APPENDIX N

Drainage Study

PALOMAR HEIGHTS
DRAINAGE STUDY

City of Escondido, CA

Prepared for

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December 2nd 2019

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Contents

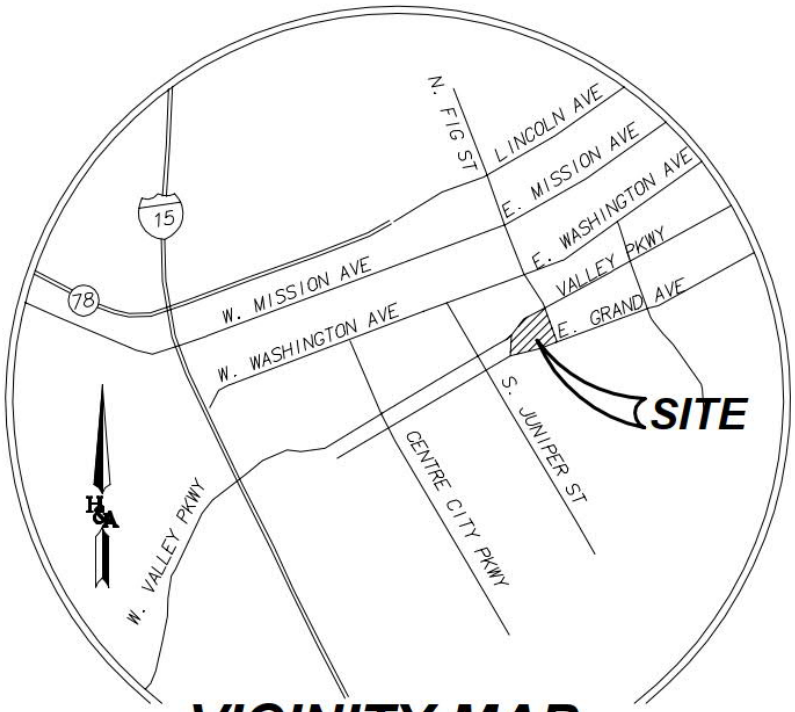
List of Appendices

1 Scope

The purpose of this study is to provide flood control calculations in support of a proposed Palomar Heights project with multifamily residential housing and mixed-use property in the City of Escondido, CA. This report will provide preliminary calculations for existing and proposed runoff for the 100-year frequency storm event.

2 Existing Conditions

Palomar Heights project is proposed within a 13.80 acre site, located in the City of Escondido, California. The site is currently developed and used as a medical service facility by Palomar Medical Center at the intersection of Valley Blvd and East Grande Ave. It is located North of E Grande Ave and to the West of N Fig Street. The project also includes the Palomar Health and Human services building and parking lot west of Valley Blvd and South of Valley Parkway. Please see vicinity map below.



VICINITY MAP

NTS

Flow discharged onto Valley Parkway is intercepted via one of the three inlets. Flow collected by the first and second inlet is routed via an 18” RCP to a 36” RCP where it is confluenced with the flow collected by the third inlet. This flow ultimately discharges into the Escondido Creek.

Flow discharged onto Fig Street from the property enters a curb inlet and is routed via a 12” RCP to a larger 33” RCP where it is confluence with flow from North Fig Street. The existing infrastructure is sized appropriately sized to convey the drainage described above.

Hydrologic and Geotechnical Characteristics

The entire site ultimately discharges into the Escondido Creek and is identified as part of the Carlsbad Hydrologic Unit (basin number 904.6). Runoff coefficient for Neighborhood Commercial was used for rational method analysis and representative based on of the existing project site conditions.

The site is not mapped within a special flood hazard and will not require and flood map revisions through FEMA.

According to the NRCS Web Soil Survey, the soils onsite are hydrologic soil type C.

3 Project Description

The Palomar Heights project proposes the construction of 509 multifamily residential/mixed use units with associated roads, walkways, recreation, and landscape areas. The project proposes the construction of a new storm drain network and 12 proprietary biofiltration units to provide water quality treatment for runoff generated in the proposed condition. Runoff coefficient for high density residential was assumed representative of the proposed project.

Drainage Routing and Improvements;

The proposed drainage will maintain the existing condition drainage patterns and discharges into the Escondido Creek. No offsite bypass flow is conveyed through the site.

The proposed onsite drainage network within the subdivision will tie into the existing drainage network on Valley Blvd and North Fig Avenue.

4 Methodology

4.1 Hydrology

The Rational Method as described in the June 2003 San Diego County Hydrology Manual (SDCHM), Section 3, was used for the hydrologic calculations for this project. The Rational Method formula is expressed as follows:

$Q = C\ I\ A$

$I = 7.44 P_6 T_c^{-0.645}$

$T_c = T_t + T_i$

$T_t = (11.9 * L^3 / \Delta E)^{0.385}$

Where:
Q = Peak discharge, in cubic feet per second (cfs).
C = Runoff coefficient, proportion of the rainfall that runs off the surface. The C coefficient was obtained from Table 3-1 of the SDCHM. It has no units and is based on the soil group and the development type for the drainage sub-area.
A = Drainage area contributing to the design location (ac).
I = Average rainfall intensity (in/hr). The formula can be found on Figure 3-2 of the SDCHM.
P_6 = 6-hour precipitation (in). This value was taken from the 6-hour isopluvial maps found in Appendix B of the SDCHM.
T_i = Initial time of concentration, from Table 3-2 of the SDCHM.
T_t = Travel time (min), from Figure 3-4 of the SDCHM.
L = Longest flow path distance (mi).
ΔE = Change in elevation along flowpath (ft).

4.2 Hydraulics

In order to provide adequate flood control, increases in peak flow rates at the outfall location for this site were mitigated using the design of the proposed basin. Mitigation within the basin was modeled using RickRatHydro as an input to Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2011.

RickRatHydro was used to produce a hydrograph for the project drainage areas, based on the area, time of concentration, P6 value, runoff coefficient, and peak flow rate.

The hydrograph was then imported into Hydraflow Hydrographs and was routed through the proposed basin by using an iteration of outlet structures, until the resulting outlet structure provided a flow rate to the outfall that was equal to or less than that during the existing condition, and the water surface elevation was below the top of the basin.

5 Results and Conclusions

The following tabulates the results for the project hydrology for the project.

TABLE 1 – Comparison of Existing and Proposed Conditions Hydrology

Outlet Location (AES NODE)		Area (ac)		100 Year Peak Flow (cfs)*	
Existing	**Proposed**	**Existing**	**Proposed**	**Existing**	**Proposed**
103	205	10.7	10.4	56.74	54.54
302	1003	3.5	3.8	23.2	22.38
122	122	1	1	6.88	6.88
TOTAL		15.2	15.2	86.82	83.8

* Peak flow taken from AES calculations.

Conclusions;

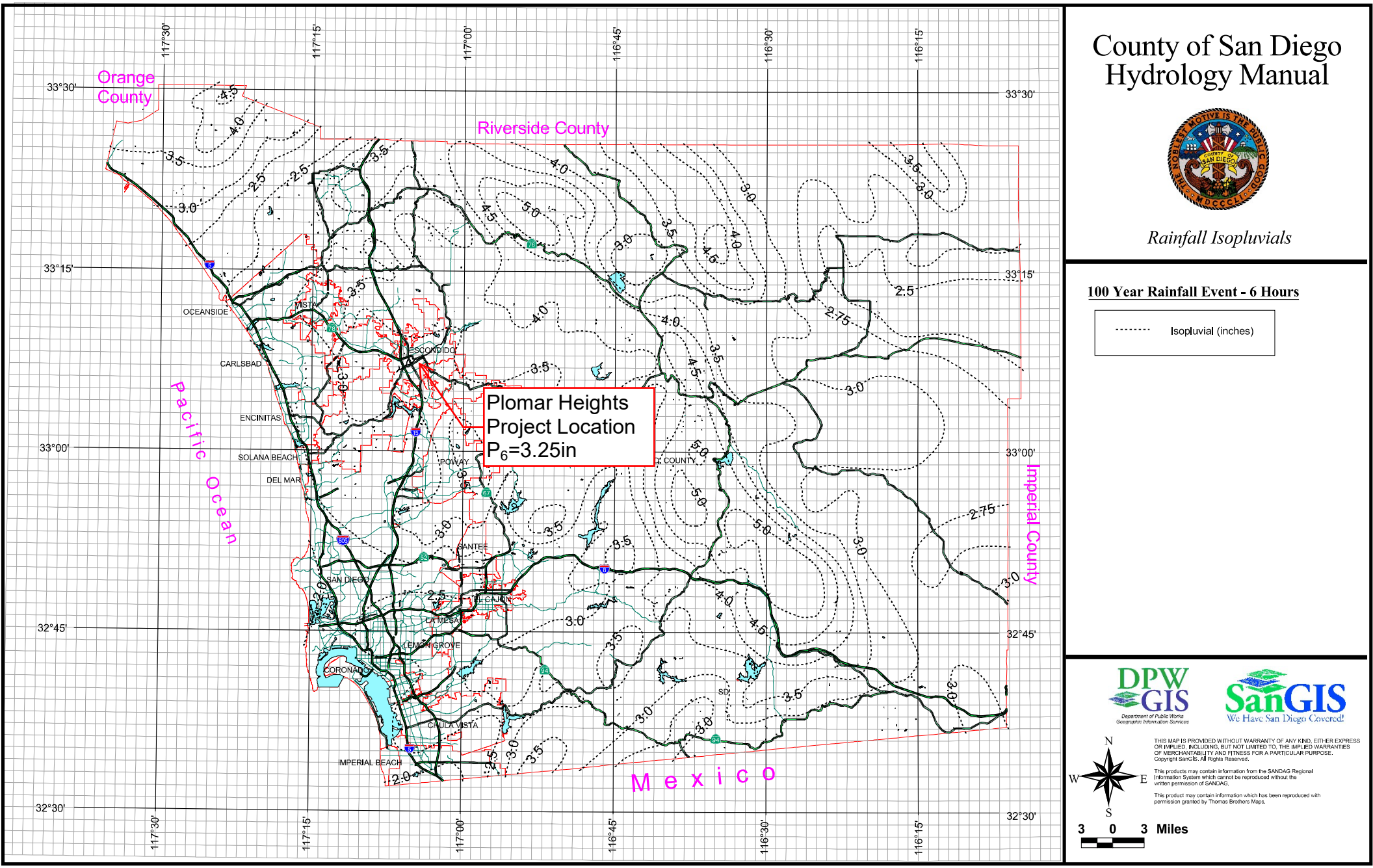
As illustrated in Table 1 above, development of the Palomar Heights project does not increase overall runoff in developed conditions. The results are expected as existing and proposed conditions land use represent fully developed site with high percentage of impervious areas. There seems to be a slight decrease in peak flows in comparison to existing conditions. The decrease in peak flows can be attributed to internal routing of flows resulting in longer travel lengths in proposed conditions.

80% of the total project site acreage is considered impervious for both the existing and proposed condition.

The project does not increase runoff in the 100-year storm event and does not need on site detention facilities for flood attenuation.

6 Watershed Information

- Isopluvial Map



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

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3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

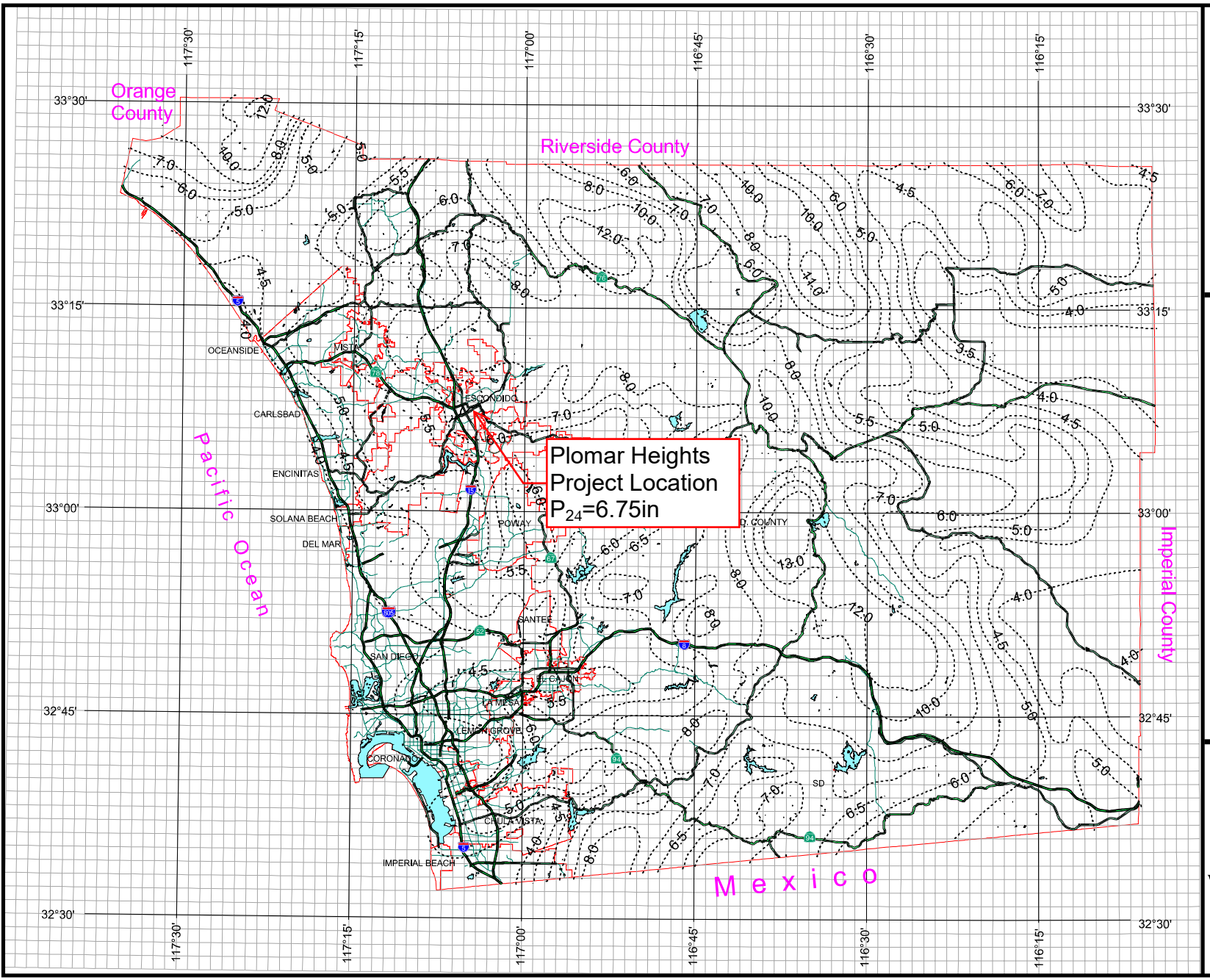

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Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

Developed

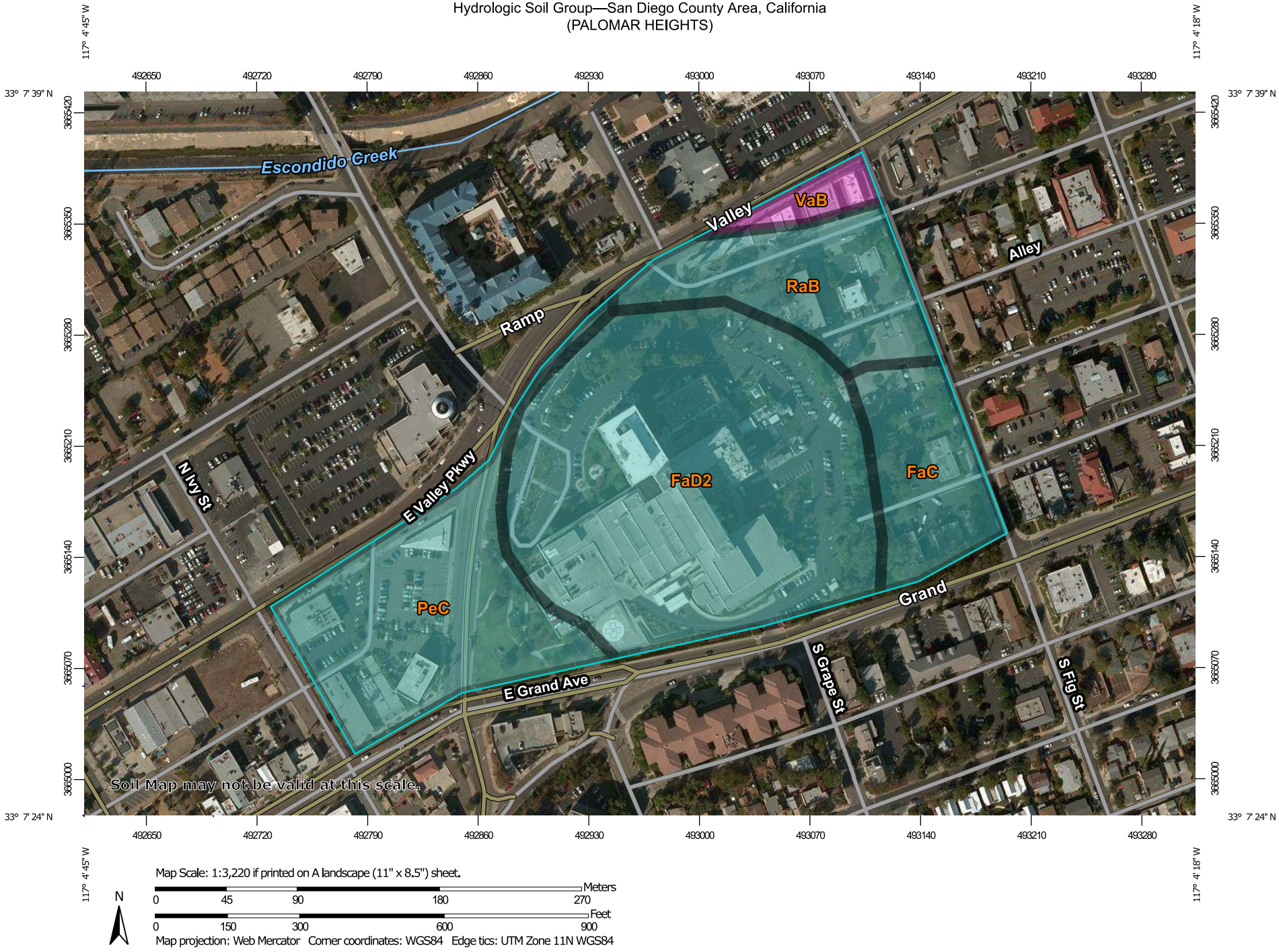
Existing

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service

7 Appendices

Appendix 1 - Soils Information

Hydrologic Soil Group—San Diego County Area, California
(PALOMAR HEIGHTS)



Map Scale: 1:3,220 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 45 90 180 270

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 13, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FaC	Fallbrook sandy loam, 5 to 9 percent slopes	C	2.2	10.7%
FaD2	Fallbrook sandy loam, 9 to 15 percent slopes, eroded	C	10.4	49.8%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	C	4.8	23.0%
RaB	Ramona sandy loam, 2 to 5 percent slopes	C	2.9	13.8%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	0.6	2.7%
Totals for Area of Interest			**20.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix 2 - Hydrology Calculations and Exhibits

EXISTING CONDITION

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                            Analysis prepared by:

                     Hunsaker & Associates San Diego, Inc.
                              9707 Waples Street
                             San Diego,  CA 92121


 ************************* DESCRIPTION OF STUDY *************************
* EXISTING CONDITIONS PALOMAR HEIGHTS                                    *
* 100-YEAR EXISTING CONDITION                                            *
*                                                                        *
 ************************************************************************

  FILE NAME: R:\1477\HYD\CALC\AES\EX\EX-Q100.DAT
  TIME/DATE OF STUDY: 05:51 06/18/2019
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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   13.0      6.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+----------------------------------------------------------------------+
| FLOWS FROM EXISTING CONDITIONS PALOMAR HEIGHTS                       |
```



```
|  TOWARDS VALLEY BLVD                                                 |
|                                                                      |
+----------------------------------------------------------------------+

**************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   209.00
  UPSTREAM ELEVATION(FEET) =    705.00
  DOWNSTREAM ELEVATION(FEET) =    700.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.826
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    78.92
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.73

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  62
--------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  700.00  DOWNSTREAM ELEVATION(FEET) =  665.00
  STREET LENGTH(FEET) =   708.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.40
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.69
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.51
  STREET FLOW TRAVEL TIME(MIN.) =   1.79   Tc(MIN.) =    5.61
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.946
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    3.43      SUBAREA RUNOFF(CFS) =   21.26
 TOTAL AREA(ACRES) =        3.5        PEAK FLOW RATE(CFS) =      21.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) =  7.27   DEPTH*VELOCITY(FT*FT/SEC.) =   3.10
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     917.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.61
 RAINFALL INTENSITY(INCH/HR) =   7.95
 TOTAL STREAM AREA(ACRES) =     3.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.94

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   131.24
 UPSTREAM ELEVATION(FEET) =    710.00
 DOWNSTREAM ELEVATION(FEET) =    705.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.480
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    89.05
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.80
 TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
```



```
============================================================================
 UPSTREAM ELEVATION(FEET) =  705.00  DOWNSTREAM ELEVATION(FEET) =  663.00
 STREET LENGTH(FEET) =  1301.60   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.48
   ***STREET FLOW SPLITS OVER STREET-CROWN***
   FULL DEPTH(FEET) =    0.43   FLOOD WIDTH(FEET) =   15.00
   FULL HALF-STREET VELOCITY(FEET/SEC.) =    5.88
   SPLIT DEPTH(FEET) =    0.33   SPLIT FLOOD WIDTH(FEET) =   10.28
   SPLIT FLOW(CFS) =    5.57   SPLIT VELOCITY(FEET/SEC.) =    4.74
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   15.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.88
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.50
 STREET FLOW TRAVEL TIME(MIN.) =   3.69   Tc(MIN.) =    7.17
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.785
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    7.06      SUBAREA RUNOFF(CFS) =   37.37
 TOTAL AREA(ACRES) =        7.2        PEAK FLOW RATE(CFS) =      38.00

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) =  6.66   DEPTH*VELOCITY(FT*FT/SEC.) =   3.05
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =    1432.84 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.17
 RAINFALL INTENSITY(INCH/HR) =   6.79
 TOTAL STREAM AREA(ACRES) =     7.18
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.00
```

```
 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       21.94     5.61        7.946          3.54
     2       38.00     7.17        6.785          7.18

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       51.69     5.61       7.946
     2       56.74     7.17       6.785

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      56.74   Tc(MIN.) =    7.17
 TOTAL AREA(ACRES) =       10.7
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    103.00 =    1432.84 FEET.

+----------------------------------------------------------------------------+
| FLOWS FROM EXISTING CONDITIONS PALOMAR HEIGHTS                             |
| TOWARDS GRAND AVE AND N FIG STREET                                         |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   173.00
 UPSTREAM ELEVATION(FEET) =    705.00
 DOWNSTREAM ELEVATION(FEET) =    685.00
 ELEVATION DIFFERENCE(FEET) =     20.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.674
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =   100.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      1.07
 TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      1.07

****************************************************************************
 FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
```



```
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  685.00  DOWNSTREAM ELEVATION(FEET) =  661.00
 STREET LENGTH(FEET) =   505.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.29
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.74
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.48
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.47
 STREET FLOW TRAVEL TIME(MIN.) =   1.30   Tc(MIN.) =    3.97
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    3.06      SUBAREA RUNOFF(CFS) =   20.44
 TOTAL AREA(ACRES) =        3.2        PEAK FLOW RATE(CFS) =      21.51

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) =  7.13   DEPTH*VELOCITY(FT*FT/SEC.) =   3.04
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     678.00 FEET.

+----------------------------------------------------------------------------+
| FLOWS FROM EXISTING CONDITIONS PALOMAR HEIGHTS                             |
| BLDG AND PARKING LOT WEST OF VALLEY BLVD                                   |
|  OUTFALL NEAR VALLEY PARKWAY                                               |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    73.94
 UPSTREAM ELEVATION(FEET) =    668.50
```

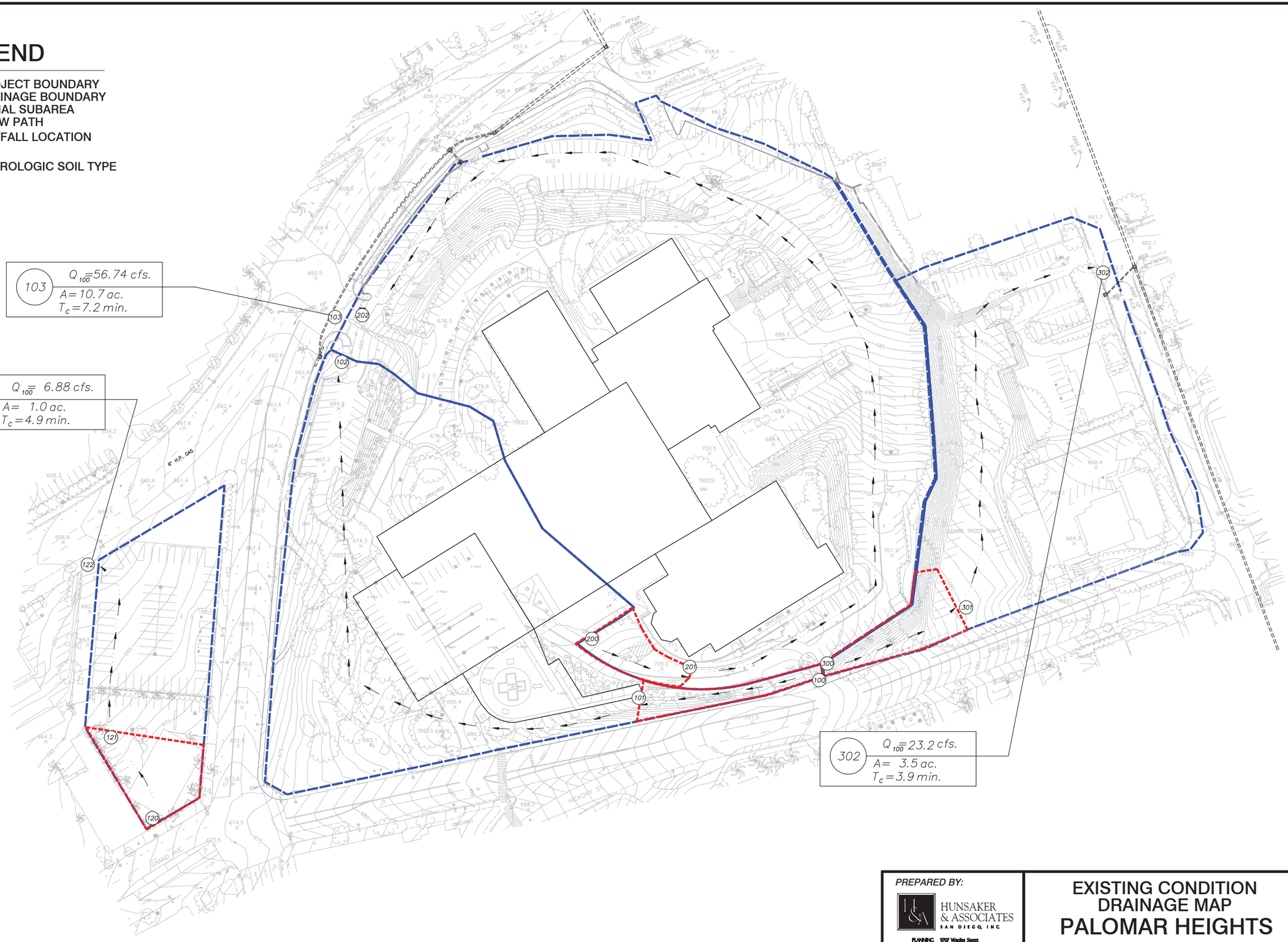
```
  DOWNSTREAM ELEVATION(FEET) =    666.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.300
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      1.40
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  666.00  DOWNSTREAM ELEVATION(FEET) =  662.00
  STREET LENGTH(FEET) =   202.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    4.22
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.82      SUBAREA RUNOFF(CFS) =    5.48
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       6.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.45
  FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     275.94 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      4.22
  PEAK FLOW RATE(CFS)   =       6.88
============================================================================
```



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

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW PATH
- (100) OUTFALL LOCATION
- (D) HYDROLOGIC SOIL TYPE



PREPARED BY:

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EXISTING CONDITION DRAINAGE MAP
PALOMAR HEIGHTS

ESCONDIDO, CALIFORNIA

SHEET 1 OF 2

W.O. 2387-17

R:\1477\Hyd\ACAD\1477-PALOMAR-DR.dwg[]Sep-13-2019:11:12

PROPOSED CONDITION

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2015 Advanced Engineering Software (aes)
              Ver. 22.0 Release Date: 07/01/2015  License ID 1239

                            Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* PALOMAR HEIGHTS                                                        *
* 100-YEAR PROPOSED CONDITION                                            *
*                                                                        *
 ************************************************************************

  FILE NAME: R:\1477\HYD\CALC\AES\PR\PR-Q100.DAT
  TIME/DATE OF STUDY: 12:38 11/29/2019
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.250
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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   13.0      6.5    0.020/0.020/0.020   0.50    1.50 0.0312 0.125 0.0160
  2   15.0      7.5    0.020/0.020/0.020   0.50    1.50 0.0312 0.125 0.0130

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

+--------------------------------------------------------------------------+
| FLOWS FROM DEVELOPED CONDITIONS PALOMAR HEIGHTS                          |
| TOWARDS VALLEY BLVD                                                      |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    96.00
  UPSTREAM ELEVATION(FEET) =    684.00
  DOWNSTREAM ELEVATION(FEET) =    680.00
```



```
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.412
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    90.83
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.14   TOTAL RUNOFF(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  688.50  DOWNSTREAM ELEVATION(FEET) =  685.50
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.66
    ***STREET FLOW SPLITS OVER STREET-CROWN***
    FULL DEPTH(FEET) =    0.43   FLOOD WIDTH(FEET) =   15.00
    FULL HALF-STREET VELOCITY(FEET/SEC.) =    2.95
    SPLIT DEPTH(FEET) =    0.33   SPLIT FLOOD WIDTH(FEET) =   10.11
    SPLIT FLOW(CFS) =    2.68   SPLIT VELOCITY(FEET/SEC.) =    2.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.95
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   2.09   Tc(MIN.) =    5.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.047
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    2.78      SUBAREA RUNOFF(CFS) =   17.45
  TOTAL AREA(ACRES) =        2.9         PEAK FLOW RATE(CFS) =      18.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  15.00
  FLOW VELOCITY(FEET/SEC.) =  3.27   DEPTH*VELOCITY(FT*FT/SEC.) =   1.49
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    102.00 =     466.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.51
  RAINFALL INTENSITY(INCH/HR) =   8.05
  TOTAL STREAM AREA(ACRES) =     2.92
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.33
```

```
 ************************************************************************
  FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
 ------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 ========================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    91.00
  UPSTREAM ELEVATION(FEET) =    690.00
  DOWNSTREAM ELEVATION(FEET) =    689.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.534
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    65.99
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.09   TOTAL RUNOFF(CFS) =      0.60

 ************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  62
 ------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
 ========================================================================
  UPSTREAM ELEVATION(FEET) =  689.60  DOWNSTREAM ELEVATION(FEET) =  686.00
  STREET LENGTH(FEET) =   170.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   0.79   Tc(MIN.) =    5.32
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.226
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.90      SUBAREA RUNOFF(CFS) =    5.77
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       6.35

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.87
  FLOW VELOCITY(FEET/SEC.) =  4.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.51
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     261.00 FEET.

 ************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    103.00 IS CODE =  31
 ------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ========================================================================
```



```
  ELEVATION DATA: UPSTREAM(FEET) =   686.00  DOWNSTREAM(FEET) =   684.00
  FLOW LENGTH(FEET) =    77.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.35
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.47
  LONGEST FLOWPATH FROM NODE    300.00 TO NODE    103.00 =     338.00 FEET.

 ************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
 ------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
 ========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.47
  RAINFALL INTENSITY(INCH/HR) =   8.08
  TOTAL STREAM AREA(ACRES) =     0.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.35

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.33     5.51        8.047          2.92
      2        6.35     5.47        8.082          0.99

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       24.56     5.47       8.082
      2       24.65     5.51       8.047

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.65   Tc(MIN.) =    5.51
  TOTAL AREA(ACRES) =        3.9
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    103.00 =     466.00 FEET.

 ************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    204.00 IS CODE =  31
 ------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   684.00  DOWNSTREAM(FEET) =   676.00
  FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.72
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.65
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.71
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    204.00 =     651.00 FEET.

 ************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 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.) =    5.71
  RAINFALL INTENSITY(INCH/HR) =   7.86
```

```
 TOTAL STREAM AREA(ACRES) =     3.91
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.65

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   112.00
 UPSTREAM ELEVATION(FEET) =    683.00
 DOWNSTREAM ELEVATION(FEET) =    678.00
 ELEVATION DIFFERENCE(FEET) =      5.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.361
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    92.32
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.87
 TOTAL AREA(ACRES) =      0.13   TOTAL RUNOFF(CFS) =      0.87

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  678.00  DOWNSTREAM ELEVATION(FEET) =  676.00
 STREET LENGTH(FEET) =   308.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.63
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.39
   HALFSTREET FLOOD WIDTH(FEET) =   13.33
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.44
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
 STREET FLOW TRAVEL TIME(MIN.) =   2.10   Tc(MIN.) =    5.46
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.089
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    1.19      SUBAREA RUNOFF(CFS) =    7.51
 TOTAL AREA(ACRES) =        1.3        PEAK FLOW RATE(CFS) =       8.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) =  2.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
 LONGEST FLOWPATH FROM NODE    200.00 TO NODE    202.00 =     420.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    202.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
```



```
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.46
 RAINFALL INTENSITY(INCH/HR) =   8.09
 TOTAL STREAM AREA(ACRES) =     1.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.33

****************************************************************************
 FLOW PROCESS FROM NODE    300.00 TO NODE    301.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (2. DU/AC OR LESS) RUNOFF COEFFICIENT = .4200
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  79
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 UPSTREAM ELEVATION(FEET) =    680.50
 DOWNSTREAM ELEVATION(FEET) =    680.00
 ELEVATION DIFFERENCE(FEET) =      0.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =   10.617
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    55.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.269
 SUBAREA RUNOFF(CFS) =      0.13
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
 FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    680.00  DOWNSTREAM(FEET) =    677.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   150.00   CHANNEL SLOPE =  0.0200
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.13
 FLOW VELOCITY(FEET/SEC) =   2.12 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   1.18   Tc(MIN.) =   11.80
 LONGEST FLOWPATH FROM NODE    300.00 TO NODE    302.00 =     230.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.923
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3663
 SUBAREA AREA(ACRES) =    0.51   SUBAREA RUNOFF(CFS) =    0.90
 TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.03
 TC(MIN.) =   11.80

****************************************************************************
 FLOW PROCESS FROM NODE    402.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.80
```

```
 RAINFALL INTENSITY(INCH/HR) =   4.92
 TOTAL STREAM AREA(ACRES) =     0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.03

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       24.65     5.71        7.856         3.91
     2        8.33     5.46        8.089         1.32
     3        1.03    11.80        4.923         0.57

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       32.75     5.46       8.089
     2       33.24     5.71       7.856
     3       21.54    11.80       4.923

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      33.24   Tc(MIN.) =    5.71
 TOTAL AREA(ACRES) =        5.8
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    204.00 =     651.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    500.00 TO NODE    501.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
 UPSTREAM ELEVATION(FEET) =    690.00
 DOWNSTREAM ELEVATION(FEET) =    686.00
 ELEVATION DIFFERENCE(FEET) =      4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.754
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    81.67
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.33
 TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
 FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  686.00  DOWNSTREAM ELEVATION(FEET) =  682.00
 STREET LENGTH(FEET) =   238.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.27
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.58
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
 STREET FLOW TRAVEL TIME(MIN.) =   1.15   Tc(MIN.) =    4.90
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    1.18      SUBAREA RUNOFF(CFS) =    7.88
 TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       8.22

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.86
 FLOW VELOCITY(FEET/SEC.) =  4.03   DEPTH*VELOCITY(FT*FT/SEC.) =   1.63
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    502.00 =     388.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    4.90
 RAINFALL INTENSITY(INCH/HR) =   8.56
 TOTAL STREAM AREA(ACRES) =     1.23
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.22

****************************************************************************
 FLOW PROCESS FROM NODE    800.00 TO NODE    801.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
 UPSTREAM ELEVATION(FEET) =    687.25
 DOWNSTREAM ELEVATION(FEET) =    686.50
 ELEVATION DIFFERENCE(FEET) =      0.75
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.708
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    61.47
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.53
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
 FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
```

```
  UPSTREAM ELEVATION(FEET) =  685.50  DOWNSTREAM ELEVATION(FEET) =  682.00
  STREET LENGTH(FEET) =   269.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.58
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    6.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.474
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    1.11      SUBAREA RUNOFF(CFS) =    6.47
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       6.94

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.62
  FLOW VELOCITY(FEET/SEC.) =  3.51   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  LONGEST FLOWPATH FROM NODE    800.00 TO NODE    802.00 =     354.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    503.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.17
  RAINFALL INTENSITY(INCH/HR) =   7.47
  TOTAL STREAM AREA(ACRES) =     1.19
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.94

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.22     4.90        8.563          1.23
      2        6.94     6.17        7.474          1.19

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       13.72     4.90       8.563
      2       14.11     6.17       7.474

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      14.11   Tc(MIN.) =    6.17
  TOTAL AREA(ACRES) =       2.4
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    503.00 =     388.00 FEET.

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



```
  FLOW PROCESS FROM NODE    503.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   681.00  DOWNSTREAM(FEET) =   676.00
  FLOW LENGTH(FEET) =   290.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.11
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.11
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    6.70
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    204.00 =     678.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.70
  RAINFALL INTENSITY(INCH/HR) =   7.09
  TOTAL STREAM AREA(ACRES) =     2.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.11

****************************************************************************
  FLOW PROCESS FROM NODE    900.00 TO NODE    901.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    72.00
  UPSTREAM ELEVATION(FEET) =    682.60
  DOWNSTREAM ELEVATION(FEET) =    682.00
  ELEVATION DIFFERENCE(FEET) =      0.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.741
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    60.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    901.00 TO NODE    902.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  682.00  DOWNSTREAM ELEVATION(FEET) =  677.00
  STREET LENGTH(FEET) =   348.85   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130
```

```
  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.83
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.38
   HALFSTREET FLOOD WIDTH(FEET) =   12.45
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
 STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    6.41
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.299
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    1.78      SUBAREA RUNOFF(CFS) =   10.13
 TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =      10.76

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.00
 FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.67
 LONGEST FLOWPATH FROM NODE    900.00 TO NODE    902.00 =     420.85 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    902.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.41
 RAINFALL INTENSITY(INCH/HR) =   7.30
 TOTAL STREAM AREA(ACRES) =     1.89
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.76

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       14.11     6.70        7.087         2.42
     2       10.76     6.41        7.299         1.89

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       24.46     6.41       7.299
     2       24.55     6.70       7.087

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      24.55   Tc(MIN.) =    6.70
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    204.00 =     678.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       24.55     6.70       7.087        4.31
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    204.00 =     678.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
```



```
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       33.24     5.71       7.856        5.80
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    204.00 =     651.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      54.17       5.71       7.856
     2      54.54       6.70       7.087

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      54.54   Tc(MIN.) =    6.70
 TOTAL AREA(ACRES) =       10.1

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    204.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   677.00  DOWNSTREAM(FEET) =   661.00
 FLOW LENGTH(FEET) =   229.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.08
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      54.54
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.89
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    205.00 =     907.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 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.) =    6.89
 RAINFALL INTENSITY(INCH/HR) =   6.97
 TOTAL STREAM AREA(ACRES) =    10.11
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     54.54

****************************************************************************
 FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    74.00
 UPSTREAM ELEVATION(FEET) =    677.00
 DOWNSTREAM ELEVATION(FEET) =    675.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.557
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.20
 TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  62
```

```
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  675.00  DOWNSTREAM ELEVATION(FEET) =  661.00
  STREET LENGTH(FEET) =   155.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.47
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.02
  STREET FLOW TRAVEL TIME(MIN.) =   0.40   Tc(MIN.) =    3.95
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.08      SUBAREA RUNOFF(CFS) =    0.53
  TOTAL AREA(ACRES) =        0.1        PEAK FLOW RATE(CFS) =       0.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.16   HALFSTREET FLOOD WIDTH(FEET) =   1.50
  FLOW VELOCITY(FEET/SEC.) =  6.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     229.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    205.00 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.) =    3.95
  RAINFALL INTENSITY(INCH/HR) =   8.56
  TOTAL STREAM AREA(ACRES) =     0.11
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    677.00
  DOWNSTREAM ELEVATION(FEET) =    675.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.987
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.20
```



```
****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  675.00  DOWNSTREAM ELEVATION(FEET) =  661.00
  STREET LENGTH(FEET) =   153.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.70
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   0.39   Tc(MIN.) =    3.37
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    1.00
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   3.14
  FLOW VELOCITY(FEET/SEC.) =  5.55   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    106.00 =     213.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    205.00 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.) =    3.37
  RAINFALL INTENSITY(INCH/HR) =   8.56
  TOTAL STREAM AREA(ACRES) =     0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       54.54     6.89        6.966         10.11
      2        0.73     3.95        8.563          0.11
      3        1.20     3.37        8.563          0.18

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
```

```
      1       28.56     3.37       8.563
      2       33.24     3.95       8.563
      3       56.11     6.89       6.966

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      56.11   Tc(MIN.) =    6.89
  TOTAL AREA(ACRES) =       10.4
  LONGEST FLOWPATH FROM NODE    500.00 TO NODE    205.00 =     907.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    205.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| FLOWS FROM DEVELOPED CONDITIONS PALOMAR HEIGHTS TOWARDS GRAND AVE        |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE    600.00 TO NODE    601.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    691.75
  DOWNSTREAM ELEVATION(FEET) =    690.00
  ELEVATION DIFFERENCE(FEET) =      1.75
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.761
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  690.00  DOWNSTREAM ELEVATION(FEET) =  676.00
  STREET LENGTH(FEET) =   544.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.38
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.59
  STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =    5.79
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.787
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
```



```
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    1.96      SUBAREA RUNOFF(CFS) =   11.90
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =      12.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.91
  FLOW VELOCITY(FEET/SEC.) =  5.24   DEPTH*VELOCITY(FT*FT/SEC.) =   2.22
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     619.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.79
  RAINFALL INTENSITY(INCH/HR) =   7.79
  TOTAL STREAM AREA(ACRES) =     2.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.27

****************************************************************************
  FLOW PROCESS FROM NODE    700.00 TO NODE    701.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    51.00
  UPSTREAM ELEVATION(FEET) =    680.20
  DOWNSTREAM ELEVATION(FEET) =    679.50
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.701
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.07
  TOTAL AREA(ACRES) =      0.01   TOTAL RUNOFF(CFS) =      0.07

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  62
----------------------------------------------------------------------------
  ** WARNING: Computed Flowrate is less than 0.1 cfs,
               Routing Algorithm is UNAVAILABLE.

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    603.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.70
  RAINFALL INTENSITY(INCH/HR) =   8.56
  TOTAL STREAM AREA(ACRES) =     0.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.07

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.27     5.79        7.787          2.02
      2        0.07     3.70        8.563          0.01

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

```
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1        7.90     3.70       8.563
     2       12.33     5.79       7.787

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.33   Tc(MIN.) =    5.79
 TOTAL AREA(ACRES) =        2.0
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE    603.00 =     619.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    603.00 TO NODE   1003.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   674.00  DOWNSTREAM(FEET) =   660.00
 FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.26
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.33
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.26
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE   1003.00 =     959.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1003.00 TO NODE   1003.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  5
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.26
 RAINFALL INTENSITY(INCH/HR) =   7.41
 TOTAL STREAM AREA(ACRES) =     2.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.33

****************************************************************************
 FLOW PROCESS FROM NODE   1000.00 TO NODE   1002.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =     0.01
 UPSTREAM ELEVATION(FEET) =    701.50
 DOWNSTREAM ELEVATION(FEET) =    699.00
 ELEVATION DIFFERENCE(FEET) =      2.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    0.030
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.67
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
 FLOW PROCESS FROM NODE   1002.00 TO NODE   1003.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  699.00  DOWNSTREAM ELEVATION(FEET) =  665.00
```



```
 STREET LENGTH(FEET) =   658.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.41
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.28
   HALFSTREET FLOOD WIDTH(FEET) =    7.45
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.06
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
 STREET FLOW TRAVEL TIME(MIN.) =   2.17   Tc(MIN.) =    2.20
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    0.82      SUBAREA RUNOFF(CFS) =    5.48
 TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       6.14

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.70
 FLOW VELOCITY(FEET/SEC.) =  5.81   DEPTH*VELOCITY(FT*FT/SEC.) =   1.86
 LONGEST FLOWPATH FROM NODE   1000.00 TO NODE   1003.00 =     658.01 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1003.00 TO NODE   1003.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  5
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    2.20
 RAINFALL INTENSITY(INCH/HR) =   8.56
 TOTAL STREAM AREA(ACRES) =     0.92
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.14

****************************************************************************
 FLOW PROCESS FROM NODE    704.00 TO NODE    706.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
 UPSTREAM ELEVATION(FEET) =    680.90
 DOWNSTREAM ELEVATION(FEET) =    680.00
 ELEVATION DIFFERENCE(FEET) =      0.90
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.364
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    67.86
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.40
 TOTAL AREA(ACRES) =      0.06   TOTAL RUNOFF(CFS) =      0.40
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    706.00 TO NODE    708.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  680.00  DOWNSTREAM ELEVATION(FEET) =  679.00
  STREET LENGTH(FEET) =    92.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.16
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.42
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.56
  STREET FLOW TRAVEL TIME(MIN.) =   0.70   Tc(MIN.) =    5.06
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.494
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    1.52
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.17
  FLOW VELOCITY(FEET/SEC.) =  2.44   DEPTH*VELOCITY(FT*FT/SEC.) =   0.71
  LONGEST FLOWPATH FROM NODE    704.00 TO NODE    708.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    708.00 TO NODE   1003.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.06
  RAINFALL INTENSITY(INCH/HR) =   8.49
  TOTAL STREAM AREA(ACRES) =     0.29
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.92

****************************************************************************
  FLOW PROCESS FROM NODE    715.00 TO NODE    717.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    680.00
  DOWNSTREAM ELEVATION(FEET) =    679.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.233
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
```



```
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    717.00 TO NODE    719.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  679.00  DOWNSTREAM ELEVATION(FEET) =  676.00
  STREET LENGTH(FEET) =    68.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 15.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
  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) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.82
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.19
    HALFSTREET FLOOD WIDTH(FEET) =    3.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    3.52
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.58
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.21   HALFSTREET FLOOD WIDTH(FEET) =   4.08
  FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
  LONGEST FLOWPATH FROM NODE    715.00 TO NODE    719.00 =     118.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    719.00 TO NODE   1003.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  5
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  4 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.52
  RAINFALL INTENSITY(INCH/HR) =   8.56
  TOTAL STREAM AREA(ACRES) =     0.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.12

****************************************************************************
  FLOW PROCESS FROM NODE    710.00 TO NODE    712.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  93
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    678.00
  DOWNSTREAM ELEVATION(FEET) =    677.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.233
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.55
 TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.55

****************************************************************************
 FLOW PROCESS FROM NODE    712.00 TO NODE    714.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  677.00  DOWNSTREAM ELEVATION(FEET) =  675.80
 STREET LENGTH(FEET) =    80.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.48
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.22
   HALFSTREET FLOOD WIDTH(FEET) =    4.45
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.50
 STREET FLOW TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =    3.80
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    1.87
 TOTAL AREA(ACRES) =       0.4        PEAK FLOW RATE(CFS) =       2.42

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.25   HALFSTREET FLOOD WIDTH(FEET) =   6.05
 FLOW VELOCITY(FEET/SEC.) =  2.50   DEPTH*VELOCITY(FT*FT/SEC.) =   0.62
 LONGEST FLOWPATH FROM NODE    710.00 TO NODE    714.00 =     130.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    714.00 TO NODE   1003.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  5
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  5 ARE:
 TIME OF CONCENTRATION(MIN.) =    3.80
 RAINFALL INTENSITY(INCH/HR) =   8.56
 TOTAL STREAM AREA(ACRES) =     0.36
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.42

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       12.33     6.26        7.410          2.03
     2        6.14     2.20        8.563          0.92
     3        1.92     5.06        8.494          0.29
     4        1.12     3.52        8.563          0.17
     5        2.42     3.80        8.563          0.36
```



```
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  5 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF       Tc      INTENSITY
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)
     1       19.74     2.20        8.563
     2       21.51     3.52        8.563
     3       21.79     3.80        8.563
     4       22.28     5.06        8.494
     5       22.38     6.26        7.410

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      22.38   Tc(MIN.) =    6.26
 TOTAL AREA(ACRES) =        3.8
 LONGEST FLOWPATH FROM NODE    600.00 TO NODE   1003.00 =     959.00 FEET.

+--------------------------------------------------------------------------+
| FLOWS FROM DEVELOPED CONDITIONS PALOMAR HEIGHTS                          |
| BLDG 24 WEST OF VALLEY BLVD                                              |
| OUTFALL NEAR VALLEY PARKWAY                                              |
+--------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   132.00
 UPSTREAM ELEVATION(FEET) =    668.50
 DOWNSTREAM ELEVATION(FEET) =    666.00
 ELEVATION DIFFERENCE(FEET) =      2.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.003
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    73.94
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      1.40
 TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      1.40

****************************************************************************
 FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  666.00  DOWNSTREAM ELEVATION(FEET) =  662.00
 STREET LENGTH(FEET) =   202.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 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) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.14
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.33
```

```
   HALFSTREET FLOOD WIDTH(FEET) =   10.05
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
 STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =    4.92
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 RESIDENTIAL (43. DU/AC OR LESS) RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    0.82      SUBAREA RUNOFF(CFS) =    5.48
 TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       6.88

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.45
 FLOW VELOCITY(FEET/SEC.) =  4.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE    122.00 =     334.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    122.00 TO NODE   1006.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   662.00  DOWNSTREAM(FEET) =   558.00
 FLOW LENGTH(FEET) =   362.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.22
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =        6.88
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    5.20
 LONGEST FLOWPATH FROM NODE    120.00 TO NODE   1006.00 =     696.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1006.00 TO NODE   1006.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    5.20
 RAINFALL INTENSITY(INCH/HR) =   8.34
 TOTAL STREAM AREA(ACRES) =     1.03
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.88

+----------------------------------------------------------------------------+
| BEGIN FLOW GENERATED BY GRAND AVENUE TRAVELING WEST                        |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
 FLOW PROCESS FROM NODE   1004.00 TO NODE   1005.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
 UPSTREAM ELEVATION(FEET) =    701.50
 DOWNSTREAM ELEVATION(FEET) =    697.00
 ELEVATION DIFFERENCE(FEET) =      4.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.558
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    87.31
```



```
         (Reference: Table 3-1B of Hydrology Manual)
         THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.67
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
 FLOW PROCESS FROM NODE   1005.00 TO NODE   1006.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  697.00  DOWNSTREAM ELEVATION(FEET) =  662.40
 STREET LENGTH(FEET) =  1034.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.17
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.26
   HALFSTREET FLOOD WIDTH(FEET) =    6.52
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.85
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
 STREET FLOW TRAVEL TIME(MIN.) =   4.48   Tc(MIN.) =    8.04
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.303
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.780
 SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    6.88
 TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       7.38

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.53
 FLOW VELOCITY(FEET/SEC.) =  4.36   DEPTH*VELOCITY(FT*FT/SEC.) =   1.30
 LONGEST FLOWPATH FROM NODE   1004.00 TO NODE   1006.00 =    1164.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1006.00 TO NODE   1006.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.04
 RAINFALL INTENSITY(INCH/HR) =   6.30
 TOTAL STREAM AREA(ACRES) =     1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.38

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        6.88     5.20        8.344          1.03
     2        7.38     8.04        6.303          1.50

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

```
 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       11.65     5.20       8.344
     2       12.57     8.04       6.303

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      12.57   Tc(MIN.) =    8.04
 TOTAL AREA(ACRES) =        2.5
 LONGEST FLOWPATH FROM NODE   1004.00 TO NODE   1006.00 =    1164.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1006.00 TO NODE    205.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   558.00  DOWNSTREAM(FEET) =   556.00
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.18
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      12.57
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.11
 LONGEST FLOWPATH FROM NODE   1004.00 TO NODE    205.00 =    1214.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1006.00 TO NODE    205.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       12.57     8.11       6.269        2.53
 LONGEST FLOWPATH FROM NODE   1004.00 TO NODE    205.00 =    1214.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       56.11     6.89       6.966       10.40
 LONGEST FLOWPATH FROM NODE    500.00 TO NODE    205.00 =     907.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      66.79       6.89       6.966
     2      63.07       8.11       6.269

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      66.79   Tc(MIN.) =    6.89
 TOTAL AREA(ACRES) =       12.9

****************************************************************************
 FLOW PROCESS FROM NODE    205.00 TO NODE   1009.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   200.00  DOWNSTREAM(FEET) =   100.00
 FLOW LENGTH(FEET) =   254.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  43.45
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
```



```
 PIPE-FLOW(CFS) =      66.79
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    6.98
 LONGEST FLOWPATH FROM NODE   1004.00 TO NODE   1009.00 =    1468.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1009.00 TO NODE   1009.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.98
 RAINFALL INTENSITY(INCH/HR) =   6.90
 TOTAL STREAM AREA(ACRES) =    12.93
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     66.79

****************************************************************************
 FLOW PROCESS FROM NODE   1007.00 TO NODE   1008.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  93
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
 UPSTREAM ELEVATION(FEET) =    662.00
 DOWNSTREAM ELEVATION(FEET) =    661.00
 ELEVATION DIFFERENCE(FEET) =      1.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.367
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    61.67
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.563
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.67
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
 FLOW PROCESS FROM NODE   1008.00 TO NODE   1009.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  162.00  DOWNSTREAM ELEVATION(FEET) =  161.00
 STREET LENGTH(FEET) =   189.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 15.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   7.50
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
 STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0130

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.01
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.64
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
 STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =    6.18
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.470
 NEIGHBORHOOD COMMERCIAL RUNOFF COEFFICIENT = .7800
 SOIL CLASSIFICATION IS "C"
```

LEGEND

- PROJECT BOUNDARY
- DRAINAGE BOUNDARY
- INITIAL SUBAREA
- FLOW PATH
- (100) AES NODE

205
Q_{100}= 56.1 cfs.
A= 10.4 ac.
T_c = 6.9 min.

122
Q_{100}= 6.88 cfs.
A= 1.0 ac.
T_c = 4.9 min.

1003
Q_{100}= 23.4 cfs.
A= 3.9 ac.
T_c = 6.2 min.

VALLEY PARKWAY
HICKORY ST
PENNSYLVANIA AVE
EXISTING ALLEY
VALLEY BLVD
FIG STREET
GRAND AVE

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PROPOSED CONDITION DRAINAGE MAP
PALOMAR HEIGHTS
ESCONDIDO, CALIFORNIA

SHEET 2 OF 2

W.O. 2387-17

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