

APPENDIX N
Drainage Study

PALOMAR HEIGHTS DRAINAGE STUDY

City of Escondido, CA

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Appendix 1 – Soils Information

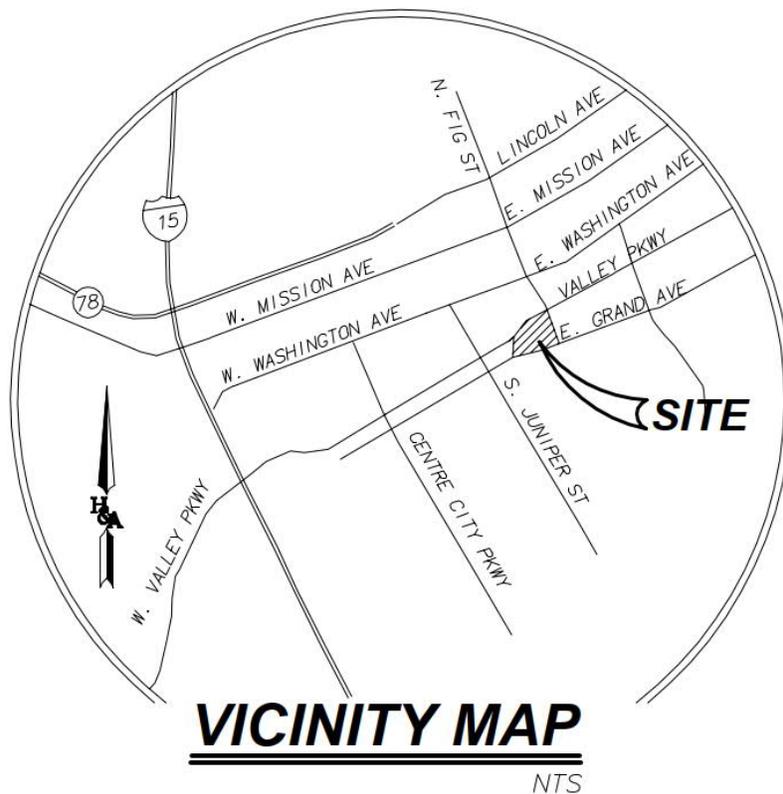
Appendix 2 – Hydrology Calculations and Exhibits

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.



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:

$$Q = C I A$$

$$I = 7.44P_6T_c^{-0.645}$$

$$T_c = T_t + T_i$$

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

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.

P₆ = 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

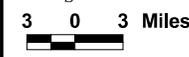
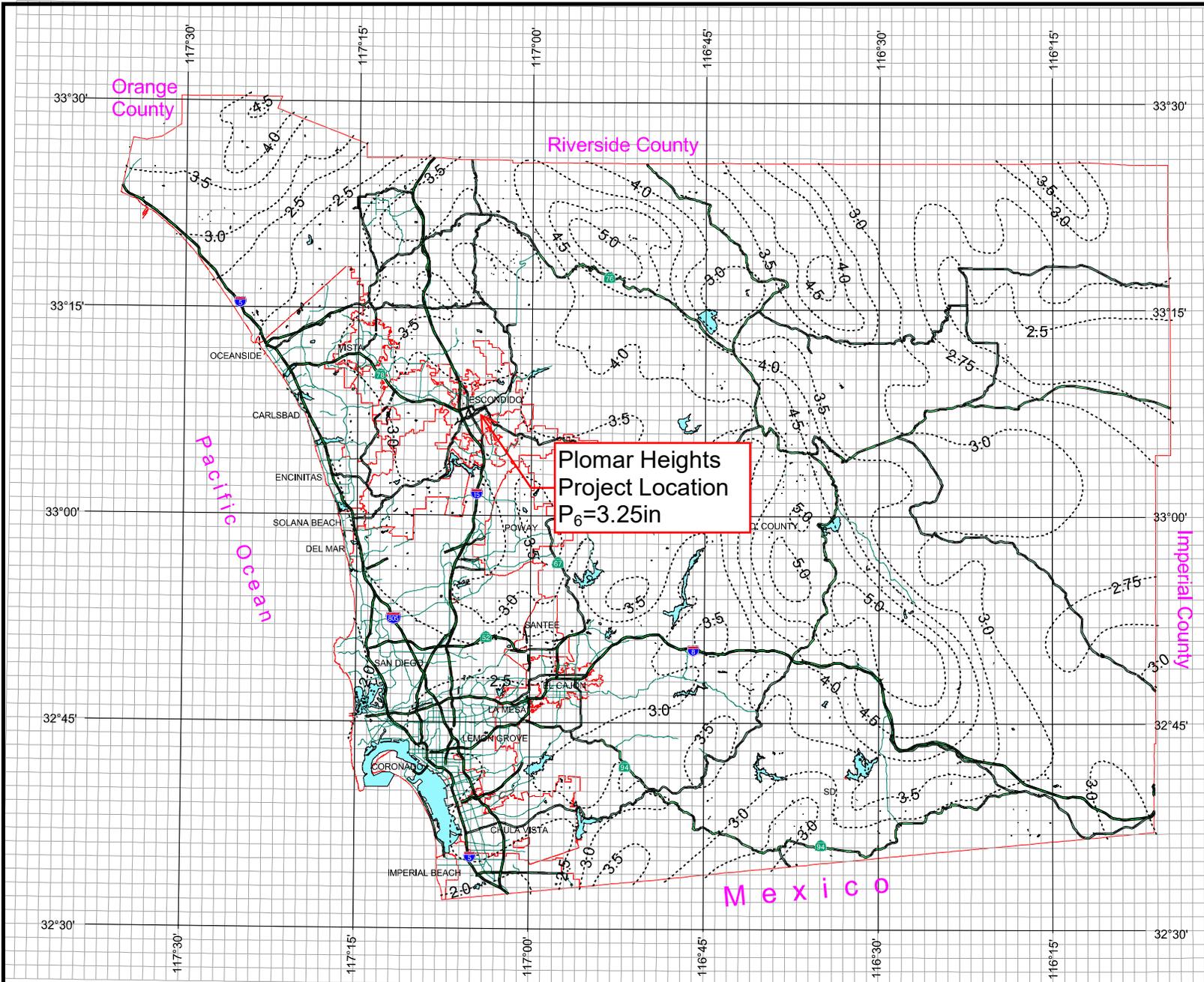
- Isopluvial Map

County of San Diego Hydrology Manual



Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours



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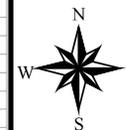
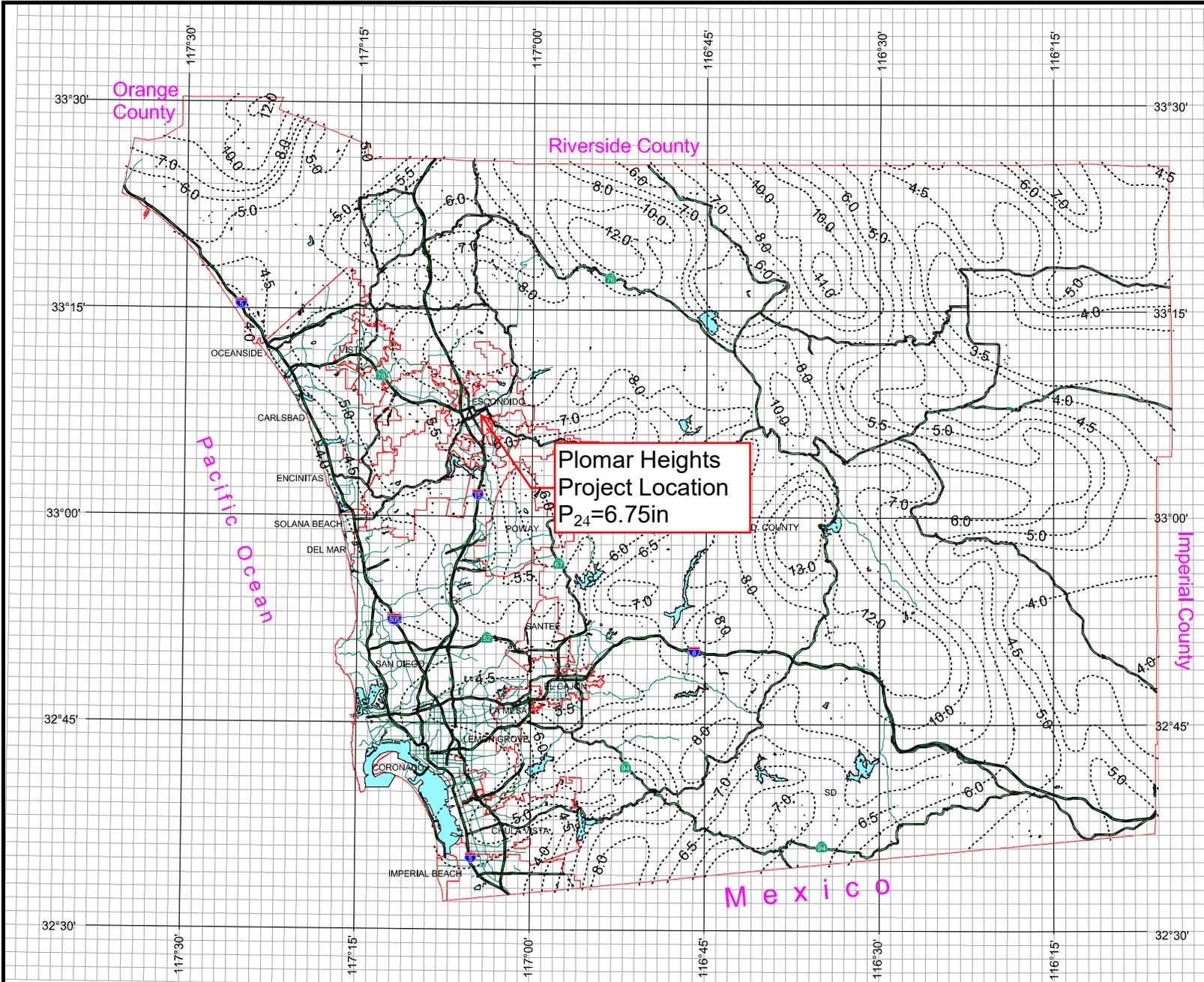
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County of San Diego Hydrology Manual



Rainfall Isopleths

100 Year Rainfall Event - 24 Hours



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**Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS**

Land Use		Runoff Coefficient "C"					
		% IMPER.	Soil Type				
NRCS Elements	County Elements		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	Developed
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79	Existing
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	

*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).

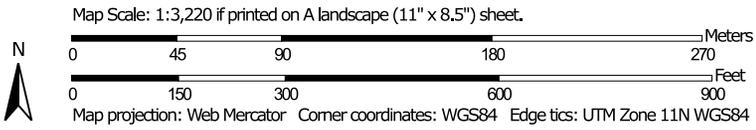
DU/A = dwelling units per acre

NRCS = National Resources Conservation Service

7 Appendices

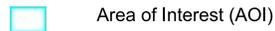
Appendix 1 - Soils Information

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



MAP LEGEND

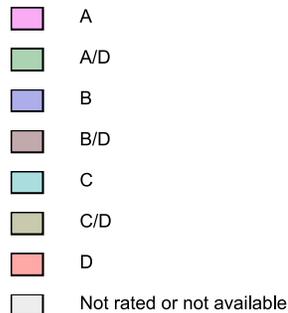
Area of Interest (AOI)



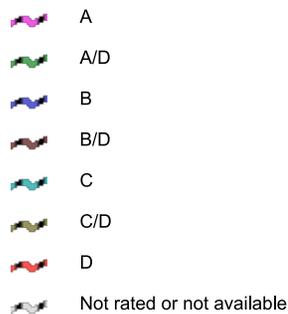
Area of Interest (AOI)

Soils

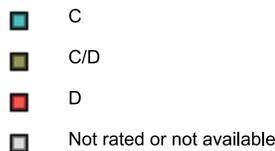
Soil Rating Polygons



Soil Rating Lines



Soil Rating Points



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

NO.	HALF- CROWN TO		STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT-/PARK- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HI KE (FT)	
1	13.0	6.5	0.020/0.020/0.020	0.020	0.50	1.50	0.0313	0.125	0.0160
2	15.0	7.5	0.020/0.020/0.020	0.020	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(curbs-to-curbs) = 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

EX-Q100.OUT

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)<<<<<

EX-Q100.OUT

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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (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

EX-Q100. OUT

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

EX-Q100. OUT

END OF RATIONAL METHOD ANALYSIS

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

DI STANCE 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(curbs-to-curbs) = 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

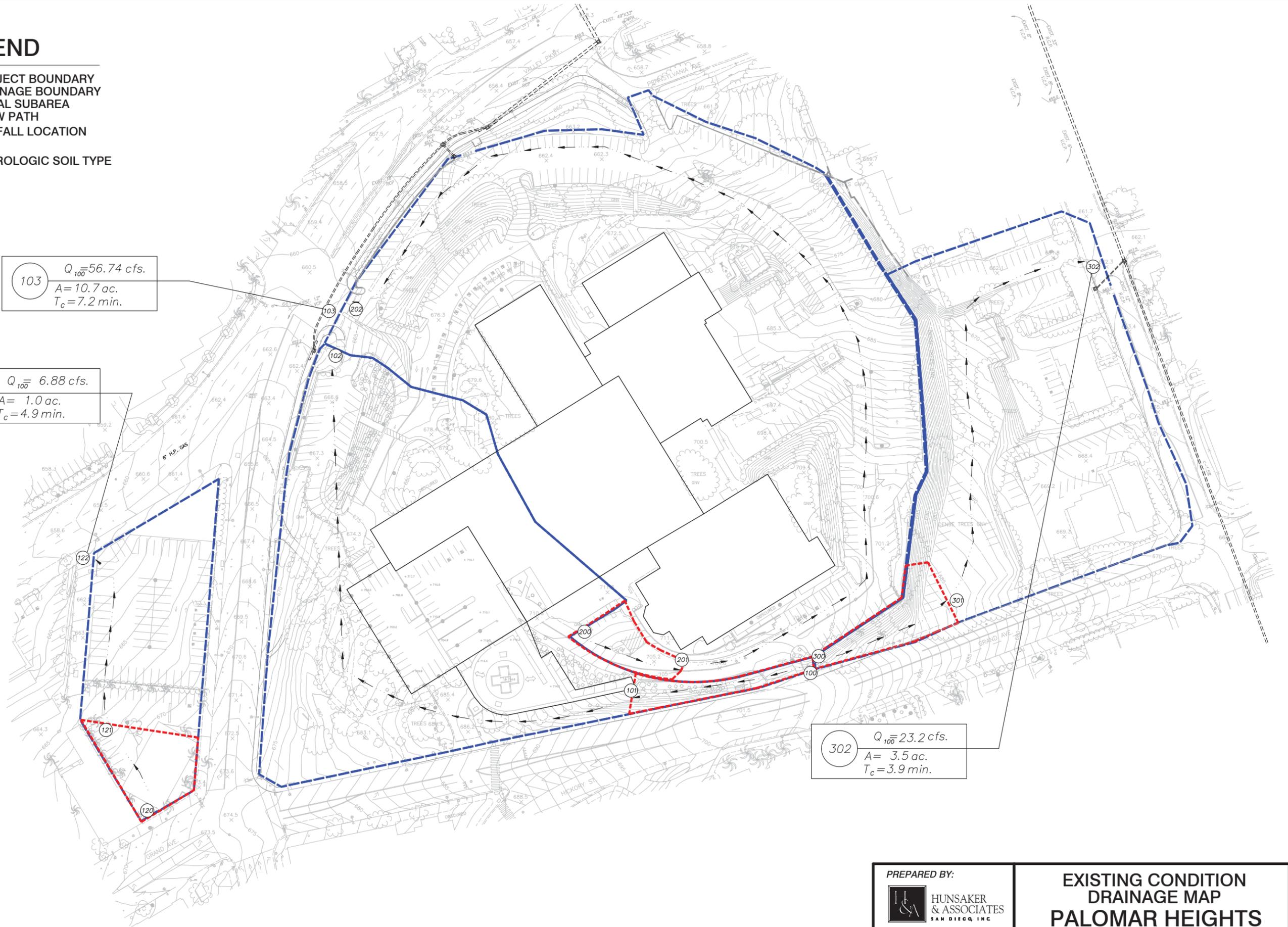
LEGEND

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

103 $Q_{100} = 56.74 \text{ cfs.}$
 $A = 10.7 \text{ ac.}$
 $T_c = 7.2 \text{ min.}$

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

302 $Q_{100} = 23.2 \text{ cfs.}$
 $A = 3.5 \text{ ac.}$
 $T_c = 3.9 \text{ min.}$



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**EXISTING CONDITION
 DRAINAGE MAP
 PALOMAR HEIGHTS**
 ESCONDIDO, CALIFORNIA

SHEET
1
 OF
2

PROPOSED CONDITION


```

PR-0100
*****
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(curbs-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 PIPE SIZE (NON-PRESSURE FLOW)<<<<<
-----

```

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PR-0100
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 PIPE SIZE (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

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PR-0100
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

DI STANCE 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

PR-0100
>>>>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

PR-0100
 RAINFALL INTENSITY(INCH/HR) = 4.92
 TOTAL STREAM AREA(ACRES) = 0.57
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 1.03

** CONFLUENCE DATA **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (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

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SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 1
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR For StreetFlow Section(curb-to-curb) = 0.0130
 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)<<<<<

```

>>>>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

DI STANCE 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 FRI CTION FACTOR For Streetflow Section(curb-to-curb) = 0.0130
Manning' s FRI CTION 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
    
```

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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
    
```

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*****
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

DI STANCE 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 FRI CTION FACTOR For Streetflow Section(curb-to-curb) = 0.0130
Manning' s FRI CTION 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
    
```

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** CONFLUENCE DATA **

```

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)
1	54.54	6.89	6.966
2	0.73	3.95	8.563
3	1.20	3.37	8.563

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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

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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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (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


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*****
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 11) = 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 11) = 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

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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 11) = 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 11) = 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

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 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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (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

PR-0100
 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 5 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (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 PIPE SIZE (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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (INCH/HOUR)	AREA (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 NUMBER	RUNOFF (CFS)	Tc (MIN.)	INTENSITY (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 PIPE SIZE (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

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

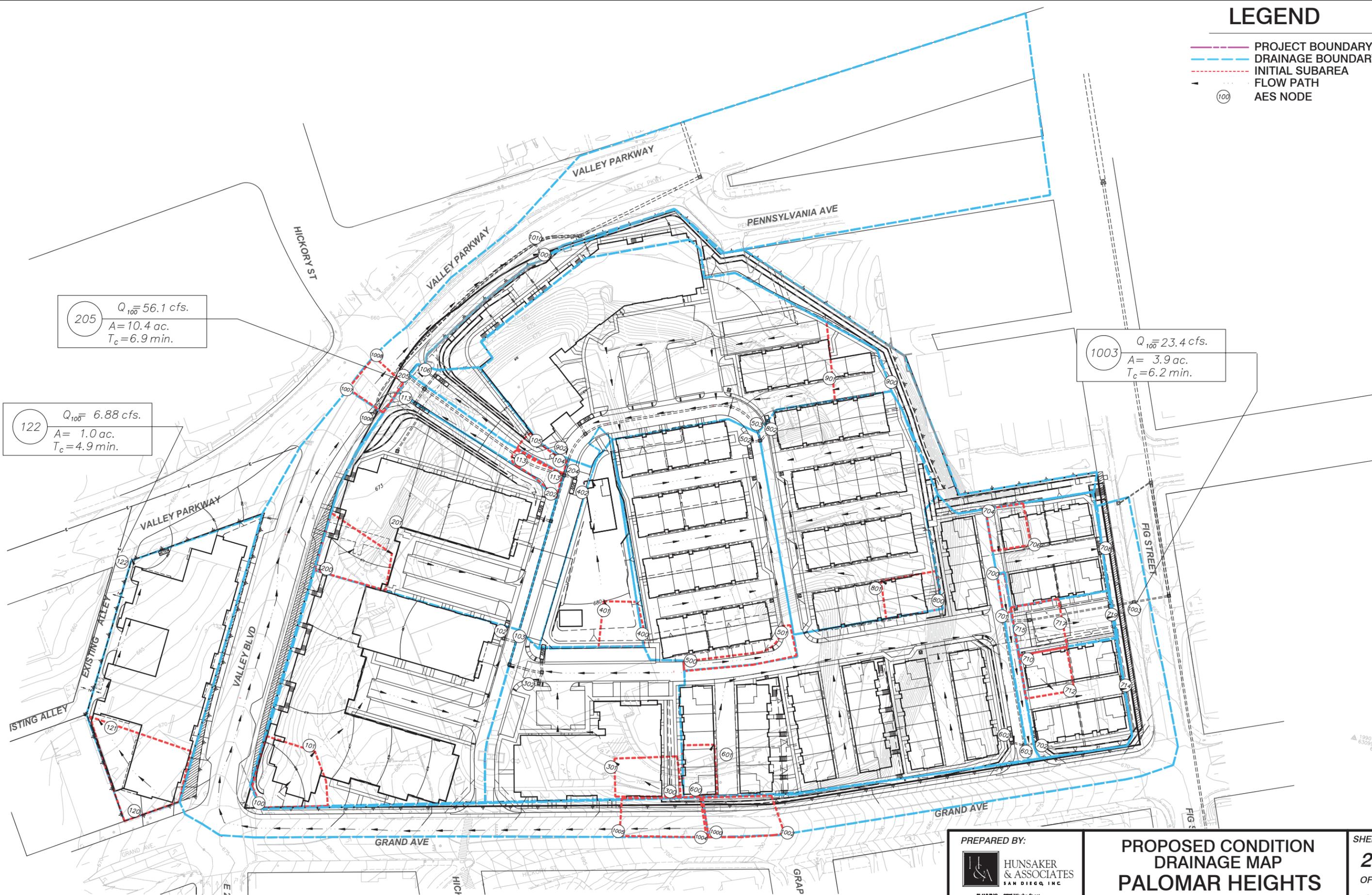
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) = 0.0130
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0130

**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.

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**PROPOSED CONDITION
 DRAINAGE MAP
 PALOMAR HEIGHTS**
 ESCONDIDO, CALIFORNIA

SHEET
2
 OF
2

