BEACH, CALIFORNIA 92660
TEL: (949) 720-2616 FAX: (949) 720-2285
TOM HEGGI, VICE PRESIDENT

No.	Date	Revision
△		
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REGISTERED PROFESSIONAL ENGINEER DONALD R. GORDON No. 024725 Exp.12/31/01 STATE OF CALIFORNIA CIVIL

OAKCREEK PARK

STORM DRAIN PROFILE

DEVELOPMENTCASE NO. 47070-PA

PHASE ONE
LOT 259
ACCESSOR PARCEL NO. 97-206

OAKCREEK COMMUNITY PARK

DEVELOPMENT CASE NO. 47070-PA	
Project No:	
Scale:	1" = 40'
Date:	01/10/01
Drawn By:	JWW
Checked By:	DRG
Sheet No:	10 OF 13

CE-10

GRADING PERMIT NO. 4319-OCG

CADD File No.:

F-1218

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