APPENDIX 6a

HYDROLOGY REPORT

HYDROLOGY REPORT AND CALCULATIONS
Preliminary Grading Stage

For the Proposed

DOVID OVED RETREAT CENTER

(APN 0296-22, Tract 2068 Lots 195, 196, &201; DRNSTY-2022-00024)

Address: TBD

City of Running Springs, California

Prepared for:

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June 6, 2022

TABLE OF CONTENTS

Part I - PROJECT SITE DESCRIPTION:

Project Description:

The Project is a proposed Retreat Center comprised of a 10,000 square-foot single-story building. It is to be located on a vacant and undeveloped property located at the southeast corner of the intersection of Cepu Road and Pine Manor Lane, in the City of Running Springs, County of San Bernardino, California. Cepu Road is an east-west street while Pine Manor Lane traverses on a south to north direction and at the point where these streets meet, it forms a T-intersection. Accesses to the building are two (2) walkways coming from Pine Manor Lane located to the west of the building. These walkways are from the existing parking spaces along the easterly side of Pine Manor Lane. Two other walkways will be from Cepu Road north of the building, one is existing and another will be part of the proposed improvement.

The Project will include grading portions of the property for the building structure, walkways, and proposed drainage improvements. Proposed improvements will include landscaping and drainage facilities addressing Best Management Practices (BMPs) concerns.

(Please refer to vicinity map on following page.)

Existing Condition:

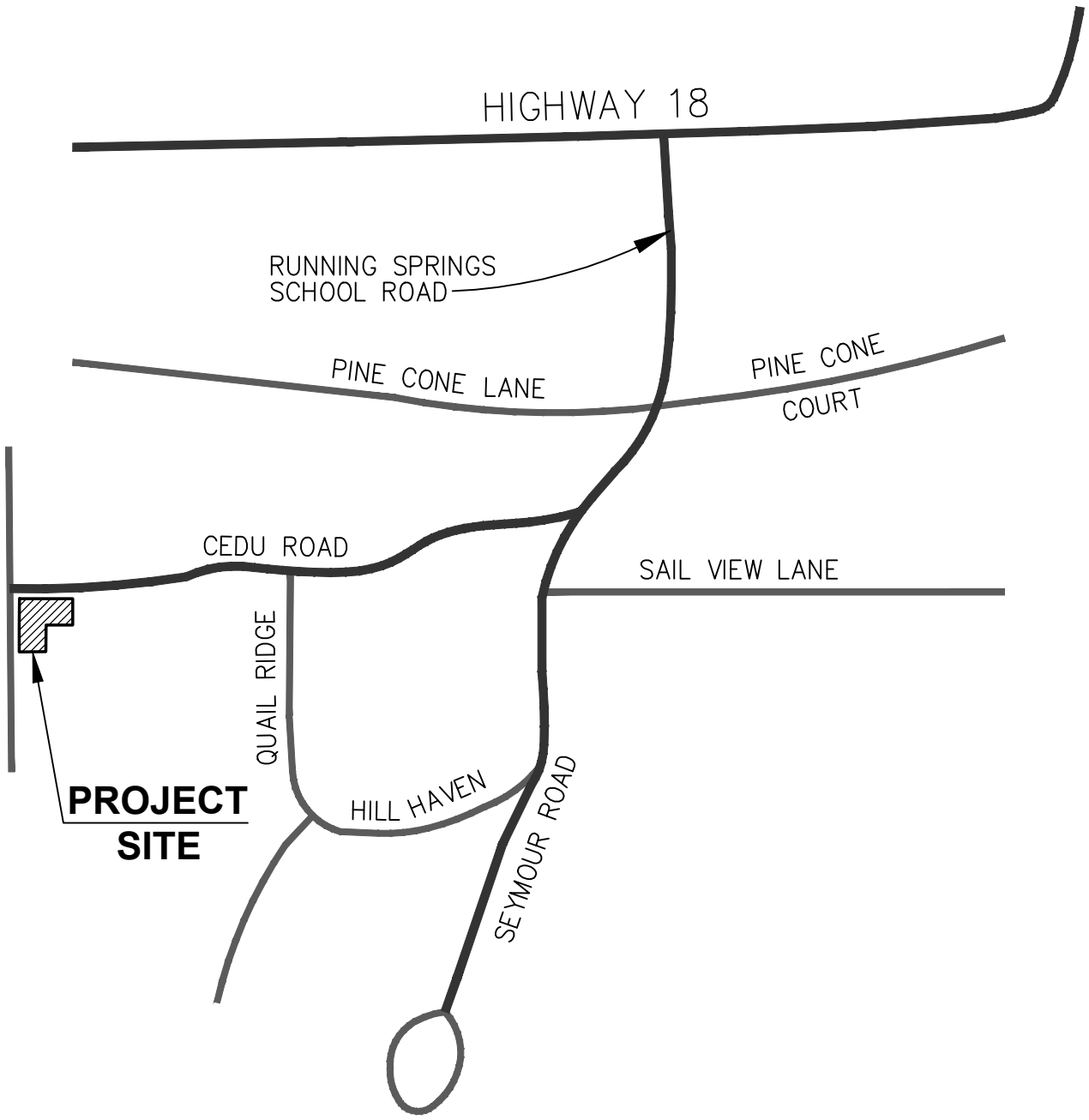
The property on which the proposed Project will be built is an undeveloped land characterized by a rolling terrain generally sloping down from the eastern side to the western side of the property. The easterly side of the property lies on a ridge at an elevation of 6,240.0 feet above sea level while the westerly side is at an elevation of 6,200.0 feet. These two points are separated by about 400 feet of horizontal distance. The existing ground cover is composed of trees sparsely distributed all over the property. No ground grass nor shrub cover is observed. The Project Site is traversed in the middle by an existing walkway crossing the property from the northern side to a southwesterly direction. This walkway defines the runoff flow into two distinct portions, in this Study (existing condition) named as Area 1, the northern side, and Area 2, the southern side. Both tributary areas drain in a westerly direction but do not confluence, hence are treated independently from each other.

Portions of Area 1 in the existing condition will be diverted to Area 2 area after the development is completed. Also, a sub-area north of the property not presently draining into Area 1, will be included in Area 1 after the completion of the Project.

Proposed Condition:

In the developed condition of the Project, the building footprint of the Retreat Center will be generally split in half between the northern tributary Area 1 and the southerly tributary Area 2. Runoff from portions of Area 1 will be diverted to the south. Likewise, the easterly part of the original Area 1 in the existing condition will no longer be draining to the same point where Area 1 drains; it will be traversing into another outlet point, Area 3. Please refer to Hydrology Map, Proposed Condition. Area 3 in the proposed condition will encompass tributary areas that will not be impacted by the proposed development; thus runoff will not be treated.

Areas 1 and 2 will be draining into retention/ detention ponds to contain runoff. These ponds will be lined with crushed rocks for filtration purposes before water is drained.



VICINITY MAP

3500 Seymour Road,
Running Springs, CA

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TT-JN 20241 02-17-2022

Part II - HYDROLOGIC CRITERIA, METHODOLOGY, and RESULTS

Criteria:

The hydrologic analyses of the Project are based on the methodology prescribed in the Hydrology Manual of San Bernardino County, 1986 Version (Manual). The software used in the calculations are the Rational Method and Small Unit Hydrograph (CH1) developed by Advanced Engineering Software (AES), 2016 version.

The Manual, under Section A.2. Hydrologic Protection Levels, mandates "…*to provide 100-year return frequency flood protection for all habitable structures …all drainage plans must demonstrate this 100-year flood protection criteria."* This study however, conducted hydrologic analyses for the existing condition and proposed condition of the Project not only for 100-year storm event but also for 2-year, 10-year, and 25-year storm frequencies. Additional parameters were used taken from an internal memo from the Water Resources Division of the County of San Bernardino, dated September 4, 1987, regarding design and construction of detention basins. This memo indicates the following criteria to be used, which in turn are applied to this Project:

- The post development peak flow rate shall be less than or equal to the 90% value of the pre-development peak discharges;
- Only 2, 10, 25, and 100-year storms need to be analyzed;
- Pre-development peak flows shall be calculated as follows:
    1. 10-year flow rates shall be calculated using 5-year rainfall;
    2. 25-year flow rates shall be calculated using 10-year rainfall;
    3. 100-year flow rates shall be calculated using 25-year rainfall and AMC II.

Although not mentioned in the memo, it is understood that the 2-year flow rates shall be calculated using 2-year rainfall, which is likewise, used in this Project. *(Note: Calculations using rainfall data mentioned above are labeled "adjusted" in its file name and headings.)*

The rainfall depths (for all the return periods under study) used in this Project were taken from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14. The rainfall data derived were based on the location of the Project Site as defined by its coordinates as follows:

34.190313° North
117.097509° West

(Please refer to the Precipitation Excerpt, located in Part III Attachment, Section A)

Methodology:

The hydrologic analyses of the site were conducted, initially for the existing condition, by determining the drainage pattern: drainage boundaries and direction of flows are established, confluence points and ultimate drainage catchments identified. In the same manner, analyses are performed using the proposed condition of the site. The later analyses provide the changes in the drainage pattern resulting from the proposed improvement of the Site.

The hydrologic analyses for the Project were performed using the Rational Method for the following reasons:

- Total tributary areas (for Areas 1, 2, and 3) do not exceed the limit established by the Manual for the use of the rational method;
- To determine the drainage pattern within the study area;
- To determine peak flows at certain points of interest within the Site;
- To determine the time of concentration at the catchment point area averaged Fm and Fp, as basis for the CH1 calculations.

Both Areas 1 and 2 (in the post development condition) are draining into catchment basins/ ponds as part of the water quality aspect of the Project. Because of this, it is essential to conduct Unit Hydrograph analyses (CH1) for both of the areas toestablish how much runoff is collected at these points. The CH1 calculations also provided the potential for running a detention pond analyses to attenuate the flow in case needed. The same input data from the Rational Method were used in the CH1 calculations. Actual sizing of the ponds will be performed in the final development of the Project. CH1 analyses were also conducted for Area 3 to determine total volume of runoff.

Area 3 in the post development stage, is originally tabled under Area 2 of the existing condition. Due to changes in the drainage pattern brought about by the development, it became a stand-alone tributary area but maintain the same point of drainage catchment. The area's land use remains the same both before and after the development. Further, no adjusted existing condition peak flow analyses were conducted for Area 3 (proposed condition).

Input Data:

The Rational Method as well as the CH1 calculations used in these Studies made use of the input data provided by the Manual. The following input data were determined:

- Tributary areas, travel length, land use (see Hydrology Maps, existing and proposed conditions)
- Soil type: **"D"** (for the entire Project Site, refer to Soil Map in the Appendix)
- Log-log slope for rational method = 0.7, for mountainous area (Section B.8 of Manual)
- Point Rainfall for 5-min, 30-min, 1-hr, 3-hr, 6-hr, and 24-hr storm duration are taken from the NOAA 14 precipitation (refer to excerpt of rainfall data in the appendix)

Summary of Study Results:

The table "Summary of Drainage Discharges," in the following page, shows the results of the various calculations conducted for these Studies. The summary includes both the results of the existing and the post-development conditions of the Project. Included too are the results of Rational Method calculations of the site for the pre-development condition using the adjusted rainfall data conforming to the requirements of the Manual memo revision of 1987.

DOVID OVED RETREAT CENTER PROJECT						29-May-22	
Running Springs, California							
Summary of Drainage Discharges, CFS							
		Area		*RATIONAL METHOD, Storm Event, Year*			
		(Ac)		*2*	*10*	*25*	*100*
Existing Condition				**Discharges Using Standard Criteria**			
	Area 1	0.67	Q, cfs	2.73	2.87	3.63	4.97
			Tc, min	8.20	8.19	8.17	8.14
	Area 2	1.18	Q, cfs	3.43	6.26	7.92	10.89
			Tc, min	6.42	6.32	6.28	6.21
				Adjusted Discharges*			
	Area 1	0.67	Q, cfs	2.73	2.19	2.87	3.63
			Tc, min	8.20	8.22	8.19	8.17
	Area 2	1.18	Q, cfs	3.43	4.37	6.26	7.92
			Tc, min	6.42	6.37	6.32	6.28
				90% of Adjusted Discharges			
	Area 1	0.67	Q, cfs	2.46	1.97	2.58	3.27
	Area 2	1.18	Q, cfs	3.09	3.93	5.63	7.13
Prop. Condition, Standard Criteria				*RATIONAL METHOD, Storm Event, Year*			
				2	*10*	*25*	*100*
	Area 1	0.49	Q, cfs	1.71	2.99	3.76	5.09
			Tc, min	5.73	5.67	5.65	5.62
	Area 2	0.55	Q, cfs	1.93	3.33	4.17	5.62
			Tc, min	5.70	5.69	5.68	5.68
	Area 3	0.82	Q, cfs	2.75	4.98	6.28	8.56
			Tc, min	5.73	5.64	5.60	5.67
				CH1 METHOD, Storm Event, Year			
				2	*10*	*25*	*100*
	Area 1	0.49	Q, cfs	1.03	1.87	2.36	3.24
			V, Af	0.15	0.18	0.24	0.45
	Area 2	0.55	Q, cfs	1.16	2.07	2.61	3.55
			V, Af	0.16	0.21	0.27	0.51
	Area 3	0.82	Q, cfs	1.59	3.04	3.85	5.32
			V, Af	0.20	0.24	0.33	0.73
		V=Volume		Af=Acre-feet			
		(*)= Using 1987 Memo Design Criteria, SBC Hydrology Manual					

Analyses and Recommendations:

As previously indicated, there are changes in flow direction within the study area, resulting from the proposed grading around the Retreat Center building. In the pre-development condition, Area 1 has an area of 0.67 Ac while Area 2 has an area of 1.18 Ac, a total of 1.85 ac. The post development condition reduced Area 1 to 0.49 Ac while Area 2 has a net area of 0.55 Ac. A substantial portion of the original (existing condition) Area 2 is tabled as a separate area, now tabled as Area 3 with an area of 0.82 Ac. The total areas of the exiting condition and post-development states remain relatively the same.

Post development Areas 1 and 2 are within the development and are treated as "disturbed" and will be fitted with catchment basins to address the BMP issues. Area 3 on the other hand remains undisturbed and will be allowed to discharge to its original flow-path and its runoff will not be treated.

The post development peak discharges were compared to the existing condition calculations with adjusted rainfall data and are further reduced to 90%. It is found that peak discharges using Rational Method for 10-, 25-, and 100-yr storm exceed the "adjusted" peak flow rates. However, the CH1 calculations are all below the adjusted peak. This will provide a benchmark for the analyses of the Project at its final design stage. Based on this preliminary analysis, the peak discharges for Areas 1 and 2 need not be attenuated.

Size of Catchment Basins:

The receiving ponds for the disturbed areas are not designed to contain the total runoff volume for the 100-year storm, much more for a multi-day storm event of the same frequency. For these studies, it is intended that runoff, after accumulating in the designated ponds, will also be allowed to overflow into the street. These retention ponds will also act as filtration galleries, addressing issues related to BMPs. The routing of flow will result in an attenuated discharge, the value of which will be determined in the final design phase of the Project. Further studies of the routing ponds involving final depth, volume/ capacity, to name a few, will be conducted to obtain the desired exit discharges.

Proposed Conveyance:

The preliminary grading plan shows 1.5-foot deep, 3-foot-wide concrete V-ditches intercepting runoff from the slopes and a 2-foot-wide earthen swale to serve the same purpose. These sizes were chosen as initial trial sizes and to indicate the need for such structures. Final dimensions for these structures will be determined in the Final Design Stage of the Project complete with hydraulics analyses for each of the chosen sizes.

PART III – ATTACHMENTS

Section A

Input Data and Information

- Rational Method Node to Node Schematics (existing and proposed conditions
- Hydrologic Soils Map with Project Site
- NOAA Atlas 14 Point Precipitation Frequency Estimate
- NOAA Atlas 14 Rainfall Data Excerpt
- Hydrology Maps (Existing and Proposed Conditions)

PRECIPITATION FREQUENCY ESTIMATES					
Excerpts from NOAA PF Estimates					
Dovid Oved Retreat Center, Running Springs, CA					
	Recurrence Interval, Years				
Duration	**2**	**5**	**10**	**25**	**100**
5-min	0.241	0.323	0.393	0.489	0.646
30-min	0.587	0.789	0.958	1.19	1.58
60-min	0.828	1.11	1.35	1.68	2.22
3-hr	1.62	2.16	2.62	3.26	4.30
6-hr	2.51	3.36	4.08	5.08	6.70
24-hr	5.43	7.49	9.16	11.50	15.00
		(precipitation in inches)			
	AMC I	2 yr, 5 yr			
	AMC II	10 yr, 25 yr, 50 yr			
	AMC III	100 yr			
Log-Log Slope=		0.7	(Mountain area)		
Project Location:					
	34.190313° N		117.097509° W		

NOAA Atlas 14, Volume 6, Version 2
Location name: Running Springs, California, USA*
Latitude: 34.1903°, Longitude: -117.0975°
Elevation: 6206.09 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.179** (0.149-0.218)	**0.241** (0.200-0.293)	**0.323** (0.267-0.395)	**0.393** (0.322-0.484)	**0.489** (0.388-0.624)	**0.566** (0.439-0.737)	**0.646** (0.489-0.862)	**0.731** (0.538-1.00)	**0.849** (0.599-1.22)	**0.945** (0.644-1.40)
10-min	**0.257** (0.213-0.313)	**0.345** (0.286-0.420)	**0.464** (0.383-0.566)	**0.563** (0.461-0.693)	**0.701** (0.556-0.894)	**0.811** (0.629-1.06)	**0.926** (0.701-1.24)	**1.05** (0.770-1.44)	**1.22** (0.859-1.74)	**1.35** (0.923-2.01)
15-min	**0.311** (0.258-0.378)	**0.417** (0.346-0.508)	**0.561** (0.463-0.685)	**0.681** (0.558-0.839)	**0.848** (0.672-1.08)	**0.981** (0.761-1.28)	**1.12** (0.847-1.49)	**1.27** (0.932-1.74)	**1.47** (1.04-2.11)	**1.64** (1.12-2.43)
30-min	**0.437** (0.363-0.532)	**0.587** (0.487-0.716)	**0.789** (0.652-0.964)	**0.958** (0.785-1.18)	**1.19** (0.946-1.52)	**1.38** (1.07-1.80)	**1.58** (1.19-2.10)	**1.78** (1.31-2.45)	**2.07** (1.46-2.97)	**2.31** (1.57-3.42)
60-min	**0.617** (0.512-0.750)	**0.828** (0.686-1.01)	**1.11** (0.920-1.36)	**1.35** (1.11-1.66)	**1.68** (1.33-2.15)	**1.95** (1.51-2.53)	**2.22** (1.68-2.97)	**2.51** (1.85-3.45)	**2.92** (2.06-4.18)	**3.25** (2.21-4.82)
2-hr	**0.937** (0.777-1.14)	**1.25** (1.03-1.52)	**1.67** (1.38-2.04)	**2.02** (1.66-2.49)	**2.52** (2.00-3.21)	**2.91** (2.26-3.79)	**3.33** (2.52-4.44)	**3.77** (2.77-5.17)	**4.39** (3.09-6.28)	**4.89** (3.33-7.24)
3-hr	**1.22** (1.01-1.48)	**1.62** (1.34-1.97)	**2.16** (1.79-2.64)	**2.62** (2.14-3.22)	**3.26** (2.58-4.15)	**3.77** (2.92-4.91)	**4.30** (3.26-5.74)	**4.87** (3.59-6.69)	**5.68** (4.01-8.13)	**6.33** (4.31-9.38)
6-hr	**1.87** (1.56-2.28)	**2.51** (2.08-3.06)	**3.36** (2.78-4.11)	**4.08** (3.34-5.02)	**5.08** (4.02-6.47)	**5.87** (4.56-7.64)	**6.70** (5.07-8.94)	**7.58** (5.58-10.4)	**8.81** (6.21-12.6)	**9.80** (6.68-14.5)
12-hr	**2.70** (2.24-3.28)	**3.69** (3.06-4.50)	**5.01** (4.14-6.13)	**6.10** (5.00-7.52)	**7.60** (6.02-9.69)	**8.77** (6.80-11.4)	**9.97** (7.55-13.3)	**11.2** (8.26-15.4)	**13.0** (9.14-18.5)	**14.3** (9.76-21.2)
24-hr	**3.86** (3.42-4.45)	**5.43** (4.80-6.26)	**7.49** (6.61-8.65)	**9.16** (8.02-10.7)	**11.5** (9.71-13.8)	**13.2** (11.0-16.3)	**15.0** (12.2-18.9)	**16.9** (13.3-21.9)	**19.5** (14.7-26.3)	**21.5** (15.7-30.0)
2-day	**4.79** (4.24-5.52)	**6.83** (6.04-7.88)	**9.54** (8.41-11.0)	**11.8** (10.3-13.7)	**14.9** (12.6-17.9)	**17.3** (14.3-21.3)	**19.8** (16.0-24.9)	**22.4** (17.7-29.0)	**26.0** (19.7-35.1)	**28.9** (21.1-40.3)
3-day	**5.26** (4.66-6.06)	**7.54** (6.67-8.70)	**10.6** (9.35-12.3)	**13.2** (11.5-15.3)	**16.7** (14.2-20.2)	**19.6** (16.2-24.1)	**22.5** (18.2-28.4)	**25.6** (20.2-33.2)	**30.0** (22.7-40.5)	**33.5** (24.5-46.7)
4-day	**5.67** (5.03-6.54)	**8.14** (7.20-9.38)	**11.5** (10.1-13.3)	**14.3** (12.5-16.6)	**18.2** (15.4-22.0)	**21.4** (17.8-26.3)	**24.7** (20.0-31.1)	**28.2** (22.3-36.5)	**33.2** (25.1-44.8)	**37.2** (27.2-51.9)
7-day	**6.64** (5.88-7.65)	**9.44** (8.35-10.9)	**13.3** (11.7-15.4)	**16.6** (14.6-19.4)	**21.4** (18.1-25.8)	**25.3** (21.0-31.1)	**29.5** (23.9-37.1)	**34.0** (26.8-44.0)	**40.5** (30.7-54.7)	**45.9** (33.6-64.0)
10-day	**7.14** (6.33-8.23)	**10.1** (8.93-11.6)	**14.2** (12.5-16.4)	**17.8** (15.6-20.7)	**23.0** (19.5-27.7)	**27.3** (22.6-33.5)	**31.9** (25.8-40.1)	**36.9** (29.1-47.8)	**44.3** (33.5-59.7)	**50.4** (36.9-70.4)
20-day	**8.84** (7.83-10.2)	**12.4** (10.9-14.3)	**17.3** (15.3-20.0)	**21.6** (18.9-25.2)	**27.9** (23.7-33.6)	**33.1** (27.5-40.7)	**38.8** (31.4-48.8)	**45.0** (35.5-58.3)	**54.1** (41.0-73.0)	**61.8** (45.2-86.2)
30-day	**10.4** (9.22-12.0)	**14.5** (12.8-16.7)	**20.2** (17.8-23.4)	**25.1** (22.0-29.3)	**32.3** (27.4-38.9)	**38.2** (31.7-47.0)	**44.6** (36.2-56.2)	**51.7** (40.7-66.9)	**62.0** (46.9-83.6)	**70.6** (51.7-98.5)
45-day	**12.6** (11.2-14.5)	**17.4** (15.4-20.1)	**24.1** (21.3-27.8)	**29.8** (26.1-34.7)	**38.0** (32.2-45.8)	**44.7** (37.1-55.0)	**51.9** (42.1-65.4)	**59.8** (47.1-77.4)	**71.2** (53.8-96.0)	**80.7** (59.0-113)
60-day	**14.8** (13.1-17.1)	**20.4** (18.0-23.5)	**27.9** (24.7-32.3)	**34.4** (30.1-40.1)	**43.5** (36.9-52.4)	**50.9** (42.3-62.6)	**58.8** (47.6-74.0)	**67.3** (53.0-87.1)	**79.5** (60.1-107)	**89.6** (65.5-125)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

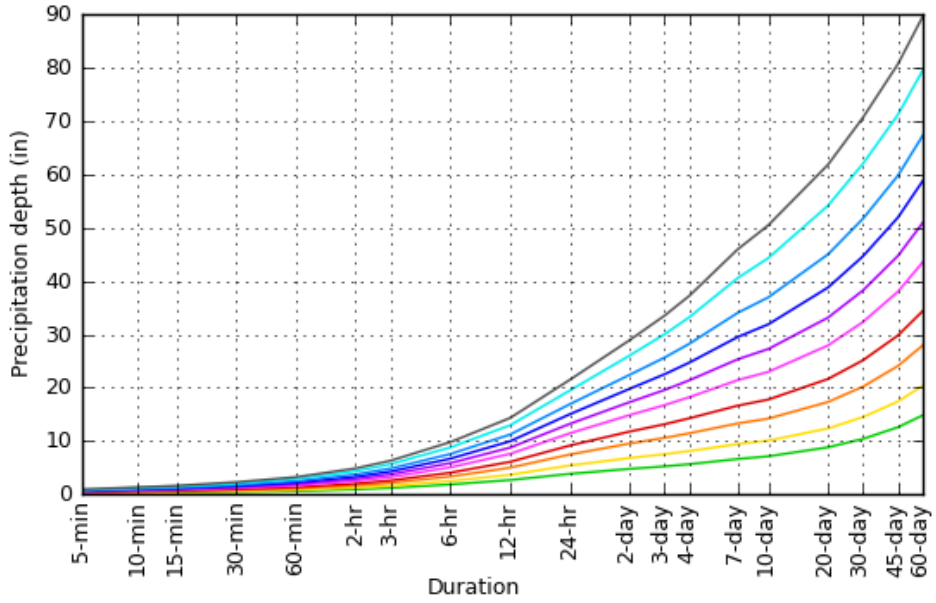
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

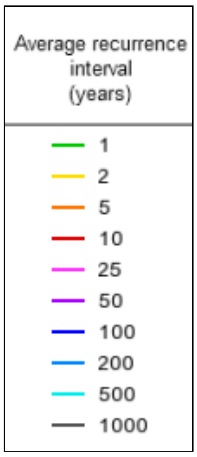
Please refer to NOAA Atlas 14 document for more information.

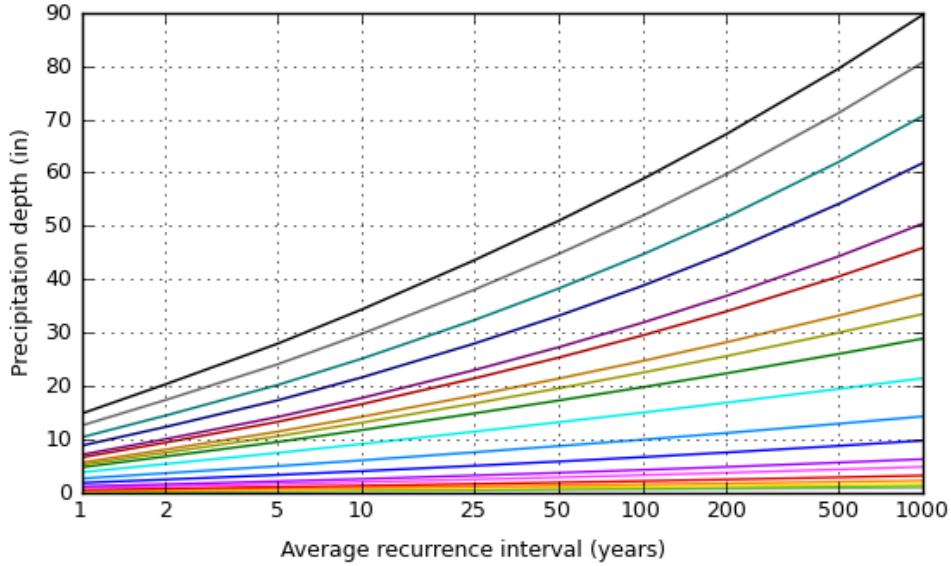
Back to Top

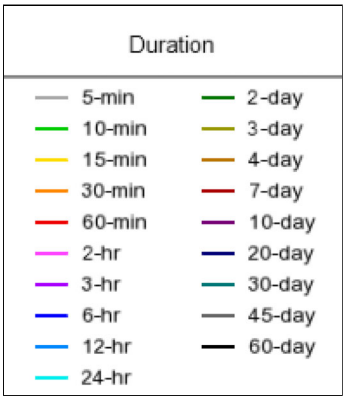
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 34.1903°, Longitude: -117.0975°









NOAA Atlas 14, Volume 6, Version 2

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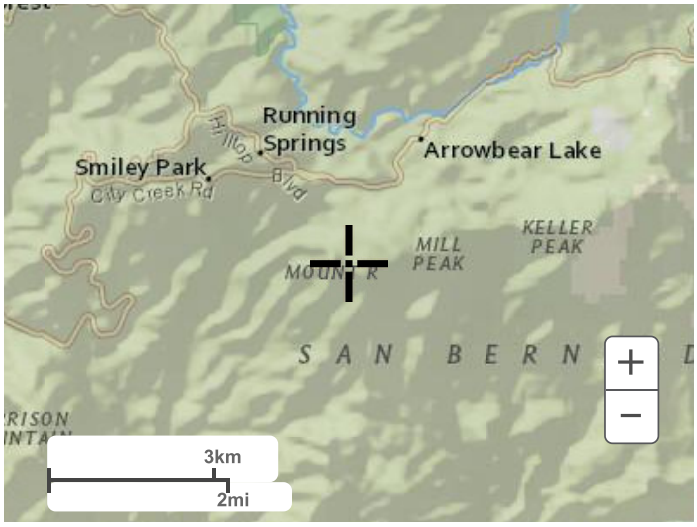
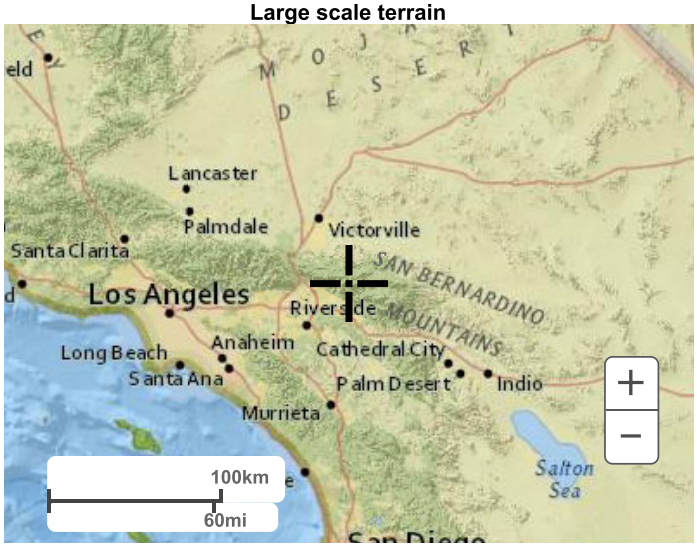
Back to Top

Maps & aerials

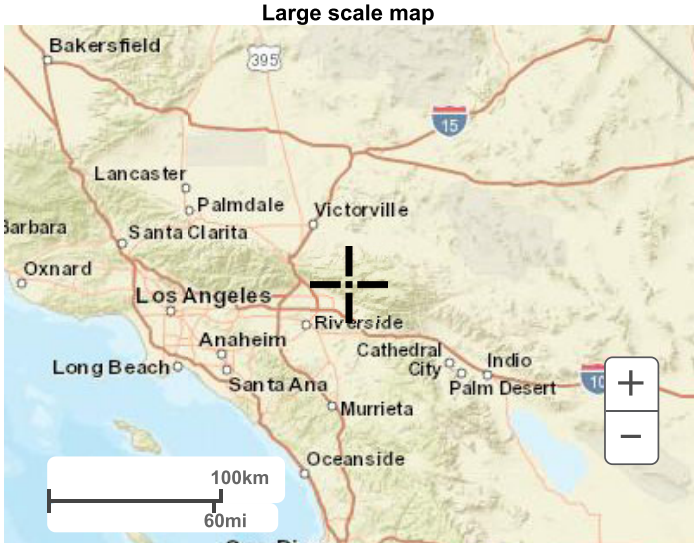
Small scale terrain



Large scale terrain

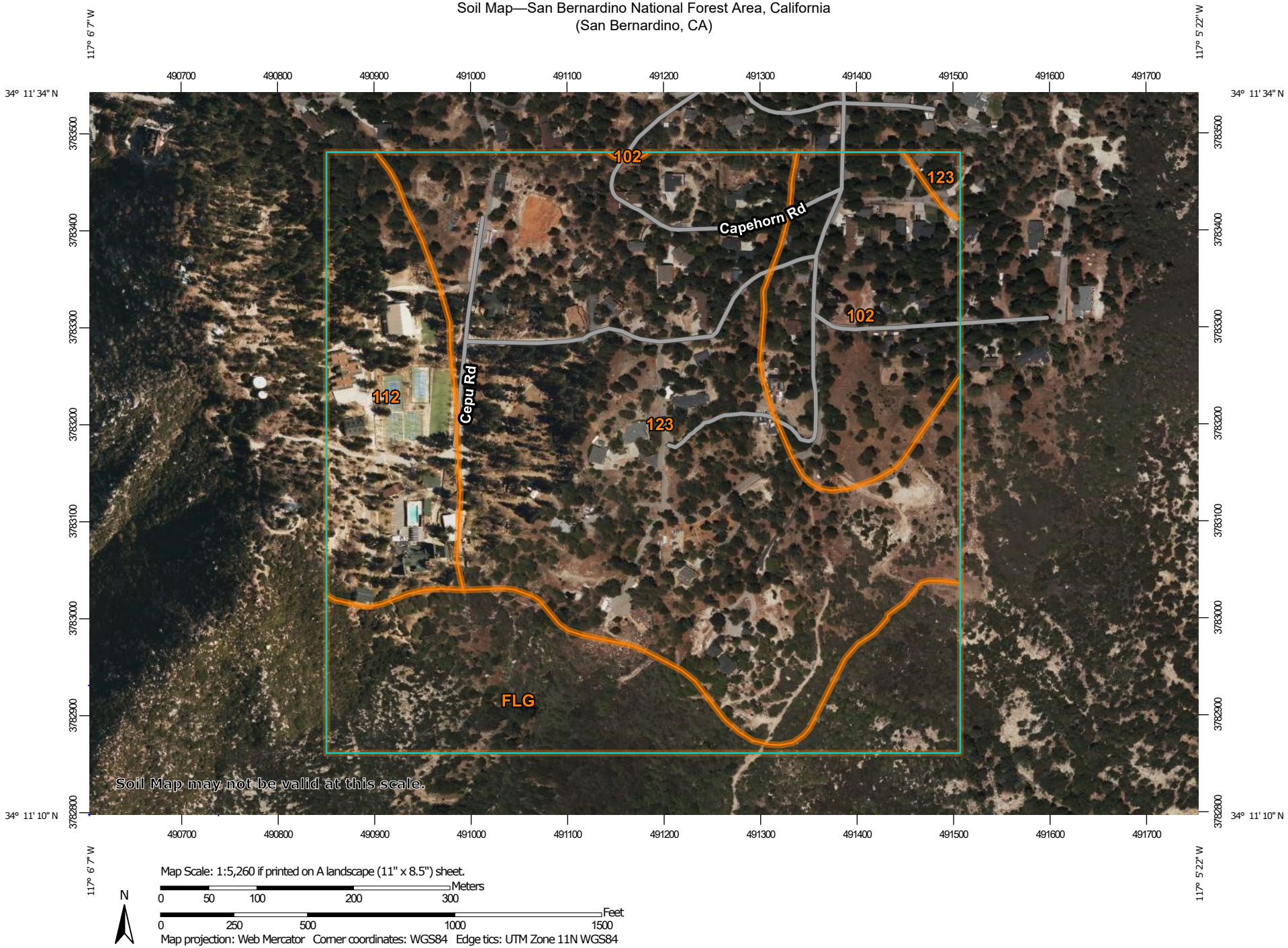


Large scale map



Large scale aerial

Soil Map—San Bernardino National Forest Area, California
(San Bernardino, CA)



Map Scale: 1:5,260 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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 Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

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 Bernardino National Forest Area, California
Survey Area Data: Version 13, Sep 13, 2021

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

Date(s) aerial images were photographed: Mar 27, 2021—May 24, 2021

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.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
102	Cedarpines-Stargazer complex, 15 to 30 percent slopes	14.5	14.3%
112	Cedarpines-Plaskett-Stargazer complex, 30 to 50 percent slopes	13.6	13.5%
123	Runningsprings-Cedarpines-Plaskett complex, 15 to 35 percent slopes	53.7	53.1%
FLG	Springdale family-Lithic Xerorthents association, dry, 50 to 75 percent slopes	19.2	19.0%
Totals for Area of Interest		**101.0**	**100.0%**

San Bernardino National Forest Area, California

123—Runningsprings-Cedarpines-Plaskett complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2dvmf
Elevation: 4,620 to 6,770 feet
Mean annual precipitation: 25 to 43 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Runningsprings and similar soils: 45 percent
Cedarpines and similar soils: 25 percent
Plaskett and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Runningsprings

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granitoid

Typical profile

A - 0 to 9 inches: sandy loam
Bw - 9 to 18 inches: sandy loam
Cr - 18 to 28 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 10 to 20 inches to paralithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D

Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Cedarpines

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium and/or residuum weathered from granitoid

Typical profile

A - 0 to 5 inches: cobbly sandy loam
Bw - 5 to 20 inches: cobbly sandy loam
C - 20 to 24 inches: extremely cobbly sand
Cr - 24 to 39 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: 24 inches to paralithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Description of Plaskett

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from granitoid

Typical profile

Oi - 0 to 4 inches: slightly decomposed plant material
A - 4 to 13 inches: very gravelly sandy loam
AB - 13 to 23 inches: very gravelly sandy loam
R - 23 to 33 inches: bedrock

Properties and qualities

Slope: 15 to 35 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: 12 to 28 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to low (0.00 to 0.01 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F019XG914CA - Loamy Hills >30"ppt
Hydric soil rating: No

Minor Components

Heapspeak

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Stargazer

Percent of map unit: 5 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Canyonspring

Percent of map unit: 3 percent
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent

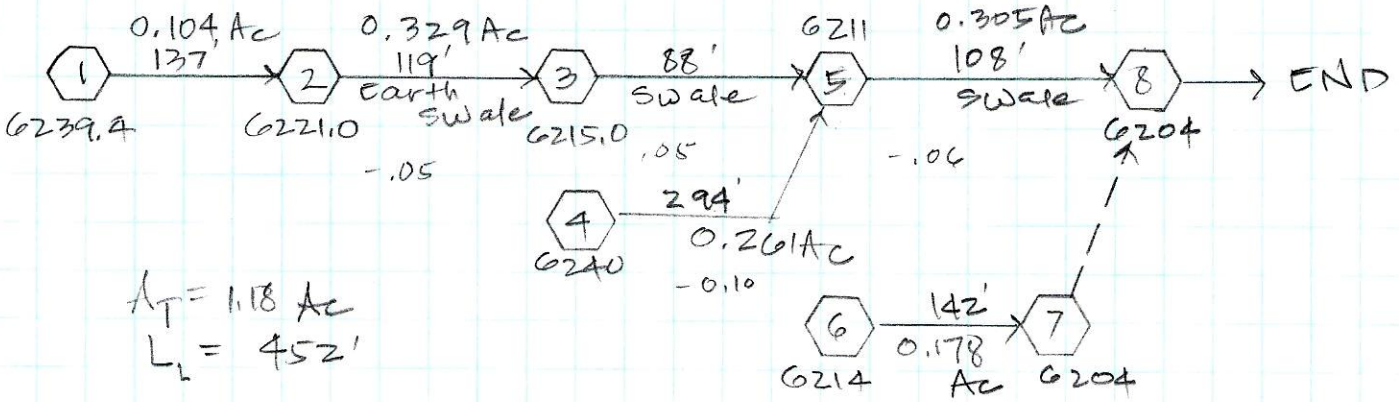
Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex

Data Source Information

Soil Survey Area: San Bernardino National Forest Area, California
Survey Area Data: Version 13, Sep 13, 2021

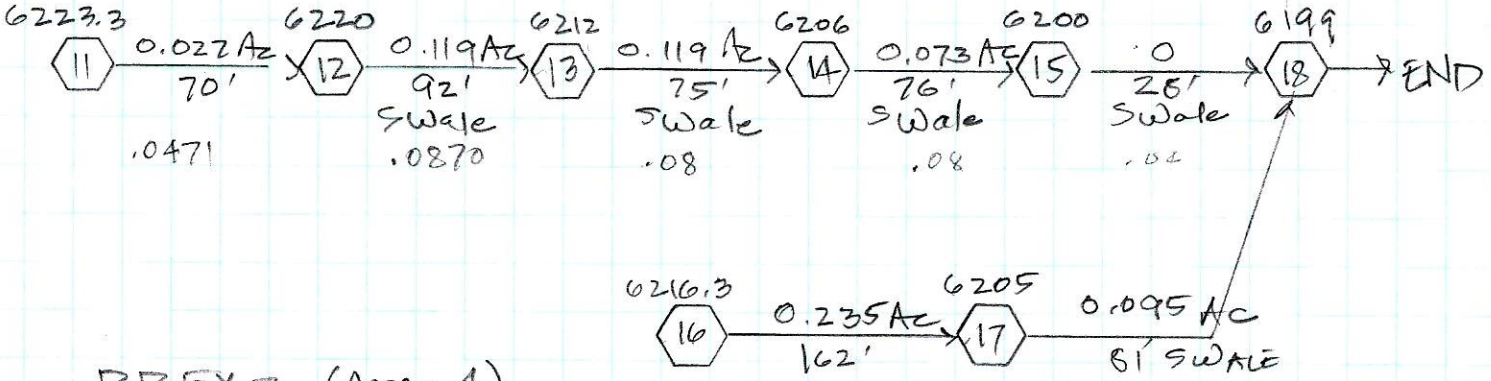
RUNNING SPRINGS
RETREAT CENTER
HYDROLOGY SCHEMATICS - EXISTING CONDITION

Soil type for entire project = "D"



A_T = 1.18 Ac
L_L = 452'

RREX1
(Area 2)



RREX2 (Area 1)

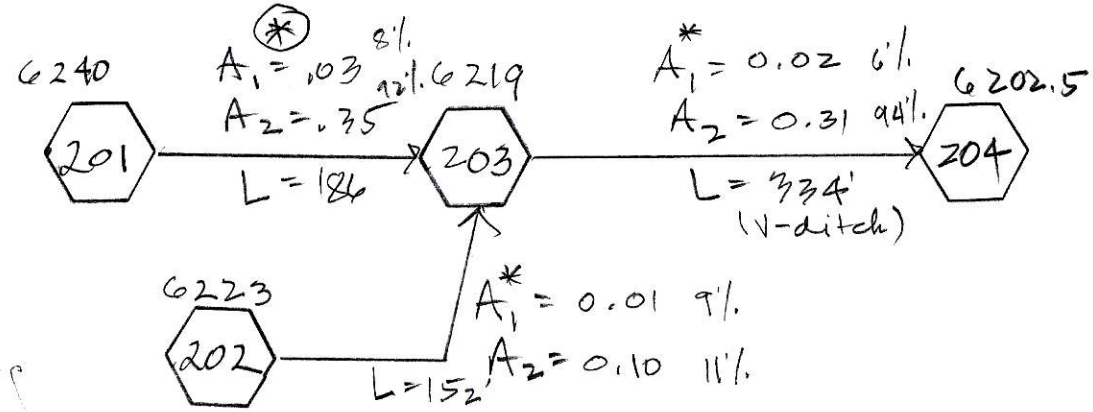
A_T = 0.67 Ac

A_T = 0.668 ; L_L = 341'

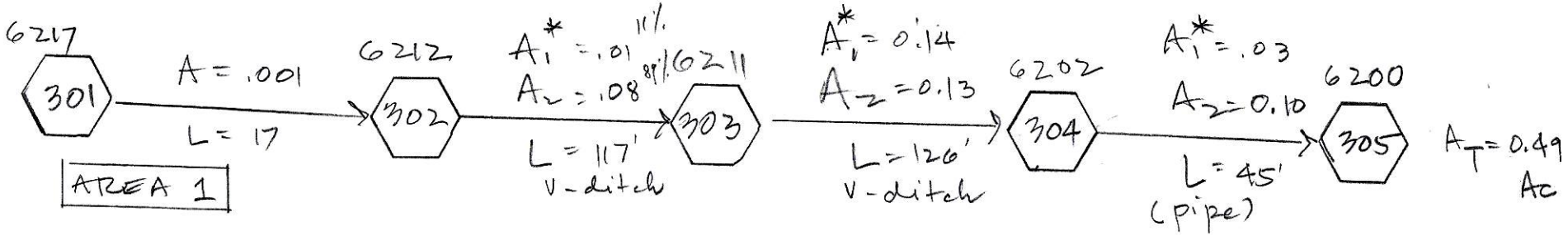
SOIL TYPE = "D"

	AMC
100-YR	3
OTHERS	2

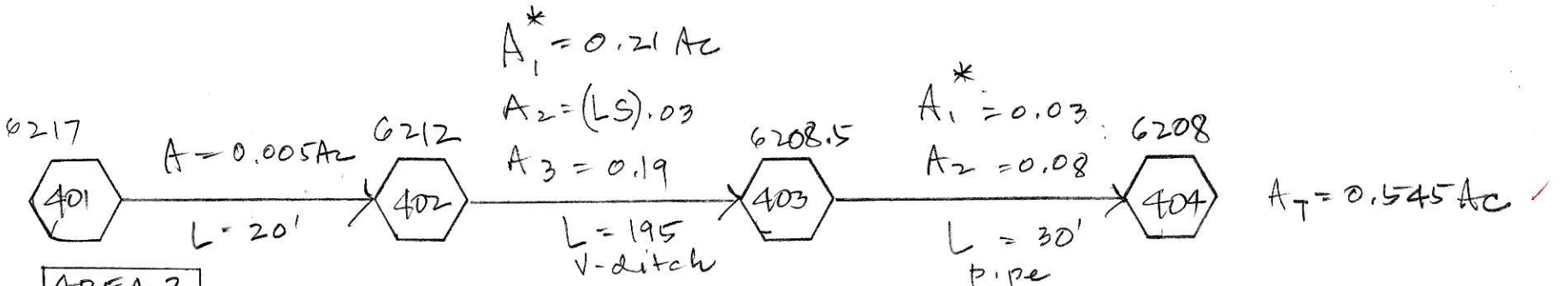
MARCH 2022



SOIL TYPE = "D"



AREA 1



AREA 2

HYDROLOGY RUNS
PROPOSED CONDITION

Total Imp = 20,910 sf
(0.48 Ac)

(*) A_1 = Impervious → DG + conc. ditches, Bldg
LS = Landscaped AREAS, etc.

AREA 1
30151.14 SF
0.692 Ac

AREA 2
54025.32 SF
1.24 Ac

AREA LIMIT

* TRIBUTARY AREA BOUNDARY
DERIVED FROM U.S.G.S. MAP
KELLER PEAK QUADRANGLE
CALIFORNIA-SA BERNARDINO CO.

	ELEV.
1	6239.4
2	6221.0
3	6215.0
4	
5	6211.0
6	6214.0
7	6293.5
8	6204.0
11	
12	6220.0
13	6212.0
14	6206.0
16	6200.0
17	6205.0
18	6200.0

H.P.

NORTH
SCALE: 1" = 20'

20' 0' 20' 40' 60'
GRAPHIC SCALE: 1" = 20'

DATE	REVISIONS

TRANSTECH
413 MACKAY DRIVE.
SAN BERNARDINO, CA. 92408
(909) 384-7464

SAN BERNARDINO COUNTY
PRELIMINARY HYDROLOGY MAP
EXISTING CONDITION - USGS TOPO OVERLAY
RUNNING SPRINGS RETREAT
RUNNING SPRINGS, CALIFORNIA

DRAWN BY:	DATE:	SCALE:	SHEET:	JOB NO.
G.A./A.C.	06-08-2022	AS SHOWN	1 OF 1	19091

AREA 1
A=0.49 Ac

AREA 2
A=0.545 Ac

AREA 3
A=0.82 Ac

AREA 1B
15750.69 SF
0.36 Ac

SINGLE STORY
RETREAT HOUSE

ENTRY
DECK

OUTDOOR
SEATING
AREA

IMPERVIOUS = 0.14 Ac
PERVIOUS = 0.13 Ac

IMPERVIOUS = 0.30 Ac
PERVIOUS = 0.10 Ac

IMPERVIOUS = 0.21 Ac
LS = 0.03 Ac
PERVIOUS = 0.19 Ac

IMPERVIOUS = 0.01 Ac
PERVIOUS = 0.10 Ac

IMPERVIOUS = 0.01 Ac
PERVIOUS = 0.10 Ac

IMPERVIOUS = 0.03 Ac
PERVIOUS = 0.35 Ac

IMPERVIOUS = 0.02 Ac
PERVIOUS = 0.31 Ac

IMPERVIOUS = 0.08 Ac
PERVIOUS = 0.03 Ac

BASIN
BOTTOM
ELEV:
6200.0

BASIN
BOTTOM
ELEV:
6208.5

BOT.
ELEV:
6207.5

BASIN
ELEV:
6206.5

BOT.
ELEV:
6204.5

L=45'
L=126'
L=152'
L=117'
L=17'
L=96'
L=191'
L=186'
L=157'
L=334'

EXISTING A.C. PAVEMENT

EXIST. DG TRAIL

VIEW DG TRAIL

WEST COAST TORAH RETREAT
RECREATION AREA

A.P.N. 0298 - 221 - 66

A.P.N. 0298 - 221 - 38

HT / SD RES

HT / RC

HC

TYP

NORTH
SCALE: 1" = 20'

GRAPHIC SCALE: 1" = 20'

DATE	REVISIONS

TRANSTECH
413 MACKAY DRIVE.
SAN BERNARDINO, CA. 92408
(909) 384-7464

SAN BERNARDINO COUNTY

PRELIMINARY HYDROLOGY MAP
PROPOSED CONDITION - USGS TOPO OVERLAY
RUNNING SPRINGS RETREAT
RUNNING SPRINGS, CALIFORNIA

DRAWN BY:	DATE:	SCALE:	SHEET:	JOB NO.
G.A./A.C.	06-08-2022	AS SHOWN	1 OF 1	19091

PART III – ATTACHMENTS

Section B

Rational Method Calculations
2-, 10-, 25- and 100-Year Storm Analyses
(Existing and Post-Development Conditions, including “Adjusted”
Rainfall Data Input for Existing Condition)

```
**********************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0 Release Date: 07/01/2016 License ID 1542
```


Analysis prepared by:
TRANSTECH ENGINEERS
413 Mackay Drive
San Bernardino, CA 92408
Tel No. (909) 384-7464


```
 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                    *
* RUNNING SPRINGS, CALIFORNIA                                          *
* AREA 1, EXISTING CONDITION                                           *
 **********************************************************************

  FILE NAME: RREX2.DAT
  TIME/DATE OF STUDY: 10:39 05/26/2022
======================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
======================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) = 12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE (LOG(I; IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3500

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**********************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE = 21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
======================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.30 DOWNSTREAM(FEET) =   6220.00
```

```
  Tc = K*[(LENGTH** 3.00)/ (ELEVATION CHANGE)] **0.20
  SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) =    7.115
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) = 6.005
  SUBAREA Tc AND LOSS RATE DATA (AMC I):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND, GRASS"           D        0.03      0.59     1.000    66    7.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.03   PEAK FLOW RATE(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE = 52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6220.00 DOWNSTREAM(FEET) =   6212.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE = 0.0870
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.13
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.35   Tc (MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.46
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  5.808
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            D        0.12      0.59     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.56
  EFFECTIVE AREA(ACRES) =      0.15   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.1       PEAK FLOW RATE(CFS) =       0.69

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    75.00   CHANNEL SLOPE =  0.0800
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.69
  FLOW VELOCITY(FEET/SEC) =   4.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    7.76
```

```
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =     237.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.76
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  5.653
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.12      0.59     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.54
 EFFECTIVE AREA(ACRES) =      0.26   AREA-AVERAGED Fm(INCH/HR) =  0.59
 AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.21

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6206.00  DOWNSTREAM(FEET) =   6200.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0789
 CHANNEL FLOW THRU SUBAREA(CFS) =       1.21
 FLOW VELOCITY(FEET/SEC) =   4.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    8.05
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =     313.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.05
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  5.510
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.07      0.59     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.32
 EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.59
 AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.50

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   6200.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    28.00   CHANNEL SLOPE =  0.0357
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.50
  FLOW VELOCITY(FEET/SEC) =   3.07 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.15   Tc(MIN.) =    8.20
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =     341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =   6216.30  DOWNSTREAM(FEET) =   6205.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.202
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  5.015
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.23      0.59     1.000    66    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6205.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    81.00   CHANNEL SLOPE =  0.0741
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.94
  FLOW VELOCITY(FEET/SEC) =   4.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.33   Tc(MIN.) =    9.53
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.53
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.893
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

```
  NATURAL FAIR COVER
  "WOODLAND, GRASS"           D        0.09      0.59     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.37
  EFFECTIVE AREA(ACRES) =      0.33   AREA-AVERAGED Fm (INCH/HR) = 0.59
  AREA-AVERAGED Fp (INCH/HR) = 0.59 AREA-AVERAGED Ap = 1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.28

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NOD      18.00 IS CODE = 11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp (Fm)   Ap     Ae     HEADWATER
   NUMBER    (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.28    9.53    4.893 0.59(0.59) 1.00       0.3      16.00
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp (Fm)  Ap     Ae     HEADWATER
   NUMBER    (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.50    8.20    5.438 0.59(0.59) 1.00       0.3      11.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp (Fm)     Ap     Ae     HEADWATER
   NUMBER   (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.73    8.20    5.438 0.59(0.59) 1.00       0.6      11.00
      2        2.61    9.53    4.893 0.59(0.59) 1.00       0.7      16.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        2.73  Tc(MIN.) =    8.198
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES) =        0.7 TC(MIN.) =      8.20
  EFFECTIVE AREA(ACRES) =      0.62 AREA-AVERAGED Fm (INCH/HR) = 0.59
  AREA-AVERAGED Fp (INCH/HR) = 0.59 AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS) =       2.73

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp (Fm) Ap     Ae     HEADWATER
   NUMBER (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.73    8.20    5.438 0.59(0.59) 1.00       0.6      11.00
      2        2.61    9.53    4.893 0.59(0.59) 1.00       0.7      16.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**********************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1542

                              Analysis prepared by:
                            TRANSTECH ENGINEERS
                              413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA 1, EXISTING CONDITION                                            *
 ************************************************************************

  FILE NAME: RREX2.DAT
  TIME/DATE OF STUDY: 10:56 05/26/2022
======================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
======================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3500

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**********************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
======================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.30  DOWNSTREAM(FEET) =   6220.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.115
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  6.005
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.03      0.34     1.000    82    7.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.03   PEAK FLOW RATE(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6220.00  DOWNSTREAM(FEET) =   6212.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE =  0.0870
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.14
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.808
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      0.15   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.1       PEAK FLOW RATE(CFS) =       0.72

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    75.00   CHANNEL SLOPE =  0.0800
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.72
  FLOW VELOCITY(FEET/SEC) =   4.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    7.76
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =     237.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.76
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.653
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.57
  EFFECTIVE AREA(ACRES) =      0.26   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.27

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6206.00  DOWNSTREAM(FEET) =   6200.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0789
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.27
  FLOW VELOCITY(FEET/SEC) =   4.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    8.04
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =     313.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.04
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.511
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.07      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.34
  EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.57

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6200.00  DOWNSTREAM(FEET) =   6199.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =    28.00   CHANNEL SLOPE =  0.0357
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.57
  FLOW VELOCITY(FEET/SEC) =   3.10 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.15   Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =     341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =   6216.30  DOWNSTREAM(FEET) =   6205.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.202
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.015
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.23      0.34     1.000    82    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6205.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    81.00   CHANNEL SLOPE =  0.0741
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.99
  FLOW VELOCITY(FEET/SEC) =   4.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.33   Tc(MIN.) =    9.53
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.53
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.893
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
```

```
  "WOODLAND,GRASS"           D        0.09      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =      0.33   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.35

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.35    9.53    4.893  0.34( 0.34) 1.00       0.3      16.00
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.57    8.19    5.440  0.34( 0.34) 1.00       0.3      11.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.87    8.19    5.440  0.34( 0.34) 1.00       0.6      11.00
      2        2.75    9.53    4.893  0.34( 0.34) 1.00       0.7      16.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        2.87  Tc(MIN.) =    8.194
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.7  TC(MIN.) =      8.19
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR)=  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       2.87

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.87    8.19    5.440  0.34( 0.34) 1.00       0.6      11.00
      2        2.75    9.53    4.893  0.34( 0.34) 1.00       0.7      16.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
*****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1542

                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA 1, EXISTING CONDITION, ADJUSTED RAINFALL                         *
 *************************************************************************

  FILE NAME: RREX2.DAT
  TIME/DATE OF STUDY: 18:06 05/26/2022
=============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1100 (5-YR 1-HR)

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

*****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.30  DOWNSTREAM(FEET) =   6220.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.115
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.938
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.03      0.59     1.000    66    7.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.11
  TOTAL AREA(ACRES) =      0.03   PEAK FLOW RATE(CFS) =      0.11

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6220.00  DOWNSTREAM(FEET) =   6212.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE =  0.0870
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.11
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.46
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.776
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.59     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =      0.15   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.1       PEAK FLOW RATE(CFS) =       0.55

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    75.00   CHANNEL SLOPE =  0.0800
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.55
  FLOW VELOCITY(FEET/SEC) =   4.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    7.76
```

```
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =     237.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.76
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.648
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.12      0.59     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.43
 EFFECTIVE AREA(ACRES) =      0.26   AREA-AVERAGED Fm(INCH/HR) =  0.59
 AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       0.97

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6206.00  DOWNSTREAM(FEET) =   6200.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0789
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.97
 FLOW VELOCITY(FEET/SEC) =   4.21 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =    8.06
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =     313.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.06
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.526
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.07      0.59     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.26
 EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.59
 AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.20

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6200.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    28.00   CHANNEL SLOPE =  0.0357
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.20
  FLOW VELOCITY(FEET/SEC) =   2.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.16   Tc(MIN.) =    8.22
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =     341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==========================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =   6216.30  DOWNSTREAM(FEET) =   6205.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.202
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.124
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.23      0.59     1.000    66    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.75
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.75

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6205.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    81.00   CHANNEL SLOPE =  0.0741
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.75
  FLOW VELOCITY(FEET/SEC) =   4.08 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.33   Tc(MIN.) =    9.53
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =    9.53
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.023
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)   (INCH/HR)   (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"          D        0.09      0.59      1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.29
  EFFECTIVE AREA(ACRES) =      0.33   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.02

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.02    9.53    4.023  0.59( 0.59) 1.00       0.3      16.00
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.20    8.22    4.465  0.59( 0.59) 1.00       0.3      11.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.19    8.22    4.465  0.59( 0.59) 1.00       0.6      11.00
      2        2.08    9.53    4.023  0.59( 0.59) 1.00       0.7      16.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        2.19  Tc(MIN.) =    8.216
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.7  TC(MIN.) =      8.22
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR)=  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       2.19

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        2.19    8.22    4.465  0.59( 0.59) 1.00       0.6      11.00
      2        2.08    9.53    4.023  0.59( 0.59) 1.00       0.7      16.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1542
```


Analysis prepared by:
TRANSTECH ENGINEERS
413 Mackay Drive
San Bernardino, CA 92408
Tel No. (909) 384-7464


```
 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA 1, EXISTING CONDITION                                            *
 ************************************************************************

  FILE NAME: RREX2.DAT
  TIME/DATE OF STUDY: 11:09 05/26/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.6800

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.30  DOWNSTREAM(FEET) =   6220.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.115
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  7.473
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.03      0.34     1.000    82    7.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.03   PEAK FLOW RATE(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6220.00  DOWNSTREAM(FEET) =   6212.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE =  0.0870
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.17
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.46
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  7.228
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.74
  EFFECTIVE AREA(ACRES) =      0.15   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.1       PEAK FLOW RATE(CFS) =       0.90

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    75.00   CHANNEL SLOPE =  0.0800
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.90
  FLOW VELOCITY(FEET/SEC) =   4.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    7.76
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =     237.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  7.035
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.72
  EFFECTIVE AREA(ACRES) =      0.26   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.60

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6206.00  DOWNSTREAM(FEET) =   6200.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0789
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.60
  FLOW VELOCITY(FEET/SEC) =   4.62 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.27   Tc(MIN.) =    8.03
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =     313.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.03
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  6.866
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.07      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.43
  EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.98

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6200.00  DOWNSTREAM(FEET) =   6199.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =    28.00   CHANNEL SLOPE =  0.0357
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.98
  FLOW VELOCITY(FEET/SEC) =   3.25 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.14   Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =     341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =   6216.30  DOWNSTREAM(FEET) =   6205.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.202
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  6.241
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.23      0.34     1.000    82    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.25

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6205.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    81.00   CHANNEL SLOPE =  0.0741
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.25
  FLOW VELOCITY(FEET/SEC) =   4.26 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.32   Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.52
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  6.095
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.09      0.34     1.000    82
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.49
  EFFECTIVE AREA(ACRES) =      0.33   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.71

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.71    9.52    6.095  0.34( 0.34) 1.00       0.3      16.00
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.98    8.17    6.781  0.34( 0.34) 1.00       0.3      11.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.63    8.17    6.781  0.34( 0.34) 1.00       0.6      11.00
      2        3.48    9.52    6.095  0.34( 0.34) 1.00       0.7      16.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        3.63  Tc(MIN.) =    8.174
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.7  TC(MIN.) =      8.17
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR)=  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       3.63

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.63    8.17    6.781  0.34( 0.34) 1.00       0.6      11.00
      2        3.48    9.52    6.095  0.34( 0.34) 1.00       0.7      16.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**********************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1542
```


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```
 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                    *
* RUNNING SPRINGS, CALIFORNIA                                          *
* AREA 1, EXISTING CONDITION                                           *
 ************************************************************************

  FILE NAME: RREX2.DAT
  TIME/DATE OF STUDY: 11:16 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.2200

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**********************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.30  DOWNSTREAM(FEET) =   6220.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.115
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  9.875
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.03      0.14     1.000    95    7.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.03   PEAK FLOW RATE(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6220.00  DOWNSTREAM(FEET) =   6212.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE =  0.0870
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.24
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  9.552
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.14     1.000    95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    1.01
  EFFECTIVE AREA(ACRES) =      0.15   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.1       PEAK FLOW RATE(CFS) =       1.24

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    75.00   CHANNEL SLOPE =  0.0800
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.24
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.28   Tc(MIN.) =    7.74
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =     237.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.74
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  9.306
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.14     1.000    95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.98
  EFFECTIVE AREA(ACRES) =      0.26   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       2.19

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6206.00  DOWNSTREAM(FEET) =   6200.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0789
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.19
  FLOW VELOCITY(FEET/SEC) =   4.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.26   Tc(MIN.) =    8.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =     313.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  9.096
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.07      0.14     1.000    95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.59
  EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       2.72

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6200.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    28.00   CHANNEL SLOPE =  0.0357
```

```
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.72
  FLOW VELOCITY(FEET/SEC) =   3.47 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.13   Tc(MIN.) =    8.14
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =     341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =   6216.30  DOWNSTREAM(FEET) =   6205.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.202
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.248
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.23      0.14     1.000    95    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.71
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.71

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6205.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    81.00   CHANNEL SLOPE =  0.0741
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.71
  FLOW VELOCITY(FEET/SEC) =   4.54 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  8.066
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.09      0.14     1.000    95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.68
  EFFECTIVE AREA(ACRES) =      0.33   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       2.35

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.35    9.50    8.066  0.14( 0.14) 1.00       0.3      16.00
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.72    8.14    8.990  0.14( 0.14) 1.00       0.3      11.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.97    8.14    8.990  0.14( 0.14) 1.00       0.6      11.00
      2        4.79    9.50    8.066  0.14( 0.14) 1.00       0.7      16.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        4.97  Tc(MIN.) =    8.136
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.7  TC(MIN.) =      8.14
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR)=  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       4.97

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.97    8.14    8.990  0.14( 0.14) 1.00       0.6      11.00
      2        4.79    9.50    8.066  0.14( 0.14) 1.00       0.7      16.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**********************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1542

                              Analysis prepared by:
                            TRANSTECH ENGINEERS
                              413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA 1, EXISTING CONDITION, ADJUSTED RAINFALL                         *
 **********************************************************************

  FILE NAME: RREX2.DAT
  TIME/DATE OF STUDY: 17:52 05/26/2022
======================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
======================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.6800 (FOR 25-YR STORM)

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**********************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
======================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    70.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.30  DOWNSTREAM(FEET) =   6220.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.115
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.473
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.03      0.34     1.000    82    7.11
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.03   PEAK FLOW RATE(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6220.00  DOWNSTREAM(FEET) =   6212.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    92.00   CHANNEL SLOPE =  0.0870
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.17
  FLOW VELOCITY(FEET/SEC) =   4.42 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.35   Tc(MIN.) =    7.46
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =     162.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.46
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.228
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.12      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.74
  EFFECTIVE AREA(ACRES) =      0.15   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.1       PEAK FLOW RATE(CFS) =       0.90

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6206.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    75.00   CHANNEL SLOPE =  0.0800
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.90
  FLOW VELOCITY(FEET/SEC) =   4.24 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.29   Tc(MIN.) =    7.76
```

```
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =     237.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  7.035
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.12      0.34     1.000    82
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.72
 EFFECTIVE AREA(ACRES) =      0.26   AREA-AVERAGED Fm(INCH/HR) =  0.34
 AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.60

****************************************************************************
 FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6206.00  DOWNSTREAM(FEET) =   6200.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =    76.00   CHANNEL SLOPE =  0.0789
 CHANNEL FLOW THRU SUBAREA(CFS) =       1.60
 FLOW VELOCITY(FEET/SEC) =   4.62 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.27   Tc(MIN.) =    8.03
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =     313.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.03
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.866
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.07      0.34     1.000    82
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.43
 EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.34
 AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.98

****************************************************************************
 FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   6200.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    28.00   CHANNEL SLOPE =  0.0357
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.98
  FLOW VELOCITY(FEET/SEC) =   3.25 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.14   Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =     341.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   162.00
  ELEVATION DATA: UPSTREAM(FEET) =   6216.30  DOWNSTREAM(FEET) =   6205.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.202
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.241
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.23      0.34     1.000    82    9.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.25

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6205.00  DOWNSTREAM(FEET) =   6199.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    81.00   CHANNEL SLOPE =  0.0741
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.25
  FLOW VELOCITY(FEET/SEC) =   4.26 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.32   Tc(MIN.) =    9.52
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.52
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.095
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
```

```
  "WOODLAND,GRASS"           D        0.09      0.34     1.000    82
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.49
  EFFECTIVE AREA(ACRES) =      0.33   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.71

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.71    9.52    6.095  0.34( 0.34) 1.00       0.3      16.00
  LONGEST FLOWPATH FROM NODE     16.00 TO NODE     18.00 =     243.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.98    8.17    6.781  0.34( 0.34) 1.00       0.3      11.00
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.63    8.17    6.781  0.34( 0.34) 1.00       0.6      11.00
      2        3.48    9.52    6.095  0.34( 0.34) 1.00       0.7      16.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        3.63  Tc(MIN.) =    8.174
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =     341.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.7  TC(MIN.) =      8.17
  EFFECTIVE AREA(ACRES) =      0.62  AREA-AVERAGED Fm(INCH/HR)=  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =       3.63

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.63    8.17    6.781  0.34( 0.34) 1.00       0.6      11.00
      2        3.48    9.52    6.095  0.34( 0.34) 1.00       0.7      16.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**********************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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                          Analysis prepared by:

                          TRANSTECH ENGINEERS
                            413 Mackay Drive
                          San Bernardino, CA 92408
                           Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER                                             *
* RUNNING SPRINGS CALIFORNIA                                            *
* PRELIMINARY GRADING ANALYSIS, EXISTING CONDITION, AREA NO. 2          *
 ************************************************************************

  FILE NAME: RREX1.DAT
  TIME/DATE OF STUDY: 14:40 05/25/2022
======================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
======================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG (Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8280

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

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

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

**********************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
======================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   137.00
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   6239.40  DOWNSTREAM(FEET) =   6221.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.715
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.10      0.72     0.850    57    5.16
  COMMERCIAL                 D        0.01      0.72     0.100    57    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.784
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6221.00  DOWNSTREAM(FEET) =   6215.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   119.00   CHANNEL SLOPE =  0.0504
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.43
  FLOW VELOCITY(FEET/SEC) =   3.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     256.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.361
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        0.33      0.72     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =      0.44   AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       1.50

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      5.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6215.00  DOWNSTREAM(FEET) =   6211.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    88.00   CHANNEL SLOPE =  0.0455
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.50
  FLOW VELOCITY(FEET/SEC) =   3.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.42   Tc(MIN.) =    6.01
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =   6240.00  DOWNSTREAM(FEET) =   6211.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.455
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  3.565
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.26      0.72     0.850    57    7.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.69    7.46    3.565  0.72( 0.61) 0.85       0.3       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      5.00 =     294.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.50    6.01    4.144  0.72( 0.60) 0.83       0.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.17    6.01    4.144  0.72( 0.60) 0.84       0.7       1.00
      2        1.95    7.46    3.565  0.72( 0.60) 0.84       0.7       4.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        2.17  Tc(MIN.) =    6.013
  EFFECTIVE AREA(ACRES) =      0.65  AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6204.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.0648
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.17
  FLOW VELOCITY(FEET/SEC) =   4.46 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.40   Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  3.959
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        0.31      0.72     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    0.92
  EFFECTIVE AREA(ACRES) =      0.96   AREA-AVERAGED Fm(INCH/HR) =  0.61
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       2.89

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   142.00
  ELEVATION DATA: UPSTREAM(FEET) =   6214.00  DOWNSTREAM(FEET) =   6204.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.961
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.169
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.18      0.72     0.850    57    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.57
```

```
**************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  10
--------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  11
--------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
==========================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        0.57    5.96    4.169  0.72( 0.61) 0.85       0.2       6.00
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     142.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.89    6.42    3.959  0.72( 0.61) 0.84       1.0       1.00
     2        2.57    7.87    3.432  0.72( 0.61) 0.84       1.0       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.42    5.96    4.169  0.72( 0.61) 0.84       1.1       6.00
     2        3.43    6.42    3.959  0.72( 0.61) 0.84       1.1       1.00
     3        3.02    7.87    3.432  0.72( 0.61) 0.84       1.2       4.00
   TOTAL AREA(ACRES) =         1.2

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        3.43  Tc(MIN.) =    6.417
 EFFECTIVE AREA(ACRES) =      1.14  AREA-AVERAGED Fm(INCH/HR) =  0.61
 AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.84
 TOTAL AREA(ACRES) =        1.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.
==========================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.2  TC(MIN.) =      6.42
 EFFECTIVE AREA(ACRES) =      1.14  AREA-AVERAGED Fm(INCH/HR)=  0.61
 AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap = 0.843
 PEAK FLOW RATE(CFS)   =       3.43

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.42    5.96    4.169  0.72( 0.61) 0.84       1.1       6.00
     2        3.43    6.42    3.959  0.72( 0.61) 0.84       1.1       1.00
     3        3.02    7.87    3.432  0.72( 0.61) 0.84       1.2       4.00
==========================================================================
==========================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1542
```


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```
 ************************** DESCRIPTION OF STUDY **************************
* DOVID OVED RETREAT CENTER                                               *
* RUNNING SPRINGS CALIFORNIA                                              *
* PRELIMINARY GRADING ANALYSIS, EXISTING CONDITION, AREA NO. 2            *
 *************************************************************************

  FILE NAME: RREX1.DAT
  TIME/DATE OF STUDY: 15:14 05/25/2022
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3500

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

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

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

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   137.00
  ELEVATION DATA: UPSTREAM(FEET) =   6239.40  DOWNSTREAM(FEET) =   6221.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.687
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.10      0.47     0.850    75    5.16
  COMMERCIAL                 D        0.01      0.47     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.784
  SUBAREA RUNOFF(CFS) =      0.75
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.75

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6221.00  DOWNSTREAM(FEET) =   6215.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   119.00   CHANNEL SLOPE =  0.0504
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.75
  FLOW VELOCITY(FEET/SEC) =   3.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     256.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.111
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        0.33      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    1.99
  EFFECTIVE AREA(ACRES) =      0.44   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.68

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      5.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6215.00  DOWNSTREAM(FEET) =   6211.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    88.00   CHANNEL SLOPE =  0.0455
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.68
  FLOW VELOCITY(FEET/SEC) =   3.91 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =    5.96
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =   6240.00  DOWNSTREAM(FEET) =   6211.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.455
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.812
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.26      0.47     0.850    75    7.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.27
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.27

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.27    7.46    5.812  0.47( 0.40) 0.85       0.3       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      5.00 =     294.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.68    5.96    6.794  0.47( 0.39) 0.83       0.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.88    5.96    6.794  0.47( 0.39) 0.84       0.7       1.00
      2        3.54    7.46    5.812  0.47( 0.39) 0.84       0.7       4.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        3.88  Tc(MIN.) =    5.964
  EFFECTIVE AREA(ACRES) =      0.65  AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6204.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.0648
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.88
  FLOW VELOCITY(FEET/SEC) =   5.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.36   Tc(MIN.) =    6.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.32
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  6.524
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        0.31      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    1.68
  EFFECTIVE AREA(ACRES) =      0.96   AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       5.28

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   142.00
  ELEVATION DATA: UPSTREAM(FEET) =   6214.00  DOWNSTREAM(FEET) =   6204.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.961
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  6.797
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.18      0.47     0.850    75    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.02

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

```
 FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.02    5.96    6.797  0.47( 0.40) 0.85       0.2       6.00
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     142.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.28    6.32    6.524  0.47( 0.40) 0.84       1.0       1.00
     2        4.75    7.82    5.622  0.47( 0.40) 0.84       1.0       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.22    5.96    6.797  0.47( 0.40) 0.84       1.1       6.00
     2        6.26    6.32    6.524  0.47( 0.40) 0.84       1.1       1.00
     3        5.58    7.82    5.622  0.47( 0.40) 0.84       1.2       4.00
   TOTAL AREA(ACRES) =         1.2

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        6.26  Tc(MIN.) =    6.320
 EFFECTIVE AREA(ACRES) =      1.13  AREA-AVERAGED Fm(INCH/HR) =  0.40
 AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.84
 TOTAL AREA(ACRES) =        1.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.2  TC(MIN.) =      6.32
 EFFECTIVE AREA(ACRES) =      1.13  AREA-AVERAGED Fm(INCH/HR)=  0.40
 AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap = 0.843
 PEAK FLOW RATE(CFS)   =       6.26

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.22    5.96    6.797  0.47( 0.40) 0.84       1.1       6.00
     2        6.26    6.32    6.524  0.47( 0.40) 0.84       1.1       1.00
     3        5.58    7.82    5.622  0.47( 0.40) 0.84       1.2       4.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
        (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0 Release Date: 07/01/2016  License ID 1542

                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER                                             *
* RUNNING SPRINGS CALIFORNIA                                            *
* EXISTING CONDITION, AREA 2, ADJUSTED RAINFALL                         *
 ************************************************************************

  FILE NAME: RREX1.DAT
  TIME/DATE OF STUDY: 18:19 05/26/2022
==============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.1100 (5-YR, 1 HR)

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

******************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   137.00
  ELEVATION DATA: UPSTREAM(FEET) =   6239.40  DOWNSTREAM(FEET) =   6221.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  6.320
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.10      0.59     1.000    66    7.55
  COMMERCIAL                 D        0.01      0.72     0.100    57    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.921
  SUBAREA RUNOFF(CFS) =      0.59
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.59

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6221.00  DOWNSTREAM(FEET) =   6215.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   119.00   CHANNEL SLOPE =  0.0504
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.59
  FLOW VELOCITY(FEET/SEC) =   3.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     256.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.847
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.33      0.59     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    1.56
  EFFECTIVE AREA(ACRES) =      0.44   AREA-AVERAGED Fm(INCH/HR) =  0.58
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.10

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      5.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6215.00  DOWNSTREAM(FEET) =   6211.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    88.00   CHANNEL SLOPE =  0.0455
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.10
  FLOW VELOCITY(FEET/SEC) =   3.71 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.40   Tc(MIN.) =    5.98
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =   6240.00  DOWNSTREAM(FEET) =   6211.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.898
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.663
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.26      0.59     1.000    66   10.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      0.72

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.72   10.90    3.663  0.59( 0.59) 1.00       0.3       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      5.00 =     294.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.10    5.98    5.573  0.59( 0.58) 0.98       0.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.74    5.98    5.573  0.59( 0.58) 0.98       0.6       1.00
      2        2.02   10.90    3.663  0.59( 0.58) 0.99       0.7       4.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        2.74  Tc(MIN.) =    5.984
  EFFECTIVE AREA(ACRES) =      0.59  AREA-AVERAGED Fm(INCH/HR) =  0.58
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  0.99
```

```
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6204.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.0648
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.74
  FLOW VELOCITY(FEET/SEC) =   4.69 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.38   Tc(MIN.) =    6.37
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.37
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  5.336
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.31      0.59     1.000    66
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    1.30
  EFFECTIVE AREA(ACRES) =      0.89   AREA-AVERAGED Fm(INCH/HR) =  0.58
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  0.99
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       3.81

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   142.00
  ELEVATION DATA: UPSTREAM(FEET) =   6214.00  DOWNSTREAM(FEET) =   6204.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.713
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  4.285
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.18      0.59     1.000    66    8.71
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.59
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.59

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.59    8.71    4.285  0.59( 0.59) 1.00       0.2       6.00
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     142.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.81    6.37    5.336  0.59( 0.58) 0.99       0.9       1.00
      2        2.71   11.31    3.570  0.59( 0.58) 0.99       1.0       4.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.37    6.37    5.336  0.59( 0.58) 0.99       1.0       1.00
      2        3.88    8.71    4.285  0.59( 0.59) 0.99       1.1       6.00
      3        3.19   11.31    3.570  0.59( 0.59) 0.99       1.2       4.00
    TOTAL AREA(ACRES) =         1.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.37  Tc(MIN.) =    6.368
  EFFECTIVE AREA(ACRES) =     1.02  AREA-AVERAGED Fm(INCH/HR) =  0.58
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  0.99
  TOTAL AREA(ACRES) =       1.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.2  TC(MIN.) =      6.37
  EFFECTIVE AREA(ACRES) =      1.02  AREA-AVERAGED Fm(INCH/HR)=  0.58
  AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap = 0.991
  PEAK FLOW RATE(CFS)   =       4.37

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.37    6.37    5.336  0.59( 0.58) 0.99       1.0       1.00
      2        3.88    8.71    4.285  0.59( 0.59) 0.99       1.1       6.00
      3        3.19   11.31    3.570  0.59( 0.59) 0.99       1.2       4.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
*****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
         (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1542

                              Analysis prepared by:
                            TRANSTECH ENGINEERS
                              413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************** DESCRIPTION OF STUDY **************************
* DOVID OVED RETREAT CENTER                                               *
* RUNNING SPRINGS CALIFORNIA                                              *
* PRELIMINARY GRADING ANALYSIS, EXISTING CONDITION, AREA NO. 2            *
 *************************************************************************

  FILE NAME: RREX1.DAT
  TIME/DATE OF STUDY: 15:22 05/25/2022
=============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.6800

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

*****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE = 21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   137.00
  ELEVATION DATA: UPSTREAM(FEET) =   6239.40 DOWNSTREAM(FEET) =   6221.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  9.566
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.10      0.47     0.850    75    5.16
  COMMERCIAL                 D        0.01      0.47     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.784
  SUBAREA RUNOFF(CFS) =      0.94
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.94

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6221.00  DOWNSTREAM(FEET) =   6215.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   119.00   CHANNEL SLOPE =  0.0504
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.94
  FLOW VELOCITY(FEET/SEC) =   3.37 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =    5.59
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     256.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.849
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        0.33      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    2.50
  EFFECTIVE AREA(ACRES) =      0.44   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       3.37

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      5.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6215.00  DOWNSTREAM(FEET) =   6211.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    88.00   CHANNEL SLOPE =  0.0455
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.37
  FLOW VELOCITY(FEET/SEC) =   4.11 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.36   Tc(MIN.) =    5.95
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =   6240.00  DOWNSTREAM(FEET) =   6211.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.455
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  7.232
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.26      0.47     0.850    75    7.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.61
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      1.61

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.61    7.46    7.232  0.47( 0.40) 0.85       0.3       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      5.00 =     294.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.37    5.95    8.474  0.47( 0.39) 0.83       0.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        4.88    5.95    8.474  0.47( 0.39) 0.84       0.7       1.00
      2        4.46    7.46    7.232  0.47( 0.39) 0.84       0.7       4.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        4.88  Tc(MIN.) =    5.946
  EFFECTIVE AREA(ACRES) =      0.65  AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6204.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.0648
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.88
  FLOW VELOCITY(FEET/SEC) =   5.34 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.34   Tc(MIN.) =    6.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.28
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.153
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        0.31      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    2.13
  EFFECTIVE AREA(ACRES) =      0.96   AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       6.68

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   142.00
  ELEVATION DATA: UPSTREAM(FEET) =   6214.00  DOWNSTREAM(FEET) =   6204.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.961
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.458
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.18      0.47     0.850    75    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      1.29
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.29

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

```
 FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.29    5.96    8.458  0.47( 0.40) 0.85       0.2       6.00
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     142.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.68    6.28    8.153  0.47( 0.40) 0.84       1.0       1.00
     2        6.00    7.80    7.007  0.47( 0.40) 0.84       1.0       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.87    5.96    8.458  0.47( 0.40) 0.84       1.1       6.00
     2        7.92    6.28    8.153  0.47( 0.40) 0.84       1.1       1.00
     3        7.06    7.80    7.007  0.47( 0.40) 0.84       1.2       4.00
   TOTAL AREA(ACRES) =         1.2

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        7.92  Tc(MIN.) =    6.283
 EFFECTIVE AREA(ACRES) =      1.13  AREA-AVERAGED Fm(INCH/HR) =  0.40
 AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.84
 TOTAL AREA(ACRES) =        1.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.2  TC(MIN.) =      6.28
 EFFECTIVE AREA(ACRES) =      1.13  AREA-AVERAGED Fm(INCH/HR)=  0.40
 AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap = 0.843
 PEAK FLOW RATE(CFS)   =       7.92

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.87    5.96    8.458  0.47( 0.40) 0.84       1.1       6.00
     2        7.92    6.28    8.153  0.47( 0.40) 0.84       1.1       1.00
     3        7.06    7.80    7.007  0.47( 0.40) 0.84       1.2       4.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**********************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1542
```


Analysis prepared by:
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```
 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER                                            *
* RUNNING SPRINGS CALIFORNIA                                           *
* PRELIMINARY GRADING ANALYSIS, EXISTING CONDITION, AREA NO. 2         *
 **********************************************************************

  FILE NAME: RREX1.DAT
  TIME/DATE OF STUDY: 15:54 05/25/2022
======================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
======================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.2200

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**********************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
======================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   137.00
  ELEVATION DATA: UPSTREAM(FEET) =   6239.40  DOWNSTREAM(FEET) =   6221.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 12.641
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                D        0.10      0.21     0.850    91    5.16
  COMMERCIAL                 D        0.01      0.21     0.100    91    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.784
  SUBAREA RUNOFF(CFS) =      1.28
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE = 52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6221.00  DOWNSTREAM(FEET) =   6215.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   119.00   CHANNEL SLOPE =  0.0504
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.28
  FLOW VELOCITY(FEET/SEC) =   3.53 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.56   Tc(MIN.) =    5.56
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     256.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.56
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 11.733
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        0.33      0.21     0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.33      SUBAREA RUNOFF(CFS) =    3.42
  EFFECTIVE AREA(ACRES) =      0.44   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       4.61

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      5.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6215.00  DOWNSTREAM(FEET) =   6211.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    88.00   CHANNEL SLOPE =  0.0455
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.61
  FLOW VELOCITY(FEET/SEC) =   4.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.33   Tc(MIN.) =    5.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

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

```
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   294.00
  ELEVATION DATA: UPSTREAM(FEET) =   6240.00  DOWNSTREAM(FEET) =   6211.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.455
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  9.557
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK               D        0.26      0.21     0.850    91    7.46
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.20
  TOTAL AREA(ACRES) =      0.26   PEAK FLOW RATE(CFS) =      2.20

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.20    7.46    9.557  0.21( 0.18) 0.85       0.3       4.00
  LONGEST FLOWPATH FROM NODE      4.00 TO NODE      5.00 =     294.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.61    5.89   11.266  0.21( 0.17) 0.83       0.4       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        6.67    5.89   11.266  0.21( 0.18) 0.84       0.6       1.00
      2        6.10    7.46    9.557  0.21( 0.18) 0.84       0.7       4.00
    TOTAL AREA(ACRES) =         0.7

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =        6.67  Tc(MIN.) =    5.894
  EFFECTIVE AREA(ACRES) =      0.65  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.84
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =     344.00 FEET.

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

```
 FLOW PROCESS FROM NODE      5.00 TO NODE      8.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6204.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   108.00   CHANNEL SLOPE =  0.0648
 CHANNEL FLOW THRU SUBAREA(CFS) =       6.67
 FLOW VELOCITY(FEET/SEC) =   5.75 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.31   Tc(MIN.) =    6.21
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.21
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 10.865
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                D        0.31      0.21     0.850    91
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    2.93
 EFFECTIVE AREA(ACRES) =      0.95   AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.84
 TOTAL AREA(ACRES) =        1.0       PEAK FLOW RATE(CFS) =       9.18

****************************************************************************
 FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   142.00
 ELEVATION DATA: UPSTREAM(FEET) =   6214.00  DOWNSTREAM(FEET) =   6204.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.961
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 11.177
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 PUBLIC PARK                D        0.18      0.21     0.850    91    5.96
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
 SUBAREA RUNOFF(CFS) =      1.76
 TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      1.76

****************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  10
```

```
------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
========================================================================

************************************************************************
 FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  11
------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
========================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.76    5.96   11.177  0.21( 0.18) 0.85       0.2       6.00
 LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     142.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        9.18    6.21   10.865  0.21( 0.18) 0.84       1.0       1.00
     2        8.27    7.78    9.280  0.21( 0.18) 0.84       1.0       4.00
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       10.84    5.96   11.177  0.21( 0.18) 0.84       1.1       6.00
     2       10.89    6.21   10.865  0.21( 0.18) 0.84       1.1       1.00
     3        9.72    7.78    9.280  0.21( 0.18) 0.84       1.2       4.00
   TOTAL AREA(ACRES) =         1.2

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       10.89  Tc(MIN.) =    6.207
 EFFECTIVE AREA(ACRES) =      1.13  AREA-AVERAGED Fm(INCH/HR) =  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.84
 TOTAL AREA(ACRES) =        1.2
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE      8.00 =     452.00 FEET.
========================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        1.2  TC(MIN.) =      6.21
 EFFECTIVE AREA(ACRES) =      1.13  AREA-AVERAGED Fm(INCH/HR)=  0.18
 AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 0.843
 PEAK FLOW RATE(CFS)   =      10.89

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       10.84    5.96   11.177  0.21( 0.18) 0.84       1.1       6.00
     2       10.89    6.21   10.865  0.21( 0.18) 0.84       1.1       1.00
     3        9.72    7.78    9.280  0.21( 0.18) 0.84       1.2       4.00
========================================================================
========================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                             San Bernardino, CA 92408
                              Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* PROPOSED CONDITION, AREA 1                                            *
 ************************************************************************

  FILE NAME: 300.DAT
  TIME/DATE OF STUDY: 14:41 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8280

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00  0.0312  0.167  0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6211.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.294
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.530
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.01      0.72     0.100    57    5.29
  PUBLIC PARK                D        0.08      0.72     0.850    57    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.768
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.09   PEAK FLOW RATE(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6202.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   126.00   CHANNEL SLOPE =  0.0714
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.346
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.72     0.100    57
  PUBLIC PARK                D        0.13      0.72     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.461
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.50
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   0.32
  Tc(MIN.) =    5.62
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    0.98
  EFFECTIVE AREA(ACRES) =      0.36     AREA-AVERAGED Fm(INCH/HR) =   0.39
  AREA-AVERAGED Fp(INCH/HR) =   0.72  AREA-AVERAGED Ap =   0.54
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   7.40
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    304.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6202.00  DOWNSTREAM(FEET) =  6200.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.45
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.29
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.73
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    305.00 =     288.00 FEET.
```

```
**********************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
  MAINLINE Tc(MIN.) =    5.73
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.284
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.72     0.100    57
  PUBLIC PARK                D        0.10      0.72     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.677
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.44
  EFFECTIVE AREA(ACRES) =      0.49   AREA-AVERAGED Fm(INCH/HR) =  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       1.71
======================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.73
  EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR)=  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap = 0.575
  PEAK FLOW RATE(CFS)   =       1.71
======================================================================
======================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                             San Bernardino, CA 92408
                              Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* PROPOSED CONDITION, AREA 1                                            *
 ************************************************************************

  FILE NAME: 300.DAT
  TIME/DATE OF STUDY: 14:48 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3500

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6211.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.294
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.386
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.01      0.47     0.100    75    5.29
  PUBLIC PARK                D        0.08      0.47     0.850    75    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.768
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.09   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6202.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   126.00   CHANNEL SLOPE =  0.0714
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.127
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.47     0.100    75
  PUBLIC PARK                D        0.13      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.461
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.58
  AVERAGE FLOW DEPTH(FEET) =   0.43   TRAVEL TIME(MIN.) =   0.28
  Tc(MIN.) =    5.57
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    1.68
  EFFECTIVE AREA(ACRES) =      0.36     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.47  AREA-AVERAGED Ap =   0.54
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       2.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   8.45
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    304.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6202.00  DOWNSTREAM(FEET) =  6200.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.59
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.67
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    305.00 =     288.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.67
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.040
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.47     0.100    75
  PUBLIC PARK                D        0.10      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.677
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.79
  EFFECTIVE AREA(ACRES) =      0.49   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       2.99
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.67
  EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR)=  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap = 0.575
  PEAK FLOW RATE(CFS)   =       2.99
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* PROPOSED CONDITION, AREA 1                                            *
 ************************************************************************

  FILE NAME: 300.DAT
  TIME/DATE OF STUDY: 14:53 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.6800

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6211.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.294
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  9.191
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.01      0.47     0.100    75    5.29
  PUBLIC PARK                D        0.08      0.47     0.850    75    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.768
  SUBAREA RUNOFF(CFS) =      0.72
  TOTAL AREA(ACRES) =      0.09   PEAK FLOW RATE(CFS) =      0.72

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6202.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   126.00   CHANNEL SLOPE =  0.0714
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.886
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.47     0.100    75
  PUBLIC PARK                D        0.13      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.461
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.78
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.04
  AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   0.26
  Tc(MIN.) =    5.56
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    2.11
  EFFECTIVE AREA(ACRES) =      0.36     AREA-AVERAGED Fm(INCH/HR) =   0.25
  AREA-AVERAGED Fp(INCH/HR) =   0.47  AREA-AVERAGED Ap =   0.54
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       2.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.56   FLOW VELOCITY(FEET/SEC.) =   8.95
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    304.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6202.00  DOWNSTREAM(FEET) =  6200.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.80
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.65
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    305.00 =     288.00 FEET.
```

```
**********************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
======================================================================
  MAINLINE Tc(MIN.) =    5.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.784
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.47     0.100    75
  PUBLIC PARK                D        0.10      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.677
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    0.99
  EFFECTIVE AREA(ACRES) =      0.49   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       3.76
======================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.65
  EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR)=  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap = 0.575
  PEAK FLOW RATE(CFS)   =       3.76
======================================================================
======================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                             San Bernardino, CA 92408
                              Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* PROPOSED CONDITION, AREA 1                                            *
 ************************************************************************

  FILE NAME: 300.DAT
  TIME/DATE OF STUDY: 14:59 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.2200

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    303.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6211.00
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.294
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 12.145
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.01      0.21      0.100    91    5.29
  PUBLIC PARK                D        0.08      0.21      0.850    91    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.768
  SUBAREA RUNOFF(CFS) =      0.98
  TOTAL AREA(ACRES) =      0.09   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
  FLOW PROCESS FROM NODE    303.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   6211.00  DOWNSTREAM(FEET) =   6202.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   126.00   CHANNEL SLOPE =  0.0714
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 11.767
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.14      0.21      0.100    91
  PUBLIC PARK                D        0.13      0.21      0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.461
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.57
  AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   0.25
  Tc(MIN.) =    5.54
  SUBAREA AREA(ACRES) =     0.27       SUBAREA RUNOFF(CFS) =    2.84
  EFFECTIVE AREA(ACRES) =      0.36     AREA-AVERAGED Fm(INCH/HR) =   0.11
  AREA-AVERAGED Fp(INCH/HR) =   0.21  AREA-AVERAGED Ap =   0.54
  TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       3.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   9.76
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    304.00 =     243.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    305.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6202.00  DOWNSTREAM(FEET) =  6200.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.83
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.79
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.62
  LONGEST FLOWPATH FROM NODE    302.00 TO NODE    305.00 =     288.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.62
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 11.642
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.21      0.100    91
  PUBLIC PARK                D        0.10      0.21      0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.677
  SUBAREA AREA(ACRES) =    0.13      SUBAREA RUNOFF(CFS) =    1.35
  EFFECTIVE AREA(ACRES) =      0.49   AREA-AVERAGED Fm(INCH/HR) =  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.58
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       5.09
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.62
  EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR)=  0.12
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 0.575
  PEAK FLOW RATE(CFS)   =       5.09
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA2, PROPOSED CONDITION                                             *
 ************************************************************************

  FILE NAME: 400.DAT
  TIME/DATE OF STUDY: 15:12 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 0.8280

  *ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6208.50
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.599
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.356
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.72     0.100    57    5.60
  PUBLIC PARK                D        0.03      0.72     0.850    57    8.90
  PUBLIC PARK                D        0.19      0.72     0.850    57    8.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA RUNOFF(CFS) =      1.57
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      1.57

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6208.50  DOWNSTREAM(FEET) =  6208.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.57
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.70
  LONGEST FLOWPATH FROM NODE    402.00 TO NODE    404.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.70
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.300
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.72     0.100    57
  PUBLIC PARK                D        0.08      0.72     0.850    57
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.72
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.38
  EFFECTIVE AREA(ACRES) =      0.55   AREA-AVERAGED Fm(INCH/HR) =  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       1.93
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.70
  EFFECTIVE AREA(ACRES) =      0.55  AREA-AVERAGED Fm(INCH/HR)=  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.72  AREA-AVERAGED Ap = 0.520
  PEAK FLOW RATE(CFS)   =       1.93
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
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                              Analysis prepared by:
                                 TRANSTECH ENGINEERS
                                   413 Mackay Drive
                                San Bernardino, CA 92408
                                 Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA2, PROPOSED CONDITION                                             *
 ************************************************************************

  FILE NAME: 400.DAT
  TIME/DATE OF STUDY: 15:18 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.3500

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6208.50
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.599
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.102
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.47     0.100    75    5.60
  PUBLIC PARK                D        0.03      0.47     0.850    75    8.90
  PUBLIC PARK                D        0.19      0.47     0.850    75    8.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA RUNOFF(CFS) =      2.69
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      2.69

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6208.50  DOWNSTREAM(FEET) =  6208.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.69
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.69
  LONGEST FLOWPATH FROM NODE    402.00 TO NODE    404.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.024
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.47     0.100    75
  PUBLIC PARK                D        0.08      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.67
  EFFECTIVE AREA(ACRES) =      0.55   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       3.33
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.69
  EFFECTIVE AREA(ACRES) =      0.55  AREA-AVERAGED Fm(INCH/HR)=  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap = 0.520
  PEAK FLOW RATE(CFS)   =       3.33
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA2, PROPOSED CONDITION                                             *
 ************************************************************************

  FILE NAME: 400.DAT
  TIME/DATE OF STUDY: 15:23 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.6800

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.    (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6208.50
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.599
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.838
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.47     0.100    75    5.60
  PUBLIC PARK                D        0.03      0.47     0.850    75    8.90
  PUBLIC PARK                D        0.19      0.47     0.850    75    8.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA RUNOFF(CFS) =      3.37
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      3.37

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6208.50  DOWNSTREAM(FEET) =  6208.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.00
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.37
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.68
  LONGEST FLOWPATH FROM NODE    402.00 TO NODE    404.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.747
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.47     0.100    75
  PUBLIC PARK                D        0.08      0.47     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.47
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.84
  EFFECTIVE AREA(ACRES) =      0.55   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       4.17
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.68
  EFFECTIVE AREA(ACRES) =      0.55  AREA-AVERAGED Fm(INCH/HR)=  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.47  AREA-AVERAGED Ap = 0.520
  PEAK FLOW RATE(CFS)   =       4.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**********************************************************************
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            Ver. 23.0  Release Date: 07/01/2016  License ID 1542
```


Analysis prepared by:
TRANSTECH ENGINEERS
413 Mackay Drive
San Bernardino, CA 92408
Tel No. (909) 384-7464


```
 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                    *
* RUNNING SPRINGS, CALIFORNIA                                          *
* AREA2, PROPOSED CONDITION                                            *
 **********************************************************************

  FILE NAME: 400.DAT
  TIME/DATE OF STUDY: 15:32 05/26/2022
======================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
======================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 2.2200

  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

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

**********************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
======================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =   6212.00  DOWNSTREAM(FEET) =   6208.50
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.599
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 11.679
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.21      0.21      0.100    91    5.60
  PUBLIC PARK                D        0.03      0.21      0.850    91    8.90
  PUBLIC PARK                D        0.19      0.21      0.850    91    8.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA RUNOFF(CFS) =      4.53
  TOTAL AREA(ACRES) =      0.44   PEAK FLOW RATE(CFS) =      4.53

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  6208.50  DOWNSTREAM(FEET) =  6208.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.51
  GIVEN PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.53
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.68
  LONGEST FLOWPATH FROM NODE    402.00 TO NODE    404.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.68
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 11.568
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.03      0.21      0.100    91
  PUBLIC PARK                D        0.08      0.21      0.850    91
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.21
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.645
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    1.13
  EFFECTIVE AREA(ACRES) =      0.55   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       5.62
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      5.68
  EFFECTIVE AREA(ACRES) =      0.55  AREA-AVERAGED Fm(INCH/HR)=  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.21  AREA-AVERAGED Ap = 0.520
  PEAK FLOW RATE(CFS)   =       5.62
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)

Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH ENGINEERS
413 Mackay Drive
San Bernardino, CA 92408
Tel No. (909) 384-7464

********** DESCRIPTION OF STUDY **********
* DOVID OVED RETREAT CENTER PROJECT *
* RUNNING SPRINGS, CALIFORNIA *
* AREA 3, PROPOSED CONDITION *
****

FILE NAME: 200.DAT
TIME/DATE OF STUDY: 12:59 05/26/2022

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = **2.00**
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = **0.7000**
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = **0.8280**

ANTECEDENT MOISTURE CONDITION (AMC) I ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

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

****
FLOW PROCESS FROM NODE 201.00 TO NODE 203.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 186.00
ELEVATION DATA: UPSTREAM(FEET) = 6240.00 DOWNSTREAM(FEET) = 6219.00
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.715
SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                 D        0.03      0.72     0.100    57    5.00
NATURAL FAIR COVER
"WOODLAND,GRASS"           D        0.35      0.59     1.000    66    8.83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.929
SUBAREA RUNOFF(CFS) =      1.42
TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.42

****************************************************************************
FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   152.00
ELEVATION DATA: UPSTREAM(FEET) =   6223.00  DOWNSTREAM(FEET) =   6219.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.715
SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                 D        0.01      0.72     0.100    57    5.00
NATURAL FAIR COVER
"WOODLAND,GRASS"           D        0.10      0.59     1.000    66   10.90
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.918
SUBAREA RUNOFF(CFS) =      0.41
TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.41

****************************************************************************
FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  11
----------------------------------------------------------------------------
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
** MAIN STREAM CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        0.41    5.00    4.715  0.59( 0.54) 0.92       0.1     202.00
LONGEST FLOWPATH FROM NODE    202.00 TO NODE    203.00 =     152.00 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        1.42    5.00    4.715  0.59( 0.55) 0.93       0.4     201.00
LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.

** PEAK FLOW RATE TABLE **
```

```
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        1.84    5.00    4.715  0.59( 0.55) 0.93       0.5     202.00
    2        1.84    5.00    4.715  0.59( 0.55) 0.93       0.5     201.00
  TOTAL AREA(ACRES) =         0.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        1.84  Tc(MIN.) =    5.000
 EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR) =  0.55
 AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap =  0.93
 TOTAL AREA(ACRES) =        0.5
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.
****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6219.00  DOWNSTREAM(FEET) =   6202.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0494
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  4.283
 SUBAREA LOSS RATE DATA(AMC  I ):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.02      0.72     0.100    57
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.31      0.59     1.000    66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.59
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.945
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.39
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.58
 AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   0.73
 Tc(MIN.) =    5.73
 SUBAREA AREA(ACRES) =     0.33       SUBAREA RUNOFF(CFS) =    1.11
 EFFECTIVE AREA(ACRES) =      0.82     AREA-AVERAGED Fm(INCH/HR) =   0.55
 AREA-AVERAGED Fp(INCH/HR) =   0.59  AREA-AVERAGED Ap =   0.93
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       2.75

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.59   FLOW VELOCITY(FEET/SEC.) =   7.85
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =     520.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      5.73
 EFFECTIVE AREA(ACRES) =      0.82  AREA-AVERAGED Fm(INCH/HR)=  0.55
 AREA-AVERAGED Fp(INCH/HR) =  0.59  AREA-AVERAGED Ap = 0.934
 PEAK FLOW RATE(CFS)   =       2.75

 ** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        2.75    5.73    4.283  0.59( 0.55) 0.93       0.8     202.00
    2        2.75    5.73    4.283  0.59( 0.55) 0.93       0.8     201.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)

Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH ENGINEERS
413 Mackay Drive
San Bernardino, CA 92408
Tel No. (909) 384-7464

********** DESCRIPTION OF STUDY **********
* DOVID OVED RETREAT CENTER PROJECT *
* RUNNING SPRINGS, CALIFORNIA *
* AREA 3, PROPOSED CONDITION *
****

FILE NAME: 200.DAT
TIME/DATE OF STUDY: 13:22 05/26/2022

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = **10.00**
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = **0.7000**
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = **1.3500**

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP	HIKE	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

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

****
FLOW PROCESS FROM NODE 201.00 TO NODE 203.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 186.00
ELEVATION DATA: UPSTREAM(FEET) = 6240.00 DOWNSTREAM(FEET) = 6219.00
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 7.687

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.03      0.47     0.100    75    5.00
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            D        0.35      0.34     1.000    82    8.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.929
  SUBAREA RUNOFF(CFS) =      2.52
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      2.52

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   152.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.00  DOWNSTREAM(FEET) =   6219.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.687
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.01      0.47     0.100    75    5.00
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            D        0.10      0.34     1.000    82   10.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.918
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.73
****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.73    5.00    7.687  0.35( 0.32) 0.92       0.1     202.00
  LONGEST FLOWPATH FROM NODE    202.00 TO NODE    203.00 =     152.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.52    5.00    7.687  0.35( 0.32) 0.93       0.4     201.00
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.

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

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        3.25    5.00    7.687  0.35( 0.32) 0.93       0.5     202.00
    2        3.25    5.00    7.687  0.35( 0.32) 0.93       0.5     201.00
  TOTAL AREA(ACRES) =         0.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        3.25  Tc(MIN.) =    5.000
 EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR) =  0.32
 AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.93
 TOTAL AREA(ACRES) =        0.5
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6219.00  DOWNSTREAM(FEET) =   6202.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0494
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  7.066
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.02      0.47     0.100    75
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.31      0.34     1.000    82
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.945
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.25
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.70
 AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.64
 Tc(MIN.) =    5.64
 SUBAREA AREA(ACRES) =     0.33       SUBAREA RUNOFF(CFS) =    2.00
 EFFECTIVE AREA(ACRES) =      0.82     AREA-AVERAGED Fm(INCH/HR) =   0.32
 AREA-AVERAGED Fp(INCH/HR) =   0.34  AREA-AVERAGED Ap =   0.93
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       4.98

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   9.02
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =     520.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      5.64
 EFFECTIVE AREA(ACRES) =      0.82  AREA-AVERAGED Fm(INCH/HR)=  0.32
 AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap = 0.934
 PEAK FLOW RATE(CFS)   =       4.98

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        4.98    5.64    7.066  0.34( 0.32) 0.93       0.8     202.00
    2        4.98    5.64    7.066  0.34( 0.32) 0.93       0.8     201.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
            Ver. 23.0  Release Date: 07/01/2016  License ID 1542

                          Analysis prepared by:
                             TRANSTECH ENGINEERS
                               413 Mackay Drive
                            San Bernardino, CA 92408
                             Tel No. (909) 384-7464

 ************************* DESCRIPTION OF STUDY *************************
* DOVID OVED RETREAT CENTER PROJECT                                     *
* RUNNING SPRINGS, CALIFORNIA                                           *
* AREA 3, PROPOSED CONDITION                                            *
 ************************************************************************
  FILE NAME: 200.DAT
  TIME/DATE OF STUDY: 13:30 05/26/2022
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.6800

  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED
************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    203.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   186.00
  ELEVATION DATA: UPSTREAM(FEET) =   6240.00  DOWNSTREAM(FEET) =   6219.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  9.566
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.03      0.47     0.100    75    5.00
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.35      0.34     1.000    82    8.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.929
  SUBAREA RUNOFF(CFS) =      3.16
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      3.16
****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   152.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.00  DOWNSTREAM(FEET) =   6219.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  9.566
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.01      0.47     0.100    75    5.00
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.10      0.34     1.000    82   10.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.35
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.918
  SUBAREA RUNOFF(CFS) =      0.92
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.92

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        0.92    5.00    9.566  0.35( 0.32) 0.92       0.1     202.00
  LONGEST FLOWPATH FROM NODE    202.00 TO NODE    203.00 =     152.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        3.16    5.00    9.566  0.35( 0.32) 0.93       0.4     201.00
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.

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

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        4.08    5.00    9.566  0.35( 0.32) 0.93       0.5     202.00
    2        4.08    5.00    9.566  0.35( 0.32) 0.93       0.5     201.00
  TOTAL AREA(ACRES) =         0.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        4.08  Tc(MIN.) =    5.000
 EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR) =  0.32
 AREA-AVERAGED Fp(INCH/HR) =  0.35  AREA-AVERAGED Ap =  0.93
 TOTAL AREA(ACRES) =        0.5
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6219.00  DOWNSTREAM(FEET) =   6202.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0494
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  8.834
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.02      0.47     0.100    75
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.31      0.34     1.000    82
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.34
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.945
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.25
 AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   0.60
 Tc(MIN.) =    5.60
 SUBAREA AREA(ACRES) =     0.33       SUBAREA RUNOFF(CFS) =    2.53
 EFFECTIVE AREA(ACRES) =      0.82     AREA-AVERAGED Fm(INCH/HR) =   0.32
 AREA-AVERAGED Fp(INCH/HR) =   0.34  AREA-AVERAGED Ap =   0.93
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       6.28

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   9.54
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =     520.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      5.60
 EFFECTIVE AREA(ACRES) =      0.82  AREA-AVERAGED Fm(INCH/HR)=  0.32
 AREA-AVERAGED Fp(INCH/HR) =  0.34  AREA-AVERAGED Ap = 0.934
 PEAK FLOW RATE(CFS)   =       6.28

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        6.28    5.60    8.834  0.34( 0.32) 0.93       0.8     202.00
    2        6.28    5.60    8.834  0.34( 0.32) 0.93       0.8     201.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)

Ver. 23.0 Release Date: 07/01/2016 License ID 1542

Analysis prepared by:
TRANSTECH ENGINEERS
413 Mackay Drive
San Bernardino, CA 92408
Tel No. (909) 384-7464

********** DESCRIPTION OF STUDY **********
* DOVID OVED RETREAT CENTER PROJECT *
* RUNNING SPRINGS, CALIFORNIA *
* AREA 3, PROPOSED CONDITION *
****

FILE NAME: 200.DAT
TIME/DATE OF STUDY: 13:39 05/26/2022

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = **100.00**
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.85
USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL

SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = **0.7000**
USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = **2.2200**

*ANTECEDENT MOISTURE CONDITION (AMC) **III** ASSUMED FOR RATIONAL METHOD*

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0312	0.167	0.0150

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

****
FLOW PROCESS FROM NODE 201.00 TO NODE 203.00 IS CODE = 21

>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 186.00
ELEVATION DATA: UPSTREAM(FEET) = 6240.00 DOWNSTREAM(FEET) = 6219.00
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000

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  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 12.641
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.03      0.21      0.100    91    5.00
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.35      0.14      1.000    95    8.83
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.929
  SUBAREA RUNOFF(CFS) =      4.28
  TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      4.28
****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================
****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   152.00
  ELEVATION DATA: UPSTREAM(FEET) =   6223.00  DOWNSTREAM(FEET) =   6219.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 12.641
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.01      0.21      0.100    91    5.00
  NATURAL FAIR COVER
  "WOODLAND,GRASS"           D        0.10      0.14      1.000    95   10.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.918
  SUBAREA RUNOFF(CFS) =      1.24
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      1.24

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        1.24    5.00   12.641  0.14( 0.13) 0.92       0.1     202.00
  LONGEST FLOWPATH FROM NODE    202.00 TO NODE    203.00 =     152.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        4.28    5.00   12.641  0.14( 0.13) 0.93       0.4     201.00
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.

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

```
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        5.52    5.00   12.641  0.14( 0.13) 0.93       0.5     202.00
    2        5.52    5.00   12.641  0.14( 0.13) 0.93       0.5     201.00
  TOTAL AREA(ACRES) =         0.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        5.52  Tc(MIN.) =    5.000
 EFFECTIVE AREA(ACRES) =      0.49  AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap =  0.93
 TOTAL AREA(ACRES) =        0.5
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     186.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   6219.00  DOWNSTREAM(FEET) =   6202.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =   334.00   CHANNEL SLOPE =  0.0494
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   1.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.50
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 11.728
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 D        0.02      0.21     0.100    91
 NATURAL FAIR COVER
 "WOODLAND,GRASS"           D        0.31      0.14     1.000    95
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.14
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.945
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.24
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.85
 AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   0.57
 Tc(MIN.) =    5.57
 SUBAREA AREA(ACRES) =     0.33       SUBAREA RUNOFF(CFS) =    3.44
 EFFECTIVE AREA(ACRES) =      0.82     AREA-AVERAGED Fm(INCH/HR) =   0.13
 AREA-AVERAGED Fp(INCH/HR) =   0.14  AREA-AVERAGED Ap =   0.93
 TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       8.56

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.91   FLOW VELOCITY(FEET/SEC.) =  10.32
 LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =     520.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      5.57
 EFFECTIVE AREA(ACRES) =      0.82  AREA-AVERAGED Fm(INCH/HR)=  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.14  AREA-AVERAGED Ap = 0.934
 PEAK FLOW RATE(CFS)   =       8.56

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        8.56    5.57   11.728  0.14( 0.13) 0.93       0.8     202.00
    2        8.56    5.57   11.728  0.14( 0.13) 0.93       0.8     201.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
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PART III – ATTACHMENTS

Section C

CH1 Calculations
2-, 10-, 25-, and 100-Year Storm Analyses
(Post Development Condition)

CH1

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.50
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.410
LOW LOSS FRACTION = 0.280
TIME OF CONCENTRATION(MIN.) = 5.73 (From Rational Method)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **2**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.24
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.59
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.83
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.62
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.51
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.43
(FROM NOAA 14 AREA RAINFALL DATA)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.15
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.08

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0001	0.04	Q	.	.	.	.
0.15	0.0004	0.04	Q	.	.	.	.
0.24	0.0007	0.04	Q	.	.	.	.
0.34	0.0011	0.04	Q	.	.	.	.
0.43	0.0014	0.04	Q	.	.	.	.
0.53	0.0017	0.04	Q	.	.	.	.
0.62	0.0020	0.04	Q	.	.	.	.
0.72	0.0024	0.04	Q	.	.	.	.
0.82	0.0027	0.04	Q	.	.	.	.
0.91	0.0030	0.04	Q	.	.	.	.
1.01	0.0033	0.04	Q	.	.	.	.
1.10	0.0037	0.04	Q	.	.	.	.
1.20	0.0040	0.04	Q	.	.	.	.
1.29	0.0043	0.04	Q	.	.	.	.
1.39	0.0047	0.04	Q	.	.	.	.
1.48	0.0050	0.04	Q	.	.	.	.
1.58	0.0053	0.04	Q	.	.	.	.
1.67	0.0057	0.04	Q	.	.	.	.
1.77	0.0060	0.04	Q	.	.	.	.
1.87	0.0064	0.04	Q	.	.	.	.
1.96	0.0067	0.04	Q	.	.	.	.
2.06	0.0070	0.04	Q	.	.	.	.
2.15	0.0074	0.04	Q	.	.	.	.
2.25	0.0077	0.04	Q	.	.	.	.
2.34	0.0081	0.04	Q	.	.	.	.
2.44	0.0084	0.04	Q	.	.	.	.
2.53	0.0088	0.04	Q	.	.	.	.
2.63	0.0091	0.04	Q	.	.	.	.
2.73	0.0095	0.04	Q	.	.	.	.
2.82	0.0098	0.04	Q	.	.	.	.
2.92	0.0102	0.04	Q	.	.	.	.

3.01	0.0105	0.04	Q	.	.	.	.
3.11	0.0109	0.04	Q	.	.	.	.
3.20	0.0112	0.04	Q	.	.	.	.
3.30	0.0116	0.05	Q	.	.	.	.
3.39	0.0119	0.05	Q	.	.	.	.
3.49	0.0123	0.05	Q	.	.	.	.
3.58	0.0126	0.05	Q	.	.	.	.
3.68	0.0130	0.05	Q	.	.	.	.
3.78	0.0134	0.05	Q	.	.	.	.
3.87	0.0137	0.05	Q	.	.	.	.
3.97	0.0141	0.05	Q	.	.	.	.
4.06	0.0145	0.05	Q	.	.	.	.
4.16	0.0148	0.05	Q	.	.	.	.
4.25	0.0152	0.05	Q	.	.	.	.
4.35	0.0156	0.05	Q	.	.	.	.
4.44	0.0159	0.05	Q	.	.	.	.
4.54	0.0163	0.05	Q	.	.	.	.
4.64	0.0167	0.05	Q	.	.	.	.
4.73	0.0171	0.05	Q	.	.	.	.
4.83	0.0174	0.05	Q	.	.	.	.
4.92	0.0178	0.05	Q	.	.	.	.
5.02	0.0182	0.05	Q	.	.	.	.
5.11	0.0186	0.05	Q	.	.	.	.
5.21	0.0189	0.05	Q	.	.	.	.
5.30	0.0193	0.05	Q	.	.	.	.
5.40	0.0197	0.05	Q	.	.	.	.
5.50	0.0201	0.05	Q	.	.	.	.
5.59	0.0205	0.05	Q	.	.	.	.
5.69	0.0209	0.05	Q	.	.	.	.
5.78	0.0213	0.05	Q	.	.	.	.
5.88	0.0217	0.05	Q	.	.	.	.
5.97	0.0221	0.05	Q	.	.	.	.
6.07	0.0224	0.05	Q	.	.	.	.
6.16	0.0228	0.05	Q	.	.	.	.
6.26	0.0232	0.05	Q	.	.	.	.
6.35	0.0236	0.05	Q	.	.	.	.
6.45	0.0240	0.05	Q	.	.	.	.
6.55	0.0245	0.05	Q	.	.	.	.
6.64	0.0249	0.05	Q	.	.	.	.
6.74	0.0253	0.05	Q	.	.	.	.
6.83	0.0257	0.05	Q	.	.	.	.
6.93	0.0261	0.05	Q	.	.	.	.
7.02	0.0265	0.05	Q	.	.	.	.
7.12	0.0269	0.05	Q	.	.	.	.
7.21	0.0273	0.05	Q	.	.	.	.
7.31	0.0278	0.05	Q	.	.	.	.
7.40	0.0282	0.05	Q	.	.	.	.
7.50	0.0286	0.05	Q	.	.	.	.
7.60	0.0290	0.05	Q	.	.	.	.
7.69	0.0295	0.05	Q	.	.	.	.
7.79	0.0299	0.05	Q	.	.	.	.
7.88	0.0303	0.05	Q	.	.	.	.
7.98	0.0307	0.06	Q	.	.	.	.
8.07	0.0312	0.06	Q	.	.	.	.
8.17	0.0316	0.06	Q	.	.	.	.
8.26	0.0321	0.06	Q	.	.	.	.
8.36	0.0325	0.06	Q	.	.	.	.
8.46	0.0330	0.06	Q	.	.	.	.

8.55	0.0334	0.06	Q	.	.	.	.
8.65	0.0339	0.06	Q	.	.	.	.
8.74	0.0343	0.06	Q	.	.	.	.
8.84	0.0348	0.06	Q	.	.	.	.
8.93	0.0352	0.06	Q	.	.	.	.
9.03	0.0357	0.06	Q	.	.	.	.
9.12	0.0361	0.06	Q	.	.	.	.
9.22	0.0366	0.06	Q	.	.	.	.
9.32	0.0371	0.06	Q	.	.	.	.
9.41	0.0376	0.06	Q	.	.	.	.
9.51	0.0380	0.06	Q	.	.	.	.
9.60	0.0385	0.06	Q	.	.	.	.
9.70	0.0390	0.06	Q	.	.	.	.
9.79	0.0395	0.06	Q	.	.	.	.
9.89	0.0400	0.06	Q	.	.	.	.
9.98	0.0405	0.06	Q	.	.	.	.
10.08	0.0410	0.06	Q	.	.	.	.
10.17	0.0415	0.06	Q	.	.	.	.
10.27	0.0420	0.06	Q	.	.	.	.
10.37	0.0425	0.06	Q	.	.	.	.
10.46	0.0430	0.06	Q	.	.	.	.
10.56	0.0435	0.07	Q	.	.	.	.
10.65	0.0440	0.07	Q	.	.	.	.
10.75	0.0445	0.07	Q	.	.	.	.
10.84	0.0451	0.07	Q	.	.	.	.
10.94	0.0456	0.07	Q	.	.	.	.
11.03	0.0461	0.07	Q	.	.	.	.
11.13	0.0467	0.07	Q	.	.	.	.
11.23	0.0472	0.07	Q	.	.	.	.
11.32	0.0478	0.07	Q	.	.	.	.
11.42	0.0483	0.07	Q	.	.	.	.
11.51	0.0489	0.07	Q	.	.	.	.
11.61	0.0494	0.07	Q	.	.	.	.
11.70	0.0500	0.07	Q	.	.	.	.
11.80	0.0506	0.07	Q	.	.	.	.
11.89	0.0512	0.07	Q	.	.	.	.
11.99	0.0517	0.07	Q	.	.	.	.
12.08	0.0524	0.08	Q	.	.	.	.
12.18	0.0530	0.09	Q	.	.	.	.
12.28	0.0537	0.09	Q	.	.	.	.
12.37	0.0544	0.09	Q	.	.	.	.
12.47	0.0551	0.09	Q	.	.	.	.
12.56	0.0558	0.09	Q	.	.	.	.
12.66	0.0565	0.09	Q	.	.	.	.
12.75	0.0573	0.09	Q	.	.	.	.
12.85	0.0580	0.09	Q	.	.	.	.
12.94	0.0587	0.09	Q	.	.	.	.
13.04	0.0595	0.09	Q	.	.	.	.
13.13	0.0602	0.10	Q	.	.	.	.
13.23	0.0610	0.10	Q	.	.	.	.
13.33	0.0617	0.10	Q	.	.	.	.
13.42	0.0625	0.10	Q	.	.	.	.
13.52	0.0633	0.10	Q	.	.	.	.
13.61	0.0641	0.10	Q	.	.	.	.
13.71	0.0649	0.10	Q	.	.	.	.
13.80	0.0658	0.11	Q	.	.	.	.
13.90	0.0666	0.11	Q	.	.	.	.
13.99	0.0674	0.11	Q	.	.	.	.

14.09	0.0683	0.11	Q	.	.	.	.
14.19	0.0692	0.11	Q	.	.	.	.
14.28	0.0700	0.11	Q	.	.	.	.
14.38	0.0709	0.11	Q	.	.	.	.
14.47	0.0718	0.12	Q	.	.	.	.
14.57	0.0728	0.12	Q	.	.	.	.
14.66	0.0737	0.12	Q	.	.	.	.
14.76	0.0747	0.13	Q	.	.	.	.
14.85	0.0757	0.13	Q	.	.	.	.
14.95	0.0767	0.13	Q	.	.	.	.
15.05	0.0778	0.14	Q	.	.	.	.
15.14	0.0789	0.14	Q	.	.	.	.
15.24	0.0801	0.15	Q	.	.	.	.
15.33	0.0813	0.16	Q	.	.	.	.
15.43	0.0825	0.15	Q	.	.	.	.
15.52	0.0837	0.15	Q	.	.	.	.
15.62	0.0849	0.16	Q	.	.	.	.
15.71	0.0862	0.18	Q	.	.	.	.
15.81	0.0878	0.20	Q	.	.	.	.
15.90	0.0897	0.28	.Q	.	.	.	.
16.00	0.0922	0.36	.Q	.	.	.	.
16.10	0.0977	**1.03**	.	**Q**	.	.	.
16.19	0.1026	0.23	Q	.	.	.	.
16.29	0.1042	0.17	Q	.	.	.	.
16.38	0.1054	0.14	Q	.	.	.	.
16.48	0.1066	0.15	Q	.	.	.	.
16.57	0.1078	0.14	Q	.	.	.	.
16.67	0.1088	0.13	Q	.	.	.	.
16.76	0.1098	0.12	Q	.	.	.	.
16.86	0.1108	0.12	Q	.	.	.	.
16.95	0.1117	0.11	Q	.	.	.	.
17.05	0.1126	0.11	Q	.	.	.	.
17.15	0.1134	0.11	Q	.	.	.	.
17.24	0.1143	0.10	Q	.	.	.	.
17.34	0.1151	0.10	Q	.	.	.	.
17.43	0.1159	0.10	Q	.	.	.	.
17.53	0.1166	0.10	Q	.	.	.	.
17.62	0.1174	0.09	Q	.	.	.	.
17.72	0.1181	0.09	Q	.	.	.	.
17.81	0.1188	0.09	Q	.	.	.	.
17.91	0.1195	0.09	Q	.	.	.	.
18.01	0.1202	0.09	Q	.	.	.	.
18.10	0.1209	0.08	Q	.	.	.	.
18.20	0.1215	0.07	Q	.	.	.	.
18.29	0.1220	0.07	Q	.	.	.	.
18.39	0.1226	0.07	Q	.	.	.	.
18.48	0.1232	0.07	Q	.	.	.	.
18.58	0.1237	0.07	Q	.	.	.	.
18.67	0.1242	0.07	Q	.	.	.	.
18.77	0.1248	0.07	Q	.	.	.	.
18.86	0.1253	0.07	Q	.	.	.	.
18.96	0.1258	0.06	Q	.	.	.	.
19.06	0.1263	0.06	Q	.	.	.	.
19.15	0.1268	0.06	Q	.	.	.	.
19.25	0.1273	0.06	Q	.	.	.	.
19.34	0.1278	0.06	Q	.	.	.	.
19.44	0.1282	0.06	Q	.	.	.	.
19.53	0.1287	0.06	Q	.	.	.	.

19.63	0.1292	0.06	Q	.	.	.	.
19.72	0.1296	0.06	Q	.	.	.	.
19.82	0.1301	0.06	Q	.	.	.	.
19.92	0.1305	0.06	Q	.	.	.	.
20.01	0.1310	0.06	Q	.	.	.	.
20.11	0.1314	0.06	Q	.	.	.	.
20.20	0.1319	0.05	Q	.	.	.	.
20.30	0.1323	0.05	Q	.	.	.	.
20.39	0.1327	0.05	Q	.	.	.	.
20.49	0.1331	0.05	Q	.	.	.	.
20.58	0.1335	0.05	Q	.	.	.	.
20.68	0.1340	0.05	Q	.	.	.	.
20.77	0.1344	0.05	Q	.	.	.	.
20.87	0.1348	0.05	Q	.	.	.	.
20.97	0.1352	0.05	Q	.	.	.	.
21.06	0.1356	0.05	Q	.	.	.	.
21.16	0.1360	0.05	Q	.	.	.	.
21.25	0.1364	0.05	Q	.	.	.	.
21.35	0.1368	0.05	Q	.	.	.	.
21.44	0.1371	0.05	Q	.	.	.	.
21.54	0.1375	0.05	Q	.	.	.	.
21.63	0.1379	0.05	Q	.	.	.	.
21.73	0.1383	0.05	Q	.	.	.	.
21.83	0.1387	0.05	Q	.	.	.	.
21.92	0.1390	0.05	Q	.	.	.	.
22.02	0.1394	0.05	Q	.	.	.	.
22.11	0.1398	0.05	Q	.	.	.	.
22.21	0.1401	0.05	Q	.	.	.	.
22.30	0.1405	0.05	Q	.	.	.	.
22.40	0.1408	0.05	Q	.	.	.	.
22.49	0.1412	0.05	Q	.	.	.	.
22.59	0.1416	0.04	Q	.	.	.	.
22.68	0.1419	0.04	Q	.	.	.	.
22.78	0.1423	0.04	Q	.	.	.	.
22.88	0.1426	0.04	Q	.	.	.	.
22.97	0.1429	0.04	Q	.	.	.	.
23.07	0.1433	0.04	Q	.	.	.	.
23.16	0.1436	0.04	Q	.	.	.	.
23.26	0.1440	0.04	Q	.	.	.	.
23.35	0.1443	0.04	Q	.	.	.	.
23.45	0.1446	0.04	Q	.	.	.	.
23.54	0.1450	0.04	Q	.	.	.	.
23.64	0.1453	0.04	Q	.	.	.	.
23.74	0.1456	0.04	Q	.	.	.	.
23.83	0.1460	0.04	Q	.	.	.	.
23.93	0.1463	0.04	Q	.	.	.	.
24.02	0.1466	0.04	Q	.	.	.	.
24.12	0.1468	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1444.0

10%	217.7
20%	22.9
30%	11.5
40%	5.7
50%	5.7
60%	5.7
70%	5.7
80%	5.7
90%	5.7

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 1, PROPOSED CONDITION 10-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.50
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.270
LOW LOSS FRACTION = 0.530
TIME OF CONCENTRATION(MIN.) = 5.67 (From Rational Method Analysis)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **10**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.39
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.96
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.35
3-HOUR POINT RAINFALL VALUE(INCHES) = 2.62
6-HOUR POINT RAINFALL VALUE(INCHES) = 4.08
24-HOUR POINT RAINFALL VALUE(INCHES) = 9.16
(NOAA 14 RAINFALL DATA FOR THE AREA)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.18
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.20

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.03	0.0000	0.00	Q	.	.	.	.
0.12	0.0002	0.05	Q	.	.	.	.
0.22	0.0006	0.05	Q	.	.	.	.
0.31	0.0009	0.05	Q	.	.	.	.
0.41	0.0013	0.05	Q	.	.	.	.
0.50	0.0017	0.05	Q	.	.	.	.
0.60	0.0020	0.05	Q	.	.	.	.
0.69	0.0024	0.05	Q	.	.	.	.
0.79	0.0028	0.05	Q	.	.	.	.
0.88	0.0032	0.05	Q	.	.	.	.
0.97	0.0035	0.05	Q	.	.	.	.
1.07	0.0039	0.05	Q	.	.	.	.
1.16	0.0043	0.05	Q	.	.	.	.
1.26	0.0047	0.05	Q	.	.	.	.
1.35	0.0051	0.05	Q	.	.	.	.
1.45	0.0054	0.05	Q	.	.	.	.
1.54	0.0058	0.05	Q	.	.	.	.
1.64	0.0062	0.05	Q	.	.	.	.
1.73	0.0066	0.05	Q	.	.	.	.
1.82	0.0070	0.05	Q	.	.	.	.
1.92	0.0074	0.05	Q	.	.	.	.
2.01	0.0077	0.05	Q	.	.	.	.
2.11	0.0081	0.05	Q	.	.	.	.
2.20	0.0085	0.05	Q	.	.	.	.
2.30	0.0089	0.05	Q	.	.	.	.
2.39	0.0093	0.05	Q	.	.	.	.
2.49	0.0097	0.05	Q	.	.	.	.
2.58	0.0101	0.05	Q	.	.	.	.
2.68	0.0105	0.05	Q	.	.	.	.
2.77	0.0109	0.05	Q	.	.	.	.

2.86	0.0113	0.05	Q	.	.	.	.
2.96	0.0117	0.05	Q	.	.	.	.
3.05	0.0121	0.05	Q	.	.	.	.
3.15	0.0125	0.05	Q	.	.	.	.
3.24	0.0129	0.05	Q	.	.	.	.
3.34	0.0133	0.05	Q	.	.	.	.
3.43	0.0137	0.05	Q	.	.	.	.
3.53	0.0141	0.05	Q	.	.	.	.
3.62	0.0145	0.05	Q	.	.	.	.
3.71	0.0149	0.05	Q	.	.	.	.
3.81	0.0153	0.05	Q	.	.	.	.
3.90	0.0157	0.05	Q	.	.	.	.
4.00	0.0161	0.05	Q	.	.	.	.
4.09	0.0166	0.05	Q	.	.	.	.
4.19	0.0170	0.05	Q	.	.	.	.
4.28	0.0174	0.05	Q	.	.	.	.
4.38	0.0178	0.05	Q	.	.	.	.
4.47	0.0182	0.05	Q	.	.	.	.
4.57	0.0187	0.05	Q	.	.	.	.
4.66	0.0191	0.05	Q	.	.	.	.
4.75	0.0195	0.05	Q	.	.	.	.
4.85	0.0199	0.05	Q	.	.	.	.
4.94	0.0204	0.05	Q	.	.	.	.
5.04	0.0208	0.05	Q	.	.	.	.
5.13	0.0212	0.06	Q	.	.	.	.
5.23	0.0216	0.06	Q	.	.	.	.
5.32	0.0221	0.06	Q	.	.	.	.
5.42	0.0225	0.06	Q	.	.	.	.
5.51	0.0229	0.06	Q	.	.	.	.
5.61	0.0234	0.06	Q	.	.	.	.
5.70	0.0238	0.06	Q	.	.	.	.
5.79	0.0243	0.06	Q	.	.	.	.
5.89	0.0247	0.06	Q	.	.	.	.
5.98	0.0252	0.06	Q	.	.	.	.
6.08	0.0256	0.06	Q	.	.	.	.
6.17	0.0260	0.06	Q	.	.	.	.
6.27	0.0265	0.06	Q	.	.	.	.
6.36	0.0270	0.06	Q	.	.	.	.
6.46	0.0274	0.06	Q	.	.	.	.
6.55	0.0279	0.06	Q	.	.	.	.
6.64	0.0283	0.06	Q	.	.	.	.
6.74	0.0288	0.06	Q	.	.	.	.
6.83	0.0292	0.06	Q	.	.	.	.
6.93	0.0297	0.06	Q	.	.	.	.
7.02	0.0302	0.06	Q	.	.	.	.
7.12	0.0306	0.06	Q	.	.	.	.
7.21	0.0311	0.06	Q	.	.	.	.
7.31	0.0316	0.06	Q	.	.	.	.
7.40	0.0320	0.06	Q	.	.	.	.
7.49	0.0325	0.06	Q	.	.	.	.
7.59	0.0330	0.06	Q	.	.	.	.
7.68	0.0335	0.06	Q	.	.	.	.
7.78	0.0340	0.06	Q	.	.	.	.
7.87	0.0344	0.06	Q	.	.	.	.
7.97	0.0349	0.06	Q	.	.	.	.
8.06	0.0354	0.06	Q	.	.	.	.
8.16	0.0359	0.06	Q	.	.	.	.
8.25	0.0364	0.06	Q	.	.	.	.
8.35	0.0369	0.06	Q	.	.	.	.

8.44	0.0374	0.06	Q	.	.	.	.
8.53	0.0379	0.06	Q	.	.	.	.
8.63	0.0384	0.06	Q	.	.	.	.
8.72	0.0389	0.07	Q	.	.	.	.
8.82	0.0394	0.07	Q	.	.	.	.
8.91	0.0399	0.07	Q	.	.	.	.
9.01	0.0405	0.07	Q	.	.	.	.
9.10	0.0410	0.07	Q	.	.	.	.
9.20	0.0415	0.07	Q	.	.	.	.
9.29	0.0420	0.07	Q	.	.	.	.
9.38	0.0425	0.07	Q	.	.	.	.
9.48	0.0431	0.07	Q	.	.	.	.
9.57	0.0436	0.07	Q	.	.	.	.
9.67	0.0441	0.07	Q	.	.	.	.
9.76	0.0447	0.07	Q	.	.	.	.
9.86	0.0452	0.07	Q	.	.	.	.
9.95	0.0458	0.07	Q	.	.	.	.
10.05	0.0463	0.07	Q	.	.	.	.
10.14	0.0469	0.07	Q	.	.	.	.
10.24	0.0474	0.07	Q	.	.	.	.
10.33	0.0480	0.07	Q	.	.	.	.
10.42	0.0486	0.07	Q	.	.	.	.
10.52	0.0491	0.07	Q	.	.	.	.
10.61	0.0497	0.07	Q	.	.	.	.
10.71	0.0503	0.07	Q	.	.	.	.
10.80	0.0509	0.07	Q	.	.	.	.
10.90	0.0515	0.08	Q	.	.	.	.
10.99	0.0520	0.08	Q	.	.	.	.
11.09	0.0526	0.08	Q	.	.	.	.
11.18	0.0532	0.08	Q	.	.	.	.
11.27	0.0538	0.08	Q	.	.	.	.
11.37	0.0545	0.08	Q	.	.	.	.
11.46	0.0551	0.08	Q	.	.	.	.
11.56	0.0557	0.08	Q	.	.	.	.
11.65	0.0563	0.08	Q	.	.	.	.
11.75	0.0569	0.08	Q	.	.	.	.
11.84	0.0576	0.08	Q	.	.	.	.
11.94	0.0582	0.08	Q	.	.	.	.
12.03	0.0589	0.08	Q	.	.	.	.
12.13	0.0596	0.09	Q	.	.	.	.
12.22	0.0603	0.09	Q	.	.	.	.
12.31	0.0610	0.09	Q	.	.	.	.
12.41	0.0618	0.09	Q	.	.	.	.
12.50	0.0625	0.10	Q	.	.	.	.
12.60	0.0632	0.10	Q	.	.	.	.
12.69	0.0640	0.10	Q	.	.	.	.
12.79	0.0648	0.10	Q	.	.	.	.
12.88	0.0655	0.10	Q	.	.	.	.
12.98	0.0663	0.10	Q	.	.	.	.
13.07	0.0671	0.10	Q	.	.	.	.
13.16	0.0679	0.10	Q	.	.	.	.
13.26	0.0687	0.10	Q	.	.	.	.
13.35	0.0695	0.11	Q	.	.	.	.
13.45	0.0704	0.11	Q	.	.	.	.
13.54	0.0712	0.11	Q	.	.	.	.
13.64	0.0721	0.11	Q	.	.	.	.
13.73	0.0730	0.11	Q	.	.	.	.
13.83	0.0739	0.12	Q	.	.	.	.
13.92	0.0748	0.12	Q	.	.	.	.

14.02	0.0758	0.13	Q	.	.	.	.
14.11	0.0768	0.12	Q	.	.	.	.
14.20	0.0777	0.12	Q	.	.	.	.
14.30	0.0787	0.13	Q	.	.	.	.
14.39	0.0797	0.13	Q	.	.	.	.
14.49	0.0808	0.14	Q	.	.	.	.
14.58	0.0819	0.15	Q	.	.	.	.
14.68	0.0830	0.15	Q	.	.	.	.
14.77	0.0842	0.16	Q	.	.	.	.
14.87	0.0855	0.17	Q	.	.	.	.
14.96	0.0869	0.18	Q	.	.	.	.
15.05	0.0883	0.19	Q	.	.	.	.
15.15	0.0898	0.20	Q	.	.	.	.
15.24	0.0914	0.21	Q	.	.	.	.
15.34	0.0932	0.23	Q	.	.	.	.
15.43	0.0949	0.21	Q	.	.	.	.
15.53	0.0965	0.21	Q	.	.	.	.
15.62	0.0983	0.24	Q	.	.	.	.
15.72	0.1004	0.30	.Q	.	.	.	.
15.81	0.1029	0.34	.Q	.	.	.	.
15.91	0.1062	0.51	. Q	.	.	.	.
16.00	0.1109	0.70	. Q	.	.	.	.
16.09	0.1209	**1.87**	.	**Q**	.	.	.
16.19	0.1298	0.41	.Q	.	.	.	.
16.28	0.1325	0.26	.Q	.	.	.	.
16.38	0.1343	0.20	Q	.	.	.	.
16.47	0.1359	0.22	Q	.	.	.	.
16.57	0.1375	0.19	Q	.	.	.	.
16.66	0.1389	0.17	Q	.	.	.	.
16.76	0.1402	0.16	Q	.	.	.	.
16.85	0.1414	0.14	Q	.	.	.	.
16.94	0.1424	0.13	Q	.	.	.	.
17.04	0.1434	0.12	Q	.	.	.	.
17.13	0.1444	0.12	Q	.	.	.	.
17.23	0.1453	0.12	Q	.	.	.	.
17.32	0.1462	0.11	Q	.	.	.	.
17.42	0.1470	0.11	Q	.	.	.	.
17.51	0.1479	0.10	Q	.	.	.	.
17.61	0.1487	0.10	Q	.	.	.	.
17.70	0.1495	0.10	Q	.	.	.	.
17.80	0.1502	0.10	Q	.	.	.	.
17.89	0.1510	0.10	Q	.	.	.	.
17.98	0.1517	0.09	Q	.	.	.	.
18.08	0.1524	0.09	Q	.	.	.	.
18.17	0.1531	0.08	Q	.	.	.	.
18.27	0.1537	0.08	Q	.	.	.	.
18.36	0.1543	0.08	Q	.	.	.	.
18.46	0.1550	0.08	Q	.	.	.	.
18.55	0.1556	0.08	Q	.	.	.	.
18.65	0.1562	0.08	Q	.	.	.	.
18.74	0.1567	0.07	Q	.	.	.	.
18.83	0.1573	0.07	Q	.	.	.	.
18.93	0.1579	0.07	Q	.	.	.	.
19.02	0.1584	0.07	Q	.	.	.	.
19.12	0.1590	0.07	Q	.	.	.	.
19.21	0.1596	0.07	Q	.	.	.	.
19.31	0.1601	0.07	Q	.	.	.	.
19.40	0.1606	0.07	Q	.	.	.	.
19.50	0.1612	0.07	Q	.	.	.	.

19.59	0.1617	0.07	Q	.	.	.	.
19.69	0.1622	0.07	Q	.	.	.	.
19.78	0.1627	0.06	Q	.	.	.	.
19.87	0.1632	0.06	Q	.	.	.	.
19.97	0.1637	0.06	Q	.	.	.	.
20.06	0.1642	0.06	Q	.	.	.	.
20.16	0.1647	0.06	Q	.	.	.	.
20.25	0.1652	0.06	Q	.	.	.	.
20.35	0.1656	0.06	Q	.	.	.	.
20.44	0.1661	0.06	Q	.	.	.	.
20.54	0.1666	0.06	Q	.	.	.	.
20.63	0.1671	0.06	Q	.	.	.	.
20.73	0.1675	0.06	Q	.	.	.	.
20.82	0.1680	0.06	Q	.	.	.	.
20.91	0.1684	0.06	Q	.	.	.	.
21.01	0.1689	0.06	Q	.	.	.	.
21.10	0.1693	0.06	Q	.	.	.	.
21.20	0.1698	0.06	Q	.	.	.	.
21.29	0.1702	0.06	Q	.	.	.	.
21.39	0.1707	0.06	Q	.	.	.	.
21.48	0.1711	0.06	Q	.	.	.	.
21.58	0.1715	0.06	Q	.	.	.	.
21.67	0.1720	0.05	Q	.	.	.	.
21.76	0.1724	0.05	Q	.	.	.	.
21.86	0.1728	0.05	Q	.	.	.	.
21.95	0.1732	0.05	Q	.	.	.	.
22.05	0.1736	0.05	Q	.	.	.	.
22.14	0.1741	0.05	Q	.	.	.	.
22.24	0.1745	0.05	Q	.	.	.	.
22.33	0.1749	0.05	Q	.	.	.	.
22.43	0.1753	0.05	Q	.	.	.	.
22.52	0.1757	0.05	Q	.	.	.	.
22.61	0.1761	0.05	Q	.	.	.	.
22.71	0.1765	0.05	Q	.	.	.	.
22.80	0.1769	0.05	Q	.	.	.	.
22.90	0.1773	0.05	Q	.	.	.	.
22.99	0.1777	0.05	Q	.	.	.	.
23.09	0.1781	0.05	Q	.	.	.	.
23.18	0.1784	0.05	Q	.	.	.	.
23.28	0.1788	0.05	Q	.	.	.	.
23.37	0.1792	0.05	Q	.	.	.	.
23.47	0.1796	0.05	Q	.	.	.	.
23.56	0.1800	0.05	Q	.	.	.	.
23.65	0.1804	0.05	Q	.	.	.	.
23.75	0.1807	0.05	Q	.	.	.	.
23.84	0.1811	0.05	Q	.	.	.	.
23.94	0.1815	0.05	Q	.	.	.	.
24.03	0.1818	0.05	Q	.	.	.	.
24.13	0.1820	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.2

10%	90.7
20%	22.7
30%	11.3
40%	5.7
50%	5.7
60%	5.7
70%	5.7
80%	5.7
90%	5.7

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 1, PROPOSED CONDITION 25-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.50
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.270
LOW LOSS FRACTION = 0.530
TIME OF CONCENTRATION(MIN.) = 5.65 (FROM RATIONAL METHOD ANALYSIS)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **25**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.49
30-MINUTE POINT RAINFALL VALUE(INCHES) = 1.19
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.68
3-HOUR POINT RAINFALL VALUE(INCHES) = 3.26
6-HOUR POINT RAINFALL VALUE(INCHES) = 5.08
24-HOUR POINT RAINFALL VALUE(INCHES) = 11.50
(DATA FROM NOAA 14 AREA CALIBRATION)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.24
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.24

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TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.09	0.0002	0.06	Q	.	.	.	.
0.18	0.0007	0.06	Q	.	.	.	.
0.27	0.0011	0.06	Q	.	.	.	.
0.37	0.0016	0.06	Q	.	.	.	.
0.46	0.0021	0.06	Q	.	.	.	.
0.56	0.0026	0.06	Q	.	.	.	.
0.65	0.0030	0.06	Q	.	.	.	.
0.74	0.0035	0.06	Q	.	.	.	.
0.84	0.0040	0.06	Q	.	.	.	.
0.93	0.0044	0.06	Q	.	.	.	.
1.03	0.0049	0.06	Q	.	.	.	.
1.12	0.0054	0.06	Q	.	.	.	.
1.22	0.0059	0.06	Q	.	.	.	.
1.31	0.0064	0.06	Q	.	.	.	.
1.40	0.0068	0.06	Q	.	.	.	.
1.50	0.0073	0.06	Q	.	.	.	.
1.59	0.0078	0.06	Q	.	.	.	.
1.69	0.0083	0.06	Q	.	.	.	.
1.78	0.0088	0.06	Q	.	.	.	.
1.87	0.0093	0.06	Q	.	.	.	.
1.97	0.0097	0.06	Q	.	.	.	.
2.06	0.0102	0.06	Q	.	.	.	.
2.16	0.0107	0.06	Q	.	.	.	.
2.25	0.0112	0.06	Q	.	.	.	.
2.35	0.0117	0.06	Q	.	.	.	.
2.44	0.0122	0.06	Q	.	.	.	.
2.53	0.0127	0.06	Q	.	.	.	.

2.63	0.0132	0.06	Q	.	.	.	.
2.72	0.0137	0.06	Q	.	.	.	.
2.82	0.0142	0.06	Q	.	.	.	.
2.91	0.0147	0.06	Q	.	.	.	.
3.00	0.0152	0.06	Q	.	.	.	.
3.10	0.0157	0.07	Q	.	.	.	.
3.19	0.0162	0.07	Q	.	.	.	.
3.29	0.0167	0.07	Q	.	.	.	.
3.38	0.0172	0.07	Q	.	.	.	.
3.48	0.0178	0.07	Q	.	.	.	.
3.57	0.0183	0.07	Q	.	.	.	.
3.66	0.0188	0.07	Q	.	.	.	.
3.76	0.0193	0.07	Q	.	.	.	.
3.85	0.0198	0.07	Q	.	.	.	.
3.95	0.0203	0.07	Q	.	.	.	.
4.04	0.0209	0.07	Q	.	.	.	.
4.13	0.0214	0.07	Q	.	.	.	.
4.23	0.0219	0.07	Q	.	.	.	.
4.32	0.0224	0.07	Q	.	.	.	.
4.42	0.0230	0.07	Q	.	.	.	.
4.51	0.0235	0.07	Q	.	.	.	.
4.61	0.0240	0.07	Q	.	.	.	.
4.70	0.0246	0.07	Q	.	.	.	.
4.79	0.0251	0.07	Q	.	.	.	.
4.89	0.0256	0.07	Q	.	.	.	.
4.98	0.0262	0.07	Q	.	.	.	.
5.08	0.0267	0.07	Q	.	.	.	.
5.17	0.0273	0.07	Q	.	.	.	.
5.26	0.0278	0.07	Q	.	.	.	.
5.36	0.0284	0.07	Q	.	.	.	.
5.45	0.0289	0.07	Q	.	.	.	.
5.55	0.0295	0.07	Q	.	.	.	.
5.64	0.0300	0.07	Q	.	.	.	.
5.74	0.0306	0.07	Q	.	.	.	.
5.83	0.0311	0.07	Q	.	.	.	.
5.92	0.0317	0.07	Q	.	.	.	.
6.02	0.0322	0.07	Q	.	.	.	.
6.11	0.0328	0.07	Q	.	.	.	.
6.21	0.0334	0.07	Q	.	.	.	.
6.30	0.0339	0.07	Q	.	.	.	.
6.39	0.0345	0.07	Q	.	.	.	.
6.49	0.0351	0.07	Q	.	.	.	.
6.58	0.0357	0.07	Q	.	.	.	.
6.68	0.0362	0.07	Q	.	.	.	.
6.77	0.0368	0.07	Q	.	.	.	.
6.87	0.0374	0.07	Q	.	.	.	.
6.96	0.0380	0.08	Q	.	.	.	.
7.05	0.0386	0.08	Q	.	.	.	.
7.15	0.0392	0.08	Q	.	.	.	.
7.24	0.0397	0.08	Q	.	.	.	.
7.34	0.0403	0.08	Q	.	.	.	.
7.43	0.0409	0.08	Q	.	.	.	.
7.53	0.0415	0.08	Q	.	.	.	.
7.62	0.0421	0.08	Q	.	.	.	.
7.71	0.0427	0.08	Q	.	.	.	.
7.81	0.0434	0.08	Q	.	.	.	.

7.90	0.0440	0.08	Q	.	.	.	.
8.00	0.0446	0.08	Q	.	.	.	.
8.09	0.0452	0.08	Q	.	.	.	.
8.18	0.0458	0.08	Q	.	.	.	.
8.28	0.0464	0.08	Q	.	.	.	.
8.37	0.0471	0.08	Q	.	.	.	.
8.47	0.0477	0.08	Q	.	.	.	.
8.56	0.0483	0.08	Q	.	.	.	.
8.65	0.0490	0.08	Q	.	.	.	.
8.75	0.0496	0.08	Q	.	.	.	.
8.84	0.0502	0.08	Q	.	.	.	.
8.94	0.0509	0.08	Q	.	.	.	.
9.03	0.0515	0.08	Q	.	.	.	.
9.13	0.0522	0.08	Q	.	.	.	.
9.22	0.0528	0.08	Q	.	.	.	.
9.31	0.0535	0.09	Q	.	.	.	.
9.41	0.0542	0.09	Q	.	.	.	.
9.50	0.0548	0.09	Q	.	.	.	.
9.60	0.0555	0.09	Q	.	.	.	.
9.69	0.0562	0.09	Q	.	.	.	.
9.78	0.0569	0.09	Q	.	.	.	.
9.88	0.0575	0.09	Q	.	.	.	.
9.97	0.0582	0.09	Q	.	.	.	.
10.07	0.0589	0.09	Q	.	.	.	.
10.16	0.0596	0.09	Q	.	.	.	.
10.26	0.0603	0.09	Q	.	.	.	.
10.35	0.0610	0.09	Q	.	.	.	.
10.44	0.0617	0.09	Q	.	.	.	.
10.54	0.0625	0.09	Q	.	.	.	.
10.63	0.0632	0.09	Q	.	.	.	.
10.73	0.0639	0.09	Q	.	.	.	.
10.82	0.0646	0.09	Q	.	.	.	.
10.91	0.0654	0.09	Q	.	.	.	.
11.01	0.0661	0.10	Q	.	.	.	.
11.10	0.0669	0.10	Q	.	.	.	.
11.20	0.0676	0.10	Q	.	.	.	.
11.29	0.0684	0.10	Q	.	.	.	.
11.39	0.0691	0.10	Q	.	.	.	.
11.48	0.0699	0.10	Q	.	.	.	.
11.57	0.0707	0.10	Q	.	.	.	.
11.67	0.0715	0.10	Q	.	.	.	.
11.76	0.0723	0.10	Q	.	.	.	.
11.86	0.0731	0.10	Q	.	.	.	.
11.95	0.0739	0.10	Q	.	.	.	.
12.05	0.0747	0.11	Q	.	.	.	.
12.14	0.0756	0.12	Q	.	.	.	.
12.23	0.0766	0.13	Q	.	.	.	.
12.33	0.0775	0.13	Q	.	.	.	.
12.42	0.0786	0.13	Q	.	.	.	.
12.52	0.0796	0.13	Q	.	.	.	.
12.61	0.0806	0.13	Q	.	.	.	.
12.70	0.0817	0.14	Q	.	.	.	.
12.80	0.0828	0.14	Q	.	.	.	.
12.89	0.0839	0.14	Q	.	.	.	.
12.99	0.0850	0.15	Q	.	.	.	.
13.08	0.0861	0.15	Q	.	.	.	.

13.18	0.0873	0.15	Q	.	.	.	.
13.27	0.0885	0.16	Q	.	.	.	.
13.36	0.0897	0.16	Q	.	.	.	.
13.46	0.0910	0.16	Q	.	.	.	.
13.55	0.0923	0.17	Q	.	.	.	.
13.65	0.0936	0.17	Q	.	.	.	.
13.74	0.0949	0.17	Q	.	.	.	.
13.83	0.0963	0.18	Q	.	.	.	.
13.93	0.0977	0.18	Q	.	.	.	.
14.02	0.0991	0.19	Q	.	.	.	.
14.12	0.1006	0.18	Q	.	.	.	.
14.21	0.1020	0.18	Q	.	.	.	.
14.30	0.1034	0.19	Q	.	.	.	.
14.40	0.1049	0.20	Q	.	.	.	.
14.49	0.1064	0.20	Q	.	.	.	.
14.59	0.1080	0.21	Q	.	.	.	.
14.68	0.1097	0.22	Q	.	.	.	.
14.78	0.1114	0.23	Q	.	.	.	.
14.87	0.1133	0.24	Q	.	.	.	.
14.96	0.1152	0.25	.Q	.	.	.	.
15.06	0.1172	0.26	.Q	.	.	.	.
15.15	0.1193	0.28	.Q	.	.	.	.
15.25	0.1215	0.29	.Q	.	.	.	.
15.34	0.1239	0.32	.Q	.	.	.	.
15.43	0.1263	0.29	.Q	.	.	.	.
15.53	0.1286	0.30	.Q	.	.	.	.
15.62	0.1310	0.33	.Q	.	.	.	.
15.72	0.1338	0.40	.Q	.	.	.	.
15.81	0.1372	0.46	.Q	.	.	.	.
15.91	0.1415	0.66	. Q	.	.	.	.
16.00	0.1476	0.90	. Q	.	.	.	.
16.09	0.1603	**2.36**	.	**Q**.	.	.	.
16.19	0.1715	0.54	. Q	.	.	.	.
16.28	0.1750	0.36	.Q	.	.	.	.
16.38	0.1775	0.28	.Q	.	.	.	.
16.47	0.1798	0.31	.Q	.	.	.	.
16.57	0.1820	0.27	.Q	.	.	.	.
16.66	0.1840	0.24	Q	.	.	.	.
16.75	0.1858	0.22	Q	.	.	.	.
16.85	0.1875	0.21	Q	.	.	.	.
16.94	0.1891	0.19	Q	.	.	.	.
17.04	0.1905	0.18	Q	.	.	.	.
17.13	0.1919	0.19	Q	.	.	.	.
17.22	0.1933	0.18	Q	.	.	.	.
17.32	0.1947	0.17	Q	.	.	.	.
17.41	0.1960	0.16	Q	.	.	.	.
17.51	0.1972	0.15	Q	.	.	.	.
17.60	0.1983	0.15	Q	.	.	.	.
17.69	0.1995	0.14	Q	.	.	.	.
17.79	0.2006	0.14	Q	.	.	.	.
17.88	0.2016	0.13	Q	.	.	.	.
17.98	0.2026	0.13	Q	.	.	.	.
18.07	0.2036	0.12	Q	.	.	.	.
18.17	0.2044	0.10	Q	.	.	.	.
18.26	0.2052	0.10	Q	.	.	.	.
18.35	0.2060	0.10	Q	.	.	.	.

18.45	0.2068	0.10	Q	.	.	.	.
18.54	0.2075	0.10	Q	.	.	.	.
18.64	0.2083	0.10	Q	.	.	.	.
18.73	0.2090	0.09	Q	.	.	.	.
18.83	0.2097	0.09	Q	.	.	.	.
18.92	0.2105	0.09	Q	.	.	.	.
19.01	0.2112	0.09	Q	.	.	.	.
19.11	0.2119	0.09	Q	.	.	.	.
19.20	0.2126	0.09	Q	.	.	.	.
19.30	0.2132	0.09	Q	.	.	.	.
19.39	0.2139	0.09	Q	.	.	.	.
19.48	0.2146	0.08	Q	.	.	.	.
19.58	0.2152	0.08	Q	.	.	.	.
19.67	0.2159	0.08	Q	.	.	.	.
19.77	0.2165	0.08	Q	.	.	.	.
19.86	0.2171	0.08	Q	.	.	.	.
19.95	0.2178	0.08	Q	.	.	.	.
20.05	0.2184	0.08	Q	.	.	.	.
20.14	0.2190	0.08	Q	.	.	.	.
20.24	0.2196	0.08	Q	.	.	.	.
20.33	0.2202	0.08	Q	.	.	.	.
20.43	0.2208	0.08	Q	.	.	.	.
20.52	0.2214	0.08	Q	.	.	.	.
20.61	0.2220	0.08	Q	.	.	.	.
20.71	0.2226	0.07	Q	.	.	.	.
20.80	0.2232	0.07	Q	.	.	.	.
20.90	0.2238	0.07	Q	.	.	.	.
20.99	0.2243	0.07	Q	.	.	.	.
21.08	0.2249	0.07	Q	.	.	.	.
21.18	0.2255	0.07	Q	.	.	.	.
21.27	0.2260	0.07	Q	.	.	.	.
21.37	0.2266	0.07	Q	.	.	.	.
21.46	0.2271	0.07	Q	.	.	.	.
21.56	0.2277	0.07	Q	.	.	.	.
21.65	0.2282	0.07	Q	.	.	.	.
21.74	0.2287	0.07	Q	.	.	.	.
21.84	0.2293	0.07	Q	.	.	.	.
21.93	0.2298	0.07	Q	.	.	.	.
22.03	0.2303	0.07	Q	.	.	.	.
22.12	0.2309	0.07	Q	.	.	.	.
22.22	0.2314	0.07	Q	.	.	.	.
22.31	0.2319	0.07	Q	.	.	.	.
22.40	0.2324	0.07	Q	.	.	.	.
22.50	0.2329	0.07	Q	.	.	.	.
22.59	0.2334	0.06	Q	.	.	.	.
22.69	0.2339	0.06	Q	.	.	.	.
22.78	0.2344	0.06	Q	.	.	.	.
22.87	0.2349	0.06	Q	.	.	.	.
22.97	0.2354	0.06	Q	.	.	.	.
23.06	0.2359	0.06	Q	.	.	.	.
23.16	0.2364	0.06	Q	.	.	.	.
23.25	0.2369	0.06	Q	.	.	.	.
23.34	0.2374	0.06	Q	.	.	.	.
23.44	0.2379	0.06	Q	.	.	.	.
23.53	0.2383	0.06	Q	.	.	.	.
23.63	0.2388	0.06	Q	.	.	.	.

23.72	0.2393	0.06	Q	.	.	.	.
23.82	0.2398	0.06	Q	.	.	.	.
23.91	0.2402	0.06	Q	.	.	.	.
24.00	0.2407	0.06	Q	.	.	.	.
24.10	0.2409	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.8
10%	113.0
20%	22.6
30%	11.3
40%	5.7
50%	5.7
60%	5.7
70%	5.7
80%	5.7
90%	5.7

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 1, PROPOSED CONDITION 100-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.50
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.120
LOW LOSS FRACTION = 0.790
TIME OF CONCENTRATION(MIN.) = 5.62 (From Rational Method Analysis)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **100**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.65
30-MINUTE POINT RAINFALL VALUE(INCHES) = 1.58
1-HOUR POINT RAINFALL VALUE(INCHES) = 2.22
3-HOUR POINT RAINFALL VALUE(INCHES) = 4.30
6-HOUR POINT RAINFALL VALUE(INCHES) = 6.70
24-HOUR POINT RAINFALL VALUE(INCHES) = 15.00
(NOAA 14 AREA RAINFALL DATA)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.45
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.17

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.08	0.0004	0.11	Q	.	.	.	.
0.17	0.0013	0.11	Q	.	.	.	.
0.26	0.0021	0.11	Q	.	.	.	.
0.36	0.0030	0.11	Q	.	.	.	.
0.45	0.0038	0.11	Q	.	.	.	.
0.55	0.0047	0.11	Q	.	.	.	.
0.64	0.0056	0.11	Q	.	.	.	.
0.73	0.0064	0.11	Q	.	.	.	.
0.83	0.0073	0.11	Q	.	.	.	.
0.92	0.0082	0.11	Q	.	.	.	.
1.01	0.0091	0.11	Q	.	.	.	.
1.11	0.0099	0.11	Q	.	.	.	.
1.20	0.0108	0.11	Q	.	.	.	.
1.29	0.0117	0.12	Q	.	.	.	.
1.39	0.0126	0.12	Q	.	.	.	.
1.48	0.0135	0.12	Q	.	.	.	.
1.58	0.0144	0.12	Q	.	.	.	.
1.67	0.0153	0.12	Q	.	.	.	.
1.76	0.0162	0.12	Q	.	.	.	.
1.86	0.0171	0.12	Q	.	.	.	.
1.95	0.0180	0.12	Q	.	.	.	.
2.04	0.0190	0.12	Q	.	.	.	.
2.14	0.0199	0.12	Q	.	.	.	.
2.23	0.0208	0.12	Q	.	.	.	.
2.32	0.0217	0.12	Q	.	.	.	.
2.42	0.0227	0.12	Q	.	.	.	.
2.51	0.0236	0.12	Q	.	.	.	.
2.61	0.0245	0.12	Q	.	.	.	.
2.70	0.0255	0.12	Q	.	.	.	.
2.79	0.0264	0.12	Q	.	.	.	.

2.89	0.0274	0.12	Q	.	.	.	.
2.98	0.0283	0.12	Q	.	.	.	.
3.07	0.0293	0.12	Q	.	.	.	.
3.17	0.0303	0.12	Q	.	.	.	.
3.26	0.0312	0.13	Q	.	.	.	.
3.36	0.0322	0.13	Q	.	.	.	.
3.45	0.0332	0.13	Q	.	.	.	.
3.54	0.0342	0.13	Q	.	.	.	.
3.64	0.0351	0.13	Q	.	.	.	.
3.73	0.0361	0.13	Q	.	.	.	.
3.82	0.0371	0.13	Q	.	.	.	.
3.92	0.0381	0.13	Q	.	.	.	.
4.01	0.0391	0.13	Q	.	.	.	.
4.10	0.0401	0.13	Q	.	.	.	.
4.20	0.0412	0.13	Q	.	.	.	.
4.29	0.0422	0.13	Q	.	.	.	.
4.39	0.0432	0.13	Q	.	.	.	.
4.48	0.0442	0.13	Q	.	.	.	.
4.57	0.0453	0.13	Q	.	.	.	.
4.67	0.0463	0.13	Q	.	.	.	.
4.76	0.0473	0.13	Q	.	.	.	.
4.85	0.0484	0.14	Q	.	.	.	.
4.95	0.0494	0.14	Q	.	.	.	.
5.04	0.0505	0.14	Q	.	.	.	.
5.13	0.0516	0.14	Q	.	.	.	.
5.23	0.0526	0.14	Q	.	.	.	.
5.32	0.0537	0.14	Q	.	.	.	.
5.42	0.0548	0.14	Q	.	.	.	.
5.51	0.0559	0.14	Q	.	.	.	.
5.60	0.0570	0.14	Q	.	.	.	.
5.70	0.0581	0.14	Q	.	.	.	.
5.79	0.0592	0.14	Q	.	.	.	.
5.88	0.0603	0.14	Q	.	.	.	.
5.98	0.0614	0.14	Q	.	.	.	.
6.07	0.0625	0.14	Q	.	.	.	.
6.17	0.0636	0.15	Q	.	.	.	.
6.26	0.0648	0.15	Q	.	.	.	.
6.35	0.0659	0.15	Q	.	.	.	.
6.45	0.0670	0.15	Q	.	.	.	.
6.54	0.0682	0.15	Q	.	.	.	.
6.63	0.0693	0.15	Q	.	.	.	.
6.73	0.0705	0.15	Q	.	.	.	.
6.82	0.0717	0.15	Q	.	.	.	.
6.91	0.0729	0.15	Q	.	.	.	.
7.01	0.0740	0.15	Q	.	.	.	.
7.10	0.0752	0.15	Q	.	.	.	.
7.20	0.0764	0.16	Q	.	.	.	.
7.29	0.0776	0.16	Q	.	.	.	.
7.38	0.0788	0.16	Q	.	.	.	.
7.48	0.0801	0.16	Q	.	.	.	.
7.57	0.0813	0.16	Q	.	.	.	.
7.66	0.0825	0.16	Q	.	.	.	.
7.76	0.0838	0.16	Q	.	.	.	.
7.85	0.0850	0.16	Q	.	.	.	.
7.94	0.0863	0.16	Q	.	.	.	.
8.04	0.0875	0.16	Q	.	.	.	.
8.13	0.0888	0.17	Q	.	.	.	.
8.23	0.0901	0.17	Q	.	.	.	.
8.32	0.0914	0.17	Q	.	.	.	.

8.41	0.0927	0.17	Q	.	.	.	.
8.51	0.0940	0.17	Q	.	.	.	.
8.60	0.0953	0.17	Q	.	.	.	.
8.69	0.0966	0.17	Q	.	.	.	.
8.79	0.0980	0.17	Q	.	.	.	.
8.88	0.0993	0.17	Q	.	.	.	.
8.98	0.1007	0.18	Q	.	.	.	.
9.07	0.1020	0.18	Q	.	.	.	.
9.16	0.1034	0.18	Q	.	.	.	.
9.26	0.1048	0.18	Q	.	.	.	.
9.35	0.1062	0.18	Q	.	.	.	.
9.44	0.1076	0.18	Q	.	.	.	.
9.54	0.1090	0.18	Q	.	.	.	.
9.63	0.1105	0.18	Q	.	.	.	.
9.72	0.1119	0.19	Q	.	.	.	.
9.82	0.1133	0.19	Q	.	.	.	.
9.91	0.1148	0.19	Q	.	.	.	.
10.01	0.1163	0.19	Q	.	.	.	.
10.10	0.1178	0.19	Q	.	.	.	.
10.19	0.1193	0.19	Q	.	.	.	.
10.29	0.1208	0.20	Q	.	.	.	.
10.38	0.1223	0.20	Q	.	.	.	.
10.47	0.1238	0.20	Q	.	.	.	.
10.57	0.1254	0.20	Q	.	.	.	.
10.66	0.1270	0.20	Q	.	.	.	.
10.75	0.1285	0.20	Q	.	.	.	.
10.85	0.1301	0.21	Q	.	.	.	.
10.94	0.1318	0.21	Q	.	.	.	.
11.04	0.1334	0.21	Q	.	.	.	.
11.13	0.1350	0.21	Q	.	.	.	.
11.22	0.1367	0.22	Q	.	.	.	.
11.32	0.1384	0.22	Q	.	.	.	.
11.41	0.1401	0.22	Q	.	.	.	.
11.50	0.1418	0.22	Q	.	.	.	.
11.60	0.1435	0.22	Q	.	.	.	.
11.69	0.1452	0.23	Q	.	.	.	.
11.78	0.1470	0.23	Q	.	.	.	.
11.88	0.1488	0.23	Q	.	.	.	.
11.97	0.1506	0.24	Q	.	.	.	.
12.07	0.1524	0.24	Q	.	.	.	.
12.16	0.1544	0.27	.Q	.	.	.	.
12.25	0.1565	0.27	.Q	.	.	.	.
12.35	0.1586	0.28	.Q	.	.	.	.
12.44	0.1608	0.28	.Q	.	.	.	.
12.53	0.1630	0.28	.Q	.	.	.	.
12.63	0.1651	0.28	.Q	.	.	.	.
12.72	0.1674	0.29	.Q	.	.	.	.
12.82	0.1696	0.29	.Q	.	.	.	.
12.91	0.1719	0.30	.Q	.	.	.	.
13.00	0.1742	0.30	.Q	.	.	.	.
13.10	0.1765	0.30	.Q	.	.	.	.
13.19	0.1789	0.31	.Q	.	.	.	.
13.28	0.1813	0.31	.Q	.	.	.	.
13.38	0.1837	0.32	.Q	.	.	.	.
13.47	0.1862	0.32	.Q	.	.	.	.
13.56	0.1887	0.33	.Q	.	.	.	.
13.66	0.1912	0.33	.Q	.	.	.	.
13.75	0.1938	0.34	.Q	.	.	.	.
13.85	0.1964	0.34	.Q	.	.	.	.

13.94	0.1991	0.35	.Q	.	.	.	.
14.03	0.2018	0.36	.Q	.	.	.	.
14.13	0.2045	0.34	.Q	.	.	.	.
14.22	0.2072	0.35	.Q	.	.	.	.
14.31	0.2099	0.35	.Q	.	.	.	.
14.41	0.2127	0.36	.Q	.	.	.	.
14.50	0.2155	0.37	.Q	.	.	.	.
14.60	0.2184	0.39	.Q	.	.	.	.
14.69	0.2214	0.39	.Q	.	.	.	.
14.78	0.2246	0.41	.Q	.	.	.	.
14.88	0.2278	0.42	.Q	.	.	.	.
14.97	0.2311	0.44	.Q	.	.	.	.
15.06	0.2345	0.45	.Q	.	.	.	.
15.16	0.2381	0.48	.Q	.	.	.	.
15.25	0.2419	0.49	.Q	.	.	.	.
15.34	0.2459	0.53	. Q	.	.	.	.
15.44	0.2497	0.48	.Q	.	.	.	.
15.53	0.2535	0.50	.Q	.	.	.	.
15.63	0.2575	0.53	. Q	.	.	.	.
15.72	0.2620	0.64	. Q	.	.	.	.
15.81	0.2673	0.72	. Q	.	.	.	.
15.91	0.2739	0.99	. Q	.	.	.	.
16.00	0.2828	1.31	. Q	.	.	.	.
16.09	0.3004	**3.24**	.	. **Q**	.	.	.
16.19	0.3161	0.83	. Q	.	.	.	.
16.28	0.3215	0.58	. Q	.	.	.	.
16.37	0.3256	0.47	.Q	.	.	.	.
16.47	0.3293	0.51	. Q	.	.	.	.
16.56	0.3331	0.46	.Q	.	.	.	.
16.66	0.3366	0.43	.Q	.	.	.	.
16.75	0.3398	0.40	.Q	.	.	.	.
16.84	0.3428	0.38	.Q	.	.	.	.
16.94	0.3456	0.36	.Q	.	.	.	.
17.03	0.3484	0.34	.Q	.	.	.	.
17.12	0.3510	0.35	.Q	.	.	.	.
17.22	0.3537	0.34	.Q	.	.	.	.
17.31	0.3563	0.33	.Q	.	.	.	.
17.41	0.3588	0.32	.Q	.	.	.	.
17.50	0.3612	0.31	.Q	.	.	.	.
17.59	0.3636	0.30	.Q	.	.	.	.
17.69	0.3659	0.29	.Q	.	.	.	.
17.78	0.3682	0.29	.Q	.	.	.	.
17.87	0.3704	0.28	.Q	.	.	.	.
17.97	0.3725	0.27	.Q	.	.	.	.
18.06	0.3746	0.27	.Q	.	.	.	.
18.15	0.3765	0.23	Q	.	.	.	.
18.25	0.3783	0.23	Q	.	.	.	.
18.34	0.3801	0.22	Q	.	.	.	.
18.44	0.3818	0.22	Q	.	.	.	.
18.53	0.3835	0.21	Q	.	.	.	.
18.62	0.3851	0.21	Q	.	.	.	.
18.72	0.3867	0.21	Q	.	.	.	.
18.81	0.3883	0.20	Q	.	.	.	.
18.90	0.3899	0.20	Q	.	.	.	.
19.00	0.3914	0.20	Q	.	.	.	.
19.09	0.3929	0.19	Q	.	.	.	.
19.18	0.3944	0.19	Q	.	.	.	.
19.28	0.3958	0.19	Q	.	.	.	.
19.37	0.3972	0.18	Q	.	.	.	.

19.47	0.3986	0.18	Q	.	.	.	.
19.56	0.4000	0.18	Q	.	.	.	.
19.65	0.4014	0.18	Q	.	.	.	.
19.75	0.4027	0.17	Q	.	.	.	.
19.84	0.4041	0.17	Q	.	.	.	.
19.93	0.4054	0.17	Q	.	.	.	.
20.03	0.4067	0.17	Q	.	.	.	.
20.12	0.4079	0.16	Q	.	.	.	.
20.22	0.4092	0.16	Q	.	.	.	.
20.31	0.4104	0.16	Q	.	.	.	.
20.40	0.4117	0.16	Q	.	.	.	.
20.50	0.4129	0.16	Q	.	.	.	.
20.59	0.4141	0.15	Q	.	.	.	.
20.68	0.4153	0.15	Q	.	.	.	.
20.78	0.4164	0.15	Q	.	.	.	.
20.87	0.4176	0.15	Q	.	.	.	.
20.96	0.4187	0.15	Q	.	.	.	.
21.06	0.4199	0.15	Q	.	.	.	.
21.15	0.4210	0.14	Q	.	.	.	.
21.25	0.4221	0.14	Q	.	.	.	.
21.34	0.4232	0.14	Q	.	.	.	.
21.43	0.4243	0.14	Q	.	.	.	.
21.53	0.4254	0.14	Q	.	.	.	.
21.62	0.4264	0.14	Q	.	.	.	.
21.71	0.4275	0.14	Q	.	.	.	.
21.81	0.4285	0.13	Q	.	.	.	.
21.90	0.4295	0.13	Q	.	.	.	.
21.99	0.4306	0.13	Q	.	.	.	.
22.09	0.4316	0.13	Q	.	.	.	.
22.18	0.4326	0.13	Q	.	.	.	.
22.28	0.4336	0.13	Q	.	.	.	.
22.37	0.4346	0.13	Q	.	.	.	.
22.46	0.4355	0.13	Q	.	.	.	.
22.56	0.4365	0.12	Q	.	.	.	.
22.65	0.4375	0.12	Q	.	.	.	.
22.74	0.4384	0.12	Q	.	.	.	.
22.84	0.4394	0.12	Q	.	.	.	.
22.93	0.4403	0.12	Q	.	.	.	.
23.02	0.4412	0.12	Q	.	.	.	.
23.12	0.4422	0.12	Q	.	.	.	.
23.21	0.4431	0.12	Q	.	.	.	.
23.31	0.4440	0.12	Q	.	.	.	.
23.40	0.4449	0.12	Q	.	.	.	.
23.49	0.4458	0.11	Q	.	.	.	.
23.59	0.4466	0.11	Q	.	.	.	.
23.68	0.4475	0.11	Q	.	.	.	.
23.77	0.4484	0.11	Q	.	.	.	.
23.87	0.4493	0.11	Q	.	.	.	.
23.96	0.4501	0.11	Q	.	.	.	.
24.06	0.4510	0.11	Q	.	.	.	.
24.15	0.4514	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)

0%	1444.3
10%	230.4
20%	28.1
30%	16.9
40%	11.2
50%	5.6
60%	5.6
70%	5.6
80%	5.6
90%	5.6

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 2, PROPOSED CONDITION 2-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.55
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.370
LOW LOSS FRACTION = 0.280
TIME OF CONCENTRATION(MIN.) = 5.70 (From Rational Method Calcs)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **2**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.24
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.59
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.83
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.62
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.51
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.43
(From NOAA 14 Rainfall Data for the Area)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.16
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.09

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.04	0.0000	0.00	Q	.	.	.	.
0.14	0.0002	0.04	Q	.	.	.	.
0.23	0.0005	0.05	Q	.	.	.	.
0.33	0.0009	0.05	Q	.	.	.	.
0.42	0.0012	0.05	Q	.	.	.	.
0.52	0.0016	0.05	Q	.	.	.	.
0.61	0.0020	0.05	Q	.	.	.	.
0.71	0.0023	0.05	Q	.	.	.	.
0.80	0.0027	0.05	Q	.	.	.	.
0.90	0.0030	0.05	Q	.	.	.	.
0.99	0.0034	0.05	Q	.	.	.	.
1.09	0.0038	0.05	Q	.	.	.	.
1.18	0.0041	0.05	Q	.	.	.	.
1.28	0.0045	0.05	Q	.	.	.	.
1.37	0.0048	0.05	Q	.	.	.	.
1.47	0.0052	0.05	Q	.	.	.	.
1.56	0.0056	0.05	Q	.	.	.	.
1.66	0.0059	0.05	Q	.	.	.	.
1.75	0.0063	0.05	Q	.	.	.	.
1.85	0.0067	0.05	Q	.	.	.	.
1.94	0.0071	0.05	Q	.	.	.	.
2.04	0.0074	0.05	Q	.	.	.	.
2.13	0.0078	0.05	Q	.	.	.	.
2.23	0.0082	0.05	Q	.	.	.	.
2.32	0.0086	0.05	Q	.	.	.	.
2.42	0.0089	0.05	Q	.	.	.	.
2.51	0.0093	0.05	Q	.	.	.	.
2.61	0.0097	0.05	Q	.	.	.	.
2.70	0.0101	0.05	Q	.	.	.	.
2.80	0.0105	0.05	Q	.	.	.	.

2.89	0.0108	0.05	Q	.	.	.	.
2.99	0.0112	0.05	Q	.	.	.	.
3.08	0.0116	0.05	Q	.	.	.	.
3.18	0.0120	0.05	Q	.	.	.	.
3.27	0.0124	0.05	Q	.	.	.	.
3.37	0.0128	0.05	Q	.	.	.	.
3.46	0.0132	0.05	Q	.	.	.	.
3.56	0.0136	0.05	Q	.	.	.	.
3.65	0.0140	0.05	Q	.	.	.	.
3.75	0.0143	0.05	Q	.	.	.	.
3.84	0.0147	0.05	Q	.	.	.	.
3.94	0.0151	0.05	Q	.	.	.	.
4.03	0.0155	0.05	Q	.	.	.	.
4.13	0.0159	0.05	Q	.	.	.	.
4.22	0.0163	0.05	Q	.	.	.	.
4.32	0.0167	0.05	Q	.	.	.	.
4.41	0.0171	0.05	Q	.	.	.	.
4.51	0.0176	0.05	Q	.	.	.	.
4.60	0.0180	0.05	Q	.	.	.	.
4.70	0.0184	0.05	Q	.	.	.	.
4.79	0.0188	0.05	Q	.	.	.	.
4.89	0.0192	0.05	Q	.	.	.	.
4.98	0.0196	0.05	Q	.	.	.	.
5.08	0.0200	0.05	Q	.	.	.	.
5.17	0.0204	0.05	Q	.	.	.	.
5.27	0.0209	0.05	Q	.	.	.	.
5.36	0.0213	0.05	Q	.	.	.	.
5.46	0.0217	0.05	Q	.	.	.	.
5.55	0.0221	0.05	Q	.	.	.	.
5.64	0.0225	0.05	Q	.	.	.	.
5.74	0.0230	0.05	Q	.	.	.	.
5.84	0.0234	0.05	Q	.	.	.	.
5.93	0.0238	0.05	Q	.	.	.	.
6.03	0.0243	0.06	Q	.	.	.	.
6.12	0.0247	0.06	Q	.	.	.	.
6.22	0.0251	0.06	Q	.	.	.	.
6.31	0.0256	0.06	Q	.	.	.	.
6.41	0.0260	0.06	Q	.	.	.	.
6.50	0.0265	0.06	Q	.	.	.	.
6.60	0.0269	0.06	Q	.	.	.	.
6.69	0.0273	0.06	Q	.	.	.	.
6.79	0.0278	0.06	Q	.	.	.	.
6.88	0.0282	0.06	Q	.	.	.	.
6.98	0.0287	0.06	Q	.	.	.	.
7.07	0.0291	0.06	Q	.	.	.	.
7.17	0.0296	0.06	Q	.	.	.	.
7.26	0.0301	0.06	Q	.	.	.	.
7.36	0.0305	0.06	Q	.	.	.	.
7.45	0.0310	0.06	Q	.	.	.	.
7.55	0.0314	0.06	Q	.	.	.	.
7.64	0.0319	0.06	Q	.	.	.	.
7.74	0.0324	0.06	Q	.	.	.	.
7.83	0.0329	0.06	Q	.	.	.	.
7.93	0.0333	0.06	Q	.	.	.	.
8.02	0.0338	0.06	Q	.	.	.	.
8.12	0.0343	0.06	Q	.	.	.	.
8.21	0.0348	0.06	Q	.	.	.	.
8.31	0.0352	0.06	Q	.	.	.	.
8.40	0.0357	0.06	Q	.	.	.	.

8.49	0.0362	0.06	Q	.	.	.	.
8.59	0.0367	0.06	Q	.	.	.	.
8.69	0.0372	0.06	Q	.	.	.	.
8.78	0.0377	0.06	Q	.	.	.	.
8.88	0.0382	0.06	Q	.	.	.	.
8.97	0.0387	0.06	Q	.	.	.	.
9.07	0.0392	0.06	Q	.	.	.	.
9.16	0.0397	0.07	Q	.	.	.	.
9.26	0.0402	0.07	Q	.	.	.	.
9.35	0.0408	0.07	Q	.	.	.	.
9.45	0.0413	0.07	Q	.	.	.	.
9.54	0.0418	0.07	Q	.	.	.	.
9.64	0.0423	0.07	Q	.	.	.	.
9.73	0.0429	0.07	Q	.	.	.	.
9.82	0.0434	0.07	Q	.	.	.	.
9.92	0.0439	0.07	Q	.	.	.	.
10.02	0.0445	0.07	Q	.	.	.	.
10.11	0.0450	0.07	Q	.	.	.	.
10.20	0.0456	0.07	Q	.	.	.	.
10.30	0.0461	0.07	Q	.	.	.	.
10.40	0.0467	0.07	Q	.	.	.	.
10.49	0.0472	0.07	Q	.	.	.	.
10.59	0.0478	0.07	Q	.	.	.	.
10.68	0.0484	0.07	Q	.	.	.	.
10.77	0.0489	0.07	Q	.	.	.	.
10.87	0.0495	0.07	Q	.	.	.	.
10.97	0.0501	0.07	Q	.	.	.	.
11.06	0.0507	0.07	Q	.	.	.	.
11.15	0.0513	0.08	Q	.	.	.	.
11.25	0.0519	0.08	Q	.	.	.	.
11.35	0.0525	0.08	Q	.	.	.	.
11.44	0.0531	0.08	Q	.	.	.	.
11.54	0.0537	0.08	Q	.	.	.	.
11.63	0.0543	0.08	Q	.	.	.	.
11.73	0.0549	0.08	Q	.	.	.	.
11.82	0.0556	0.08	Q	.	.	.	.
11.91	0.0562	0.08	Q	.	.	.	.
12.01	0.0568	0.08	Q	.	.	.	.
12.10	0.0575	0.09	Q	.	.	.	.
12.20	0.0583	0.10	Q	.	.	.	.
12.30	0.0590	0.10	Q	.	.	.	.
12.39	0.0598	0.10	Q	.	.	.	.
12.49	0.0605	0.10	Q	.	.	.	.
12.58	0.0613	0.10	Q	.	.	.	.
12.68	0.0621	0.10	Q	.	.	.	.
12.77	0.0629	0.10	Q	.	.	.	.
12.87	0.0637	0.10	Q	.	.	.	.
12.96	0.0645	0.10	Q	.	.	.	.
13.05	0.0653	0.10	Q	.	.	.	.
13.15	0.0661	0.11	Q	.	.	.	.
13.24	0.0670	0.11	Q	.	.	.	.
13.34	0.0678	0.11	Q	.	.	.	.
13.43	0.0687	0.11	Q	.	.	.	.
13.53	0.0695	0.11	Q	.	.	.	.
13.62	0.0704	0.11	Q	.	.	.	.
13.72	0.0713	0.11	Q	.	.	.	.
13.82	0.0722	0.12	Q	.	.	.	.
13.91	0.0731	0.12	Q	.	.	.	.
14.01	0.0741	0.12	Q	.	.	.	.

14.10	0.0750	0.12	Q	.	.	.	.
14.20	0.0759	0.12	Q	.	.	.	.
14.29	0.0769	0.12	Q	.	.	.	.
14.38	0.0779	0.13	Q	.	.	.	.
14.48	0.0789	0.13	Q	.	.	.	.
14.57	0.0799	0.13	Q	.	.	.	.
14.67	0.0809	0.13	Q	.	.	.	.
14.77	0.0820	0.14	Q	.	.	.	.
14.86	0.0831	0.14	Q	.	.	.	.
14.95	0.0843	0.15	Q	.	.	.	.
15.05	0.0854	0.15	Q	.	.	.	.
15.15	0.0866	0.16	Q	.	.	.	.
15.24	0.0879	0.16	Q	.	.	.	.
15.34	0.0892	0.17	Q	.	.	.	.
15.43	0.0906	0.16	Q	.	.	.	.
15.52	0.0918	0.16	Q	.	.	.	.
15.62	0.0932	0.17	Q	.	.	.	.
15.72	0.0946	0.20	Q	.	.	.	.
15.81	0.0963	0.23	Q	.	.	.	.
15.90	0.0984	0.30	.Q	.	.	.	.
16.00	0.1012	0.40	.Q	.	.	.	.
16.09	0.1073	**1.16**	.	**Q**	.	.	.
16.19	0.1128	0.26	.Q	.	.	.	.
16.28	0.1145	0.19	Q	.	.	.	.
16.38	0.1159	0.15	Q	.	.	.	.
16.48	0.1171	0.17	Q	.	.	.	.
16.57	0.1184	0.16	Q	.	.	.	.
16.67	0.1196	0.14	Q	.	.	.	.
16.76	0.1207	0.14	Q	.	.	.	.
16.85	0.1217	0.13	Q	.	.	.	.
16.95	0.1227	0.12	Q	.	.	.	.
17.05	0.1237	0.12	Q	.	.	.	.
17.14	0.1246	0.12	Q	.	.	.	.
17.23	0.1255	0.12	Q	.	.	.	.
17.33	0.1264	0.11	Q	.	.	.	.
17.42	0.1273	0.11	Q	.	.	.	.
17.52	0.1282	0.11	Q	.	.	.	.
17.61	0.1290	0.10	Q	.	.	.	.
17.71	0.1298	0.10	Q	.	.	.	.
17.81	0.1306	0.10	Q	.	.	.	.
17.90	0.1313	0.10	Q	.	.	.	.
17.99	0.1321	0.10	Q	.	.	.	.
18.09	0.1328	0.08	Q	.	.	.	.
18.18	0.1335	0.08	Q	.	.	.	.
18.28	0.1341	0.08	Q	.	.	.	.
18.38	0.1347	0.08	Q	.	.	.	.
18.47	0.1353	0.08	Q	.	.	.	.
18.57	0.1359	0.08	Q	.	.	.	.
18.66	0.1365	0.07	Q	.	.	.	.
18.76	0.1371	0.07	Q	.	.	.	.
18.85	0.1376	0.07	Q	.	.	.	.
18.94	0.1382	0.07	Q	.	.	.	.
19.04	0.1388	0.07	Q	.	.	.	.
19.14	0.1393	0.07	Q	.	.	.	.
19.23	0.1398	0.07	Q	.	.	.	.
19.33	0.1404	0.07	Q	.	.	.	.
19.42	0.1409	0.07	Q	.	.	.	.
19.52	0.1414	0.07	Q	.	.	.	.
19.61	0.1419	0.06	Q	.	.	.	.

19.70	0.1424	0.06	Q	.	.	.	.
19.80	0.1429	0.06	Q	.	.	.	.
19.89	0.1434	0.06	Q	.	.	.	.
19.99	0.1439	0.06	Q	.	.	.	.
20.08	0.1444	0.06	Q	.	.	.	.
20.18	0.1449	0.06	Q	.	.	.	.
20.27	0.1453	0.06	Q	.	.	.	.
20.37	0.1458	0.06	Q	.	.	.	.
20.47	0.1463	0.06	Q	.	.	.	.
20.56	0.1467	0.06	Q	.	.	.	.
20.66	0.1472	0.06	Q	.	.	.	.
20.75	0.1476	0.06	Q	.	.	.	.
20.84	0.1481	0.06	Q	.	.	.	.
20.94	0.1485	0.06	Q	.	.	.	.
21.03	0.1489	0.06	Q	.	.	.	.
21.13	0.1494	0.06	Q	.	.	.	.
21.23	0.1498	0.05	Q	.	.	.	.
21.32	0.1502	0.05	Q	.	.	.	.
21.42	0.1507	0.05	Q	.	.	.	.
21.51	0.1511	0.05	Q	.	.	.	.
21.61	0.1515	0.05	Q	.	.	.	.
21.70	0.1519	0.05	Q	.	.	.	.
21.80	0.1523	0.05	Q	.	.	.	.
21.89	0.1527	0.05	Q	.	.	.	.
21.98	0.1531	0.05	Q	.	.	.	.
22.08	0.1535	0.05	Q	.	.	.	.
22.17	0.1539	0.05	Q	.	.	.	.
22.27	0.1543	0.05	Q	.	.	.	.
22.36	0.1547	0.05	Q	.	.	.	.
22.46	0.1551	0.05	Q	.	.	.	.
22.55	0.1555	0.05	Q	.	.	.	.
22.65	0.1559	0.05	Q	.	.	.	.
22.74	0.1563	0.05	Q	.	.	.	.
22.84	0.1566	0.05	Q	.	.	.	.
22.93	0.1570	0.05	Q	.	.	.	.
23.03	0.1574	0.05	Q	.	.	.	.
23.12	0.1578	0.05	Q	.	.	.	.
23.22	0.1581	0.05	Q	.	.	.	.
23.32	0.1585	0.05	Q	.	.	.	.
23.41	0.1589	0.05	Q	.	.	.	.
23.50	0.1593	0.05	Q	.	.	.	.
23.60	0.1596	0.05	Q	.	.	.	.
23.69	0.1600	0.05	Q	.	.	.	.
23.79	0.1603	0.05	Q	.	.	.	.
23.89	0.1607	0.05	Q	.	.	.	.
23.98	0.1610	0.05	Q	.	.	.	.
24.08	0.1614	0.04	Q	.	.	.	.
24.17	0.1616	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1442.1
10%	205.2

20%	22.8
30%	11.4
40%	5.7
50%	5.7
60%	5.7
70%	5.7
80%	5.7
90%	5.7

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 2, PROPOSED CONDITION 10-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.55
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.240
LOW LOSS FRACTION = 0.530
TIME OF CONCENTRATION(MIN.) = 5.69 (From Rational Method Calcs)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **10**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.39
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.96
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.35
3-HOUR POINT RAINFALL VALUE(INCHES) = 2.62
6-HOUR POINT RAINFALL VALUE(INCHES) = 4.08
24-HOUR POINT RAINFALL VALUE(INCHES) = 9.16
(From NOAA 14 Rainfall Data for the Area)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.21
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.21

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.07	0.0002	0.05	Q	.	.	.	.
0.16	0.0006	0.05	Q	.	.	.	.
0.26	0.0010	0.05	Q	.	.	.	.
0.35	0.0014	0.05	Q	.	.	.	.
0.45	0.0018	0.05	Q	.	.	.	.
0.54	0.0022	0.05	Q	.	.	.	.
0.64	0.0027	0.05	Q	.	.	.	.
0.73	0.0031	0.05	Q	.	.	.	.
0.83	0.0035	0.05	Q	.	.	.	.
0.92	0.0039	0.05	Q	.	.	.	.
1.02	0.0043	0.05	Q	.	.	.	.
1.11	0.0047	0.05	Q	.	.	.	.
1.21	0.0051	0.05	Q	.	.	.	.
1.30	0.0056	0.05	Q	.	.	.	.
1.40	0.0060	0.05	Q	.	.	.	.
1.49	0.0064	0.05	Q	.	.	.	.
1.59	0.0068	0.05	Q	.	.	.	.
1.68	0.0073	0.05	Q	.	.	.	.
1.77	0.0077	0.05	Q	.	.	.	.
1.87	0.0081	0.05	Q	.	.	.	.
1.96	0.0085	0.05	Q	.	.	.	.
2.06	0.0090	0.05	Q	.	.	.	.
2.15	0.0094	0.05	Q	.	.	.	.
2.25	0.0098	0.06	Q	.	.	.	.
2.34	0.0103	0.06	Q	.	.	.	.
2.44	0.0107	0.06	Q	.	.	.	.
2.53	0.0111	0.06	Q	.	.	.	.
2.63	0.0116	0.06	Q	.	.	.	.
2.72	0.0120	0.06	Q	.	.	.	.
2.82	0.0124	0.06	Q	.	.	.	.

2.91	0.0129	0.06	Q	.	.	.	.
3.01	0.0133	0.06	Q	.	.	.	.
3.10	0.0138	0.06	Q	.	.	.	.
3.20	0.0142	0.06	Q	.	.	.	.
3.29	0.0146	0.06	Q	.	.	.	.
3.39	0.0151	0.06	Q	.	.	.	.
3.48	0.0155	0.06	Q	.	.	.	.
3.58	0.0160	0.06	Q	.	.	.	.
3.67	0.0164	0.06	Q	.	.	.	.
3.77	0.0169	0.06	Q	.	.	.	.
3.86	0.0173	0.06	Q	.	.	.	.
3.96	0.0178	0.06	Q	.	.	.	.
4.05	0.0183	0.06	Q	.	.	.	.
4.15	0.0187	0.06	Q	.	.	.	.
4.24	0.0192	0.06	Q	.	.	.	.
4.34	0.0196	0.06	Q	.	.	.	.
4.43	0.0201	0.06	Q	.	.	.	.
4.53	0.0206	0.06	Q	.	.	.	.
4.62	0.0210	0.06	Q	.	.	.	.
4.71	0.0215	0.06	Q	.	.	.	.
4.81	0.0220	0.06	Q	.	.	.	.
4.90	0.0224	0.06	Q	.	.	.	.
5.00	0.0229	0.06	Q	.	.	.	.
5.09	0.0234	0.06	Q	.	.	.	.
5.19	0.0239	0.06	Q	.	.	.	.
5.28	0.0243	0.06	Q	.	.	.	.
5.38	0.0248	0.06	Q	.	.	.	.
5.47	0.0253	0.06	Q	.	.	.	.
5.57	0.0258	0.06	Q	.	.	.	.
5.66	0.0263	0.06	Q	.	.	.	.
5.76	0.0267	0.06	Q	.	.	.	.
5.85	0.0272	0.06	Q	.	.	.	.
5.95	0.0277	0.06	Q	.	.	.	.
6.04	0.0282	0.06	Q	.	.	.	.
6.14	0.0287	0.06	Q	.	.	.	.
6.23	0.0292	0.06	Q	.	.	.	.
6.33	0.0297	0.06	Q	.	.	.	.
6.42	0.0302	0.06	Q	.	.	.	.
6.52	0.0307	0.06	Q	.	.	.	.
6.61	0.0312	0.06	Q	.	.	.	.
6.71	0.0317	0.06	Q	.	.	.	.
6.80	0.0322	0.07	Q	.	.	.	.
6.90	0.0327	0.07	Q	.	.	.	.
6.99	0.0333	0.07	Q	.	.	.	.
7.09	0.0338	0.07	Q	.	.	.	.
7.18	0.0343	0.07	Q	.	.	.	.
7.28	0.0348	0.07	Q	.	.	.	.
7.37	0.0353	0.07	Q	.	.	.	.
7.46	0.0358	0.07	Q	.	.	.	.
7.56	0.0364	0.07	Q	.	.	.	.
7.65	0.0369	0.07	Q	.	.	.	.
7.75	0.0374	0.07	Q	.	.	.	.
7.84	0.0380	0.07	Q	.	.	.	.
7.94	0.0385	0.07	Q	.	.	.	.
8.03	0.0390	0.07	Q	.	.	.	.
8.13	0.0396	0.07	Q	.	.	.	.
8.22	0.0401	0.07	Q	.	.	.	.
8.32	0.0407	0.07	Q	.	.	.	.
8.41	0.0412	0.07	Q	.	.	.	.

8.51	0.0418	0.07	Q	.	.	.	.
8.60	0.0423	0.07	Q	.	.	.	.
8.70	0.0429	0.07	Q	.	.	.	.
8.79	0.0435	0.07	Q	.	.	.	.
8.89	0.0440	0.07	Q	.	.	.	.
8.98	0.0446	0.07	Q	.	.	.	.
9.08	0.0452	0.07	Q	.	.	.	.
9.17	0.0457	0.07	Q	.	.	.	.
9.27	0.0463	0.07	Q	.	.	.	.
9.36	0.0469	0.07	Q	.	.	.	.
9.46	0.0475	0.07	Q	.	.	.	.
9.55	0.0481	0.08	Q	.	.	.	.
9.65	0.0487	0.08	Q	.	.	.	.
9.74	0.0493	0.08	Q	.	.	.	.
9.84	0.0499	0.08	Q	.	.	.	.
9.93	0.0505	0.08	Q	.	.	.	.
10.03	0.0511	0.08	Q	.	.	.	.
10.12	0.0517	0.08	Q	.	.	.	.
10.22	0.0523	0.08	Q	.	.	.	.
10.31	0.0529	0.08	Q	.	.	.	.
10.40	0.0535	0.08	Q	.	.	.	.
10.50	0.0542	0.08	Q	.	.	.	.
10.59	0.0548	0.08	Q	.	.	.	.
10.69	0.0554	0.08	Q	.	.	.	.
10.78	0.0561	0.08	Q	.	.	.	.
10.88	0.0567	0.08	Q	.	.	.	.
10.97	0.0574	0.08	Q	.	.	.	.
11.07	0.0580	0.08	Q	.	.	.	.
11.16	0.0587	0.08	Q	.	.	.	.
11.26	0.0594	0.09	Q	.	.	.	.
11.35	0.0600	0.09	Q	.	.	.	.
11.45	0.0607	0.09	Q	.	.	.	.
11.54	0.0614	0.09	Q	.	.	.	.
11.64	0.0621	0.09	Q	.	.	.	.
11.73	0.0628	0.09	Q	.	.	.	.
11.83	0.0635	0.09	Q	.	.	.	.
11.92	0.0642	0.09	Q	.	.	.	.
12.02	0.0649	0.09	Q	.	.	.	.
12.11	0.0657	0.10	Q	.	.	.	.
12.21	0.0664	0.10	Q	.	.	.	.
12.30	0.0673	0.10	Q	.	.	.	.
12.40	0.0681	0.10	Q	.	.	.	.
12.49	0.0689	0.11	Q	.	.	.	.
12.59	0.0697	0.11	Q	.	.	.	.
12.68	0.0706	0.11	Q	.	.	.	.
12.78	0.0714	0.11	Q	.	.	.	.
12.87	0.0723	0.11	Q	.	.	.	.
12.97	0.0732	0.12	Q	.	.	.	.
13.06	0.0741	0.12	Q	.	.	.	.
13.15	0.0751	0.12	Q	.	.	.	.
13.25	0.0761	0.13	Q	.	.	.	.
13.34	0.0771	0.13	Q	.	.	.	.
13.44	0.0781	0.13	Q	.	.	.	.
13.53	0.0791	0.13	Q	.	.	.	.
13.63	0.0802	0.14	Q	.	.	.	.
13.72	0.0813	0.14	Q	.	.	.	.
13.82	0.0824	0.15	Q	.	.	.	.
13.91	0.0836	0.15	Q	.	.	.	.
14.01	0.0847	0.15	Q	.	.	.	.

14.10	0.0859	0.15	Q	.	.	.	.
14.20	0.0871	0.15	Q	.	.	.	.
14.29	0.0883	0.15	Q	.	.	.	.
14.39	0.0895	0.16	Q	.	.	.	.
14.48	0.0908	0.17	Q	.	.	.	.
14.58	0.0921	0.17	Q	.	.	.	.
14.67	0.0935	0.18	Q	.	.	.	.
14.77	0.0950	0.19	Q	.	.	.	.
14.86	0.0965	0.20	Q	.	.	.	.
14.96	0.0981	0.21	Q	.	.	.	.
15.05	0.0998	0.22	Q	.	.	.	.
15.15	0.1016	0.24	Q	.	.	.	.
15.24	0.1035	0.25	Q	.	.	.	.
15.34	0.1055	0.27	.Q	.	.	.	.
15.43	0.1075	0.25	Q	.	.	.	.
15.53	0.1095	0.25	.Q	.	.	.	.
15.62	0.1115	0.27	.Q	.	.	.	.
15.72	0.1139	0.34	.Q	.	.	.	.
15.81	0.1168	0.39	.Q	.	.	.	.
15.91	0.1206	0.57	. Q	.	.	.	.
16.00	0.1259	0.78	. Q	.	.	.	.
16.09	0.1370	**2.07**	.	**Q**	.	.	.
16.19	0.1470	0.46	.Q	.	.	.	.
16.28	0.1500	0.30	.Q	.	.	.	.
16.38	0.1521	0.23	Q	.	.	.	.
16.47	0.1540	0.26	.Q	.	.	.	.
16.57	0.1559	0.23	Q	.	.	.	.
16.66	0.1576	0.20	Q	.	.	.	.
16.76	0.1591	0.19	Q	.	.	.	.
16.85	0.1605	0.17	Q	.	.	.	.
16.95	0.1618	0.16	Q	.	.	.	.
17.04	0.1630	0.15	Q	.	.	.	.
17.14	0.1641	0.15	Q	.	.	.	.
17.23	0.1653	0.14	Q	.	.	.	.
17.33	0.1664	0.14	Q	.	.	.	.
17.42	0.1674	0.13	Q	.	.	.	.
17.52	0.1684	0.12	Q	.	.	.	.
17.61	0.1694	0.12	Q	.	.	.	.
17.71	0.1703	0.11	Q	.	.	.	.
17.80	0.1711	0.11	Q	.	.	.	.
17.90	0.1720	0.10	Q	.	.	.	.
17.99	0.1728	0.10	Q	.	.	.	.
18.09	0.1735	0.09	Q	.	.	.	.
18.18	0.1743	0.09	Q	.	.	.	.
18.28	0.1750	0.09	Q	.	.	.	.
18.37	0.1757	0.09	Q	.	.	.	.
18.47	0.1763	0.09	Q	.	.	.	.
18.56	0.1770	0.08	Q	.	.	.	.
18.66	0.1777	0.08	Q	.	.	.	.
18.75	0.1783	0.08	Q	.	.	.	.
18.84	0.1789	0.08	Q	.	.	.	.
18.94	0.1796	0.08	Q	.	.	.	.
19.03	0.1802	0.08	Q	.	.	.	.
19.13	0.1808	0.08	Q	.	.	.	.
19.22	0.1814	0.08	Q	.	.	.	.
19.32	0.1820	0.08	Q	.	.	.	.
19.41	0.1826	0.07	Q	.	.	.	.
19.51	0.1832	0.07	Q	.	.	.	.
19.60	0.1837	0.07	Q	.	.	.	.

19.70	0.1843	0.07	Q	.	.	.	.
19.79	0.1849	0.07	Q	.	.	.	.
19.89	0.1854	0.07	Q	.	.	.	.
19.98	0.1860	0.07	Q	.	.	.	.
20.08	0.1865	0.07	Q	.	.	.	.
20.17	0.1871	0.07	Q	.	.	.	.
20.27	0.1876	0.07	Q	.	.	.	.
20.36	0.1881	0.07	Q	.	.	.	.
20.46	0.1886	0.07	Q	.	.	.	.
20.55	0.1892	0.07	Q	.	.	.	.
20.65	0.1897	0.07	Q	.	.	.	.
20.74	0.1902	0.06	Q	.	.	.	.
20.84	0.1907	0.06	Q	.	.	.	.
20.93	0.1912	0.06	Q	.	.	.	.
21.03	0.1917	0.06	Q	.	.	.	.
21.12	0.1922	0.06	Q	.	.	.	.
21.22	0.1927	0.06	Q	.	.	.	.
21.31	0.1932	0.06	Q	.	.	.	.
21.41	0.1937	0.06	Q	.	.	.	.
21.50	0.1941	0.06	Q	.	.	.	.
21.60	0.1946	0.06	Q	.	.	.	.
21.69	0.1951	0.06	Q	.	.	.	.
21.78	0.1956	0.06	Q	.	.	.	.
21.88	0.1960	0.06	Q	.	.	.	.
21.97	0.1965	0.06	Q	.	.	.	.
22.07	0.1969	0.06	Q	.	.	.	.
22.16	0.1974	0.06	Q	.	.	.	.
22.26	0.1978	0.06	Q	.	.	.	.
22.35	0.1983	0.06	Q	.	.	.	.
22.45	0.1987	0.06	Q	.	.	.	.
22.54	0.1992	0.06	Q	.	.	.	.
22.64	0.1996	0.06	Q	.	.	.	.
22.73	0.2001	0.06	Q	.	.	.	.
22.83	0.2005	0.06	Q	.	.	.	.
22.92	0.2009	0.06	Q	.	.	.	.
23.02	0.2014	0.05	Q	.	.	.	.
23.11	0.2018	0.05	Q	.	.	.	.
23.21	0.2022	0.05	Q	.	.	.	.
23.30	0.2027	0.05	Q	.	.	.	.
23.40	0.2031	0.05	Q	.	.	.	.
23.49	0.2035	0.05	Q	.	.	.	.
23.59	0.2039	0.05	Q	.	.	.	.
23.68	0.2043	0.05	Q	.	.	.	.
23.78	0.2047	0.05	Q	.	.	.	.
23.87	0.2052	0.05	Q	.	.	.	.
23.97	0.2056	0.05	Q	.	.	.	.
24.06	0.2060	0.05	Q	.	.	.	.
24.16	0.2062	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1445.3
10%	102.4

20%	22.8
30%	11.4
40%	5.7
50%	5.7
60%	5.7
70%	5.7
80%	5.7
90%	5.7

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 2, PROPOSED CONDITION 25-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.55
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.240
LOW LOSS FRACTION = 0.530
TIME OF CONCENTRATION(MIN.) = 5.68
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **25**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.49
30-MINUTE POINT RAINFALL VALUE(INCHES) = 1.19
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.68
3-HOUR POINT RAINFALL VALUE(INCHES) = 3.26
6-HOUR POINT RAINFALL VALUE(INCHES) = 5.08
24-HOUR POINT RAINFALL VALUE(INCHES) = 11.50

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.27
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.25

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.00	0.0000	0.00	Q	.	.	.	.
0.10	0.0003	0.07	Q	.	.	.	.
0.19	0.0008	0.07	Q	.	.	.	.
0.29	0.0013	0.07	Q	.	.	.	.
0.38	0.0018	0.07	Q	.	.	.	.
0.47	0.0023	0.07	Q	.	.	.	.
0.57	0.0028	0.07	Q	.	.	.	.
0.66	0.0034	0.07	Q	.	.	.	.
0.76	0.0039	0.07	Q	.	.	.	.
0.85	0.0044	0.07	Q	.	.	.	.
0.95	0.0049	0.07	Q	.	.	.	.
1.04	0.0055	0.07	Q	.	.	.	.
1.14	0.0060	0.07	Q	.	.	.	.
1.23	0.0065	0.07	Q	.	.	.	.
1.33	0.0071	0.07	Q	.	.	.	.
1.42	0.0076	0.07	Q	.	.	.	.
1.52	0.0081	0.07	Q	.	.	.	.
1.61	0.0087	0.07	Q	.	.	.	.
1.71	0.0092	0.07	Q	.	.	.	.
1.80	0.0097	0.07	Q	.	.	.	.
1.89	0.0103	0.07	Q	.	.	.	.
1.99	0.0108	0.07	Q	.	.	.	.
2.08	0.0113	0.07	Q	.	.	.	.
2.18	0.0119	0.07	Q	.	.	.	.
2.27	0.0124	0.07	Q	.	.	.	.
2.37	0.0130	0.07	Q	.	.	.	.
2.46	0.0135	0.07	Q	.	.	.	.
2.56	0.0141	0.07	Q	.	.	.	.
2.65	0.0146	0.07	Q	.	.	.	.

2.75	0.0152	0.07	Q	.	.	.	.
2.84	0.0157	0.07	Q	.	.	.	.
2.94	0.0163	0.07	Q	.	.	.	.
3.03	0.0169	0.07	Q	.	.	.	.
3.13	0.0174	0.07	Q	.	.	.	.
3.22	0.0180	0.07	Q	.	.	.	.
3.31	0.0185	0.07	Q	.	.	.	.
3.41	0.0191	0.07	Q	.	.	.	.
3.50	0.0197	0.07	Q	.	.	.	.
3.60	0.0202	0.07	Q	.	.	.	.
3.69	0.0208	0.07	Q	.	.	.	.
3.79	0.0214	0.07	Q	.	.	.	.
3.88	0.0220	0.07	Q	.	.	.	.
3.98	0.0225	0.07	Q	.	.	.	.
4.07	0.0231	0.07	Q	.	.	.	.
4.17	0.0237	0.07	Q	.	.	.	.
4.26	0.0243	0.07	Q	.	.	.	.
4.36	0.0249	0.07	Q	.	.	.	.
4.45	0.0254	0.07	Q	.	.	.	.
4.55	0.0260	0.08	Q	.	.	.	.
4.64	0.0266	0.08	Q	.	.	.	.
4.73	0.0272	0.08	Q	.	.	.	.
4.83	0.0278	0.08	Q	.	.	.	.
4.92	0.0284	0.08	Q	.	.	.	.
5.02	0.0290	0.08	Q	.	.	.	.
5.11	0.0296	0.08	Q	.	.	.	.
5.21	0.0302	0.08	Q	.	.	.	.
5.30	0.0308	0.08	Q	.	.	.	.
5.40	0.0314	0.08	Q	.	.	.	.
5.49	0.0320	0.08	Q	.	.	.	.
5.59	0.0326	0.08	Q	.	.	.	.
5.68	0.0332	0.08	Q	.	.	.	.
5.78	0.0338	0.08	Q	.	.	.	.
5.87	0.0345	0.08	Q	.	.	.	.
5.97	0.0351	0.08	Q	.	.	.	.
6.06	0.0357	0.08	Q	.	.	.	.
6.15	0.0363	0.08	Q	.	.	.	.
6.25	0.0370	0.08	Q	.	.	.	.
6.34	0.0376	0.08	Q	.	.	.	.
6.44	0.0382	0.08	Q	.	.	.	.
6.53	0.0389	0.08	Q	.	.	.	.
6.63	0.0395	0.08	Q	.	.	.	.
6.72	0.0401	0.08	Q	.	.	.	.
6.82	0.0408	0.08	Q	.	.	.	.
6.91	0.0414	0.08	Q	.	.	.	.
7.01	0.0421	0.08	Q	.	.	.	.
7.10	0.0427	0.08	Q	.	.	.	.
7.20	0.0434	0.08	Q	.	.	.	.
7.29	0.0440	0.08	Q	.	.	.	.
7.39	0.0447	0.08	Q	.	.	.	.
7.48	0.0453	0.08	Q	.	.	.	.
7.57	0.0460	0.09	Q	.	.	.	.
7.67	0.0467	0.09	Q	.	.	.	.
7.76	0.0473	0.09	Q	.	.	.	.
7.86	0.0480	0.09	Q	.	.	.	.
7.95	0.0487	0.09	Q	.	.	.	.
8.05	0.0494	0.09	Q	.	.	.	.
8.14	0.0501	0.09	Q	.	.	.	.

8.24	0.0507	0.09	Q	.	.	.	.
8.33	0.0514	0.09	Q	.	.	.	.
8.43	0.0521	0.09	Q	.	.	.	.
8.52	0.0528	0.09	Q	.	.	.	.
8.62	0.0535	0.09	Q	.	.	.	.
8.71	0.0542	0.09	Q	.	.	.	.
8.81	0.0549	0.09	Q	.	.	.	.
8.90	0.0557	0.09	Q	.	.	.	.
8.99	0.0564	0.09	Q	.	.	.	.
9.09	0.0571	0.09	Q	.	.	.	.
9.18	0.0578	0.09	Q	.	.	.	.
9.28	0.0585	0.09	Q	.	.	.	.
9.37	0.0593	0.09	Q	.	.	.	.
9.47	0.0600	0.09	Q	.	.	.	.
9.56	0.0608	0.09	Q	.	.	.	.
9.66	0.0615	0.10	Q	.	.	.	.
9.75	0.0623	0.10	Q	.	.	.	.
9.85	0.0630	0.10	Q	.	.	.	.
9.94	0.0638	0.10	Q	.	.	.	.
10.04	0.0645	0.10	Q	.	.	.	.
10.13	0.0653	0.10	Q	.	.	.	.
10.23	0.0661	0.10	Q	.	.	.	.
10.32	0.0669	0.10	Q	.	.	.	.
10.41	0.0676	0.10	Q	.	.	.	.
10.51	0.0684	0.10	Q	.	.	.	.
10.60	0.0692	0.10	Q	.	.	.	.
10.70	0.0700	0.10	Q	.	.	.	.
10.79	0.0708	0.10	Q	.	.	.	.
10.89	0.0716	0.10	Q	.	.	.	.
10.98	0.0725	0.11	Q	.	.	.	.
11.08	0.0733	0.11	Q	.	.	.	.
11.17	0.0741	0.11	Q	.	.	.	.
11.27	0.0750	0.11	Q	.	.	.	.
11.36	0.0759	0.11	Q	.	.	.	.
11.46	0.0767	0.11	Q	.	.	.	.
11.55	0.0776	0.12	Q	.	.	.	.
11.65	0.0786	0.12	Q	.	.	.	.
11.74	0.0795	0.12	Q	.	.	.	.
11.83	0.0804	0.12	Q	.	.	.	.
11.93	0.0814	0.12	Q	.	.	.	.
12.02	0.0824	0.13	Q	.	.	.	.
12.12	0.0835	0.15	Q	.	.	.	.
12.21	0.0847	0.15	Q	.	.	.	.
12.31	0.0859	0.16	Q	.	.	.	.
12.40	0.0871	0.16	Q	.	.	.	.
12.50	0.0883	0.16	Q	.	.	.	.
12.59	0.0896	0.16	Q	.	.	.	.
12.69	0.0909	0.17	Q	.	.	.	.
12.78	0.0922	0.17	Q	.	.	.	.
12.88	0.0935	0.17	Q	.	.	.	.
12.97	0.0949	0.17	Q	.	.	.	.
13.07	0.0963	0.18	Q	.	.	.	.
13.16	0.0977	0.18	Q	.	.	.	.
13.25	0.0991	0.19	Q	.	.	.	.
13.35	0.1006	0.19	Q	.	.	.	.
13.44	0.1021	0.19	Q	.	.	.	.
13.54	0.1036	0.20	Q	.	.	.	.
13.63	0.1051	0.20	Q	.	.	.	.

13.73	0.1067	0.21	Q	.	.	.	.
13.82	0.1084	0.21	Q	.	.	.	.
13.92	0.1100	0.22	Q	.	.	.	.
14.01	0.1117	0.22	Q	.	.	.	.
14.11	0.1134	0.21	Q	.	.	.	.
14.20	0.1151	0.22	Q	.	.	.	.
14.30	0.1168	0.22	Q	.	.	.	.
14.39	0.1186	0.23	Q	.	.	.	.
14.49	0.1204	0.24	Q	.	.	.	.
14.58	0.1223	0.25	Q	.	.	.	.
14.67	0.1242	0.25	.Q	.	.	.	.
14.77	0.1263	0.27	.Q	.	.	.	.
14.86	0.1284	0.27	.Q	.	.	.	.
14.96	0.1306	0.29	.Q	.	.	.	.
15.05	0.1329	0.30	.Q	.	.	.	.
15.15	0.1354	0.32	.Q	.	.	.	.
15.24	0.1380	0.34	.Q	.	.	.	.
15.34	0.1407	0.37	.Q	.	.	.	.
15.43	0.1435	0.33	.Q	.	.	.	.
15.53	0.1461	0.34	.Q	.	.	.	.
15.62	0.1489	0.37	.Q	.	.	.	.
15.72	0.1521	0.46	.Q	.	.	.	.
15.81	0.1559	0.52	. Q	.	.	.	.
15.91	0.1609	0.74	. Q	.	.	.	.
16.00	0.1676	1.00	. Q	.	.	.	.
16.09	0.1817	**2.61**	.	**Q**	.	.	.
16.19	0.1943	0.60	. Q	.	.	.	.
16.28	0.1983	0.41	.Q	.	.	.	.
16.38	0.2011	0.32	.Q	.	.	.	.
16.47	0.2037	0.35	.Q	.	.	.	.
16.57	0.2063	0.31	.Q	.	.	.	.
16.66	0.2086	0.28	.Q	.	.	.	.
16.76	0.2108	0.26	.Q	.	.	.	.
16.85	0.2127	0.24	Q	.	.	.	.
16.95	0.2145	0.22	Q	.	.	.	.
17.04	0.2162	0.21	Q	.	.	.	.
17.14	0.2179	0.22	Q	.	.	.	.
17.23	0.2196	0.21	Q	.	.	.	.
17.33	0.2212	0.20	Q	.	.	.	.
17.42	0.2227	0.19	Q	.	.	.	.
17.51	0.2242	0.18	Q	.	.	.	.
17.61	0.2256	0.18	Q	.	.	.	.
17.70	0.2269	0.17	Q	.	.	.	.
17.80	0.2283	0.16	Q	.	.	.	.
17.89	0.2295	0.16	Q	.	.	.	.
17.99	0.2307	0.15	Q	.	.	.	.
18.08	0.2319	0.14	Q	.	.	.	.
18.18	0.2329	0.12	Q	.	.	.	.
18.27	0.2338	0.12	Q	.	.	.	.
18.37	0.2348	0.11	Q	.	.	.	.
18.46	0.2356	0.11	Q	.	.	.	.
18.56	0.2365	0.11	Q	.	.	.	.
18.65	0.2373	0.10	Q	.	.	.	.
18.75	0.2381	0.10	Q	.	.	.	.
18.84	0.2389	0.10	Q	.	.	.	.
18.93	0.2397	0.10	Q	.	.	.	.
19.03	0.2405	0.10	Q	.	.	.	.
19.12	0.2413	0.10	Q	.	.	.	.

19.22	0.2420	0.10	Q	.	.	.	.
19.31	0.2428	0.10	Q	.	.	.	.
19.41	0.2435	0.09	Q	.	.	.	.
19.50	0.2443	0.09	Q	.	.	.	.
19.60	0.2450	0.09	Q	.	.	.	.
19.69	0.2457	0.09	Q	.	.	.	.
19.79	0.2464	0.09	Q	.	.	.	.
19.88	0.2471	0.09	Q	.	.	.	.
19.98	0.2478	0.09	Q	.	.	.	.
20.07	0.2485	0.09	Q	.	.	.	.
20.17	0.2492	0.09	Q	.	.	.	.
20.26	0.2498	0.09	Q	.	.	.	.
20.35	0.2505	0.08	Q	.	.	.	.
20.45	0.2512	0.08	Q	.	.	.	.
20.54	0.2518	0.08	Q	.	.	.	.
20.64	0.2525	0.08	Q	.	.	.	.
20.73	0.2531	0.08	Q	.	.	.	.
20.83	0.2538	0.08	Q	.	.	.	.
20.92	0.2544	0.08	Q	.	.	.	.
21.02	0.2550	0.08	Q	.	.	.	.
21.11	0.2557	0.08	Q	.	.	.	.
21.21	0.2563	0.08	Q	.	.	.	.
21.30	0.2569	0.08	Q	.	.	.	.
21.40	0.2575	0.08	Q	.	.	.	.
21.49	0.2581	0.08	Q	.	.	.	.
21.59	0.2587	0.08	Q	.	.	.	.
21.68	0.2593	0.08	Q	.	.	.	.
21.77	0.2599	0.08	Q	.	.	.	.
21.87	0.2605	0.08	Q	.	.	.	.
21.96	0.2611	0.07	Q	.	.	.	.
22.06	0.2617	0.07	Q	.	.	.	.
22.15	0.2622	0.07	Q	.	.	.	.
22.25	0.2628	0.07	Q	.	.	.	.
22.34	0.2634	0.07	Q	.	.	.	.
22.44	0.2639	0.07	Q	.	.	.	.
22.53	0.2645	0.07	Q	.	.	.	.
22.63	0.2651	0.07	Q	.	.	.	.
22.72	0.2656	0.07	Q	.	.	.	.
22.82	0.2662	0.07	Q	.	.	.	.
22.91	0.2667	0.07	Q	.	.	.	.
23.01	0.2673	0.07	Q	.	.	.	.
23.10	0.2678	0.07	Q	.	.	.	.
23.19	0.2684	0.07	Q	.	.	.	.
23.29	0.2689	0.07	Q	.	.	.	.
23.38	0.2694	0.07	Q	.	.	.	.
23.48	0.2700	0.07	Q	.	.	.	.
23.57	0.2705	0.07	Q	.	.	.	.
23.67	0.2710	0.07	Q	.	.	.	.
23.76	0.2715	0.07	Q	.	.	.	.
23.86	0.2721	0.07	Q	.	.	.	.
23.95	0.2726	0.07	Q	.	.	.	.
24.05	0.2731	0.07	Q	.	.	.	.
24.14	0.2734	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:

(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1442.7
10%	119.3
20%	22.7
30%	11.4
40%	5.7
50%	5.7
60%	5.7
70%	5.7
80%	5.7
90%	5.7

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 2, PROPOSED CONDITION 100-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.55
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.110
LOW LOSS FRACTION = 0.790
TIME OF CONCENTRATION(MIN.) = 5.68
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **100**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.65
30-MINUTE POINT RAINFALL VALUE(INCHES) = 1.58
1-HOUR POINT RAINFALL VALUE(INCHES) = 2.22
3-HOUR POINT RAINFALL VALUE(INCHES) = 4.30
6-HOUR POINT RAINFALL VALUE(INCHES) = 6.70
24-HOUR POINT RAINFALL VALUE(INCHES) = 15.00

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.51
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.18

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.00	0.0000	0.00	Q	.	.	.	.
0.10	0.0005	0.13	Q	.	.	.	.
0.19	0.0015	0.13	Q	.	.	.	.
0.29	0.0025	0.13	Q	.	.	.	.
0.38	0.0035	0.13	Q	.	.	.	.
0.47	0.0044	0.13	Q	.	.	.	.
0.57	0.0054	0.13	Q	.	.	.	.
0.66	0.0064	0.13	Q	.	.	.	.
0.76	0.0075	0.13	Q	.	.	.	.
0.85	0.0085	0.13	Q	.	.	.	.
0.95	0.0095	0.13	Q	.	.	.	.
1.04	0.0105	0.13	Q	.	.	.	.
1.14	0.0115	0.13	Q	.	.	.	.
1.23	0.0125	0.13	Q	.	.	.	.
1.33	0.0136	0.13	Q	.	.	.	.
1.42	0.0146	0.13	Q	.	.	.	.
1.52	0.0156	0.13	Q	.	.	.	.
1.61	0.0167	0.13	Q	.	.	.	.
1.71	0.0177	0.13	Q	.	.	.	.
1.80	0.0188	0.13	Q	.	.	.	.
1.89	0.0198	0.13	Q	.	.	.	.
1.99	0.0209	0.14	Q	.	.	.	.
2.08	0.0219	0.14	Q	.	.	.	.
2.18	0.0230	0.14	Q	.	.	.	.
2.27	0.0241	0.14	Q	.	.	.	.
2.37	0.0251	0.14	Q	.	.	.	.
2.46	0.0262	0.14	Q	.	.	.	.
2.56	0.0273	0.14	Q	.	.	.	.
2.65	0.0284	0.14	Q	.	.	.	.

2.75	0.0295	0.14	Q	.	.	.	.
2.84	0.0306	0.14	Q	.	.	.	.
2.94	0.0317	0.14	Q	.	.	.	.
3.03	0.0328	0.14	Q	.	.	.	.
3.13	0.0339	0.14	Q	.	.	.	.
3.22	0.0350	0.14	Q	.	.	.	.
3.31	0.0361	0.14	Q	.	.	.	.
3.41	0.0372	0.14	Q	.	.	.	.
3.50	0.0384	0.14	Q	.	.	.	.
3.60	0.0395	0.15	Q	.	.	.	.
3.69	0.0406	0.15	Q	.	.	.	.
3.79	0.0418	0.15	Q	.	.	.	.
3.88	0.0429	0.15	Q	.	.	.	.
3.98	0.0441	0.15	Q	.	.	.	.
4.07	0.0452	0.15	Q	.	.	.	.
4.17	0.0464	0.15	Q	.	.	.	.
4.26	0.0476	0.15	Q	.	.	.	.
4.36	0.0487	0.15	Q	.	.	.	.
4.45	0.0499	0.15	Q	.	.	.	.
4.55	0.0511	0.15	Q	.	.	.	.
4.64	0.0523	0.15	Q	.	.	.	.
4.73	0.0535	0.15	Q	.	.	.	.
4.83	0.0547	0.15	Q	.	.	.	.
4.92	0.0559	0.15	Q	.	.	.	.
5.02	0.0571	0.16	Q	.	.	.	.
5.11	0.0583	0.16	Q	.	.	.	.
5.21	0.0596	0.16	Q	.	.	.	.
5.30	0.0608	0.16	Q	.	.	.	.
5.40	0.0620	0.16	Q	.	.	.	.
5.49	0.0633	0.16	Q	.	.	.	.
5.59	0.0645	0.16	Q	.	.	.	.
5.68	0.0658	0.16	Q	.	.	.	.
5.78	0.0670	0.16	Q	.	.	.	.
5.87	0.0683	0.16	Q	.	.	.	.
5.97	0.0696	0.16	Q	.	.	.	.
6.06	0.0709	0.16	Q	.	.	.	.
6.15	0.0722	0.17	Q	.	.	.	.
6.25	0.0735	0.17	Q	.	.	.	.
6.34	0.0748	0.17	Q	.	.	.	.
6.44	0.0761	0.17	Q	.	.	.	.
6.53	0.0774	0.17	Q	.	.	.	.
6.63	0.0787	0.17	Q	.	.	.	.
6.72	0.0800	0.17	Q	.	.	.	.
6.82	0.0814	0.17	Q	.	.	.	.
6.91	0.0827	0.17	Q	.	.	.	.
7.01	0.0841	0.17	Q	.	.	.	.
7.10	0.0854	0.17	Q	.	.	.	.
7.20	0.0868	0.18	Q	.	.	.	.
7.29	0.0882	0.18	Q	.	.	.	.
7.39	0.0896	0.18	Q	.	.	.	.
7.48	0.0910	0.18	Q	.	.	.	.
7.57	0.0924	0.18	Q	.	.	.	.
7.67	0.0938	0.18	Q	.	.	.	.
7.76	0.0952	0.18	Q	.	.	.	.
7.86	0.0966	0.18	Q	.	.	.	.
7.95	0.0981	0.18	Q	.	.	.	.
8.05	0.0995	0.19	Q	.	.	.	.
8.14	0.1010	0.19	Q	.	.	.	.

8.24	0.1024	0.19	Q	.	.	.	.
8.33	0.1039	0.19	Q	.	.	.	.
8.43	0.1054	0.19	Q	.	.	.	.
8.52	0.1069	0.19	Q	.	.	.	.
8.62	0.1084	0.19	Q	.	.	.	.
8.71	0.1099	0.19	Q	.	.	.	.
8.81	0.1114	0.20	Q	.	.	.	.
8.90	0.1130	0.20	Q	.	.	.	.
8.99	0.1145	0.20	Q	.	.	.	.
9.09	0.1161	0.20	Q	.	.	.	.
9.18	0.1177	0.20	Q	.	.	.	.
9.28	0.1192	0.20	Q	.	.	.	.
9.37	0.1208	0.20	Q	.	.	.	.
9.47	0.1224	0.21	Q	.	.	.	.
9.56	0.1241	0.21	Q	.	.	.	.
9.66	0.1257	0.21	Q	.	.	.	.
9.75	0.1273	0.21	Q	.	.	.	.
9.85	0.1290	0.21	Q	.	.	.	.
9.94	0.1307	0.21	Q	.	.	.	.
10.04	0.1323	0.22	Q	.	.	.	.
10.13	0.1340	0.22	Q	.	.	.	.
10.23	0.1357	0.22	Q	.	.	.	.
10.32	0.1375	0.22	Q	.	.	.	.
10.41	0.1392	0.22	Q	.	.	.	.
10.51	0.1410	0.22	Q	.	.	.	.
10.60	0.1427	0.23	Q	.	.	.	.
10.70	0.1445	0.23	Q	.	.	.	.
10.79	0.1463	0.23	Q	.	.	.	.
10.89	0.1481	0.23	Q	.	.	.	.
10.98	0.1500	0.24	Q	.	.	.	.
11.08	0.1518	0.24	Q	.	.	.	.
11.17	0.1537	0.24	Q	.	.	.	.
11.27	0.1556	0.24	Q	.	.	.	.
11.36	0.1575	0.25	Q	.	.	.	.
11.46	0.1594	0.25	Q	.	.	.	.
11.55	0.1614	0.25	.Q	.	.	.	.
11.65	0.1634	0.25	.Q	.	.	.	.
11.74	0.1654	0.26	.Q	.	.	.	.
11.83	0.1674	0.26	.Q	.	.	.	.
11.93	0.1694	0.26	.Q	.	.	.	.
12.02	0.1715	0.26	.Q	.	.	.	.
12.12	0.1737	0.30	.Q	.	.	.	.
12.21	0.1760	0.30	.Q	.	.	.	.
12.31	0.1784	0.31	.Q	.	.	.	.
12.40	0.1809	0.31	.Q	.	.	.	.
12.50	0.1833	0.31	.Q	.	.	.	.
12.59	0.1858	0.32	.Q	.	.	.	.
12.69	0.1883	0.32	.Q	.	.	.	.
12.78	0.1908	0.32	.Q	.	.	.	.
12.88	0.1933	0.33	.Q	.	.	.	.
12.97	0.1959	0.33	.Q	.	.	.	.
13.07	0.1985	0.34	.Q	.	.	.	.
13.16	0.2012	0.34	.Q	.	.	.	.
13.25	0.2039	0.35	.Q	.	.	.	.
13.35	0.2066	0.35	.Q	.	.	.	.
13.44	0.2094	0.36	.Q	.	.	.	.
13.54	0.2122	0.36	.Q	.	.	.	.
13.63	0.2151	0.37	.Q	.	.	.	.

13.73	0.2180	0.37	.Q	.	.	.	.
13.82	0.2209	0.38	.Q	.	.	.	.
13.92	0.2239	0.39	.Q	.	.	.	.
14.01	0.2270	0.40	.Q	.	.	.	.
14.11	0.2300	0.38	.Q	.	.	.	.
14.20	0.2330	0.38	.Q	.	.	.	.
14.30	0.2360	0.39	.Q	.	.	.	.
14.39	0.2392	0.40	.Q	.	.	.	.
14.49	0.2423	0.41	.Q	.	.	.	.
14.58	0.2456	0.43	.Q	.	.	.	.
14.67	0.2490	0.43	.Q	.	.	.	.
14.77	0.2525	0.45	.Q	.	.	.	.
14.86	0.2560	0.46	.Q	.	.	.	.
14.96	0.2598	0.49	.Q	.	.	.	.
15.05	0.2636	0.50	.Q	.	.	.	.
15.15	0.2676	0.53	. Q	.	.	.	.
15.24	0.2718	0.55	. Q	.	.	.	.
15.34	0.2763	0.58	. Q	.	.	.	.
15.43	0.2807	0.54	. Q	.	.	.	.
15.53	0.2849	0.55	. Q	.	.	.	.
15.62	0.2894	0.59	. Q	.	.	.	.
15.72	0.2944	0.70	. Q	.	.	.	.
15.81	0.3003	0.79	. Q	.	.	.	.
15.91	0.3076	1.09	. Q	.	.	.	.
16.00	0.3175	1.43	. Q	.	.	.	.
16.09	0.3369	**3.55**	.	.	**Q**	.	.
16.19	0.3544	0.91	. Q	.	.	.	.
16.28	0.3604	0.64	. Q	.	.	.	.
16.38	0.3649	0.51	. Q	.	.	.	.
16.47	0.3691	0.56	. Q	.	.	.	.
16.57	0.3733	0.51	. Q	.	.	.	.
16.66	0.3772	0.47	.Q	.	.	.	.
16.76	0.3808	0.44	.Q	.	.	.	.
16.85	0.3842	0.42	.Q	.	.	.	.
16.95	0.3874	0.40	.Q	.	.	.	.
17.04	0.3904	0.38	.Q	.	.	.	.
17.14	0.3934	0.39	.Q	.	.	.	.
17.23	0.3964	0.38	.Q	.	.	.	.
17.33	0.3993	0.36	.Q	.	.	.	.
17.42	0.4021	0.35	.Q	.	.	.	.
17.51	0.4049	0.34	.Q	.	.	.	.
17.61	0.4075	0.33	.Q	.	.	.	.
17.70	0.4101	0.33	.Q	.	.	.	.
17.80	0.4126	0.32	.Q	.	.	.	.
17.89	0.4151	0.31	.Q	.	.	.	.
17.99	0.4175	0.31	.Q	.	.	.	.
18.08	0.4198	0.28	.Q	.	.	.	.
18.18	0.4219	0.26	.Q	.	.	.	.
18.27	0.4239	0.25	.Q	.	.	.	.
18.37	0.4259	0.25	Q	.	.	.	.
18.46	0.4278	0.24	Q	.	.	.	.
18.56	0.4297	0.24	Q	.	.	.	.
18.65	0.4316	0.23	Q	.	.	.	.
18.75	0.4334	0.23	Q	.	.	.	.
18.84	0.4352	0.23	Q	.	.	.	.
18.93	0.4369	0.22	Q	.	.	.	.
19.03	0.4387	0.22	Q	.	.	.	.
19.12	0.4404	0.22	Q	.	.	.	.

19.22	0.4420	0.21	Q	.	.	.	.
19.31	0.4437	0.21	Q	.	.	.	.
19.41	0.4453	0.21	Q	.	.	.	.
19.50	0.4469	0.20	Q	.	.	.	.
19.60	0.4484	0.20	Q	.	.	.	.
19.69	0.4500	0.20	Q	.	.	.	.
19.79	0.4515	0.19	Q	.	.	.	.
19.88	0.4530	0.19	Q	.	.	.	.
19.98	0.4545	0.19	Q	.	.	.	.
20.07	0.4560	0.19	Q	.	.	.	.
20.17	0.4574	0.18	Q	.	.	.	.
20.26	0.4589	0.18	Q	.	.	.	.
20.35	0.4603	0.18	Q	.	.	.	.
20.45	0.4617	0.18	Q	.	.	.	.
20.54	0.4630	0.18	Q	.	.	.	.
20.64	0.4644	0.17	Q	.	.	.	.
20.73	0.4658	0.17	Q	.	.	.	.
20.83	0.4671	0.17	Q	.	.	.	.
20.92	0.4684	0.17	Q	.	.	.	.
21.02	0.4697	0.17	Q	.	.	.	.
21.11	0.4710	0.16	Q	.	.	.	.
21.21	0.4723	0.16	Q	.	.	.	.
21.30	0.4735	0.16	Q	.	.	.	.
21.40	0.4748	0.16	Q	.	.	.	.
21.49	0.4760	0.16	Q	.	.	.	.
21.59	0.4772	0.16	Q	.	.	.	.
21.68	0.4785	0.15	Q	.	.	.	.
21.77	0.4797	0.15	Q	.	.	.	.
21.87	0.4809	0.15	Q	.	.	.	.
21.96	0.4820	0.15	Q	.	.	.	.
22.06	0.4832	0.15	Q	.	.	.	.
22.15	0.4844	0.15	Q	.	.	.	.
22.25	0.4855	0.15	Q	.	.	.	.
22.34	0.4866	0.14	Q	.	.	.	.
22.44	0.4878	0.14	Q	.	.	.	.
22.53	0.4889	0.14	Q	.	.	.	.
22.63	0.4900	0.14	Q	.	.	.	.
22.72	0.4911	0.14	Q	.	.	.	.
22.82	0.4922	0.14	Q	.	.	.	.
22.91	0.4933	0.14	Q	.	.	.	.
23.01	0.4943	0.14	Q	.	.	.	.
23.10	0.4954	0.14	Q	.	.	.	.
23.19	0.4965	0.13	Q	.	.	.	.
23.29	0.4975	0.13	Q	.	.	.	.
23.38	0.4986	0.13	Q	.	.	.	.
23.48	0.4996	0.13	Q	.	.	.	.
23.57	0.5006	0.13	Q	.	.	.	.
23.67	0.5016	0.13	Q	.	.	.	.
23.76	0.5026	0.13	Q	.	.	.	.
23.86	0.5036	0.13	Q	.	.	.	.
23.95	0.5046	0.13	Q	.	.	.	.
24.05	0.5056	0.13	Q	.	.	.	.
24.14	0.5061	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1442.7
10%	238.6
20%	28.4
30%	17.0
40%	11.4
50%	5.7
60%	5.7
70%	5.7
80%	5.7
90%	5.7

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 3, PROPOSED CONDITION 2-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.82
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.550
LOW LOSS FRACTION = 0.410
TIME OF CONCENTRATION(MIN.) = 5.73 (From Rational Method Calcs)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **2**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.24
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.59
1-HOUR POINT RAINFALL VALUE(INCHES) = 0.83
3-HOUR POINT RAINFALL VALUE(INCHES) = 1.62
6-HOUR POINT RAINFALL VALUE(INCHES) = 2.51
24-HOUR POINT RAINFALL VALUE(INCHES) = 5.43
(From NOAA 14 Rainfall Data)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.20
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.17

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TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.05	0.0001	0.05	Q	.	.	.	.
0.15	0.0005	0.05	Q	.	.	.	.
0.24	0.0010	0.06	Q	.	.	.	.
0.34	0.0014	0.06	Q	.	.	.	.
0.43	0.0019	0.06	Q	.	.	.	.
0.53	0.0023	0.06	Q	.	.	.	.
0.62	0.0027	0.06	Q	.	.	.	.
0.72	0.0032	0.06	Q	.	.	.	.
0.82	0.0036	0.06	Q	.	.	.	.
0.91	0.0041	0.06	Q	.	.	.	.
1.01	0.0045	0.06	Q	.	.	.	.
1.10	0.0049	0.06	Q	.	.	.	.
1.20	0.0054	0.06	Q	.	.	.	.
1.29	0.0058	0.06	Q	.	.	.	.
1.39	0.0063	0.06	Q	.	.	.	.
1.48	0.0067	0.06	Q	.	.	.	.
1.58	0.0072	0.06	Q	.	.	.	.
1.67	0.0076	0.06	Q	.	.	.	.
1.77	0.0081	0.06	Q	.	.	.	.
1.87	0.0086	0.06	Q	.	.	.	.
1.96	0.0090	0.06	Q	.	.	.	.
2.06	0.0095	0.06	Q	.	.	.	.
2.15	0.0099	0.06	Q	.	.	.	.
2.25	0.0104	0.06	Q	.	.	.	.
2.34	0.0108	0.06	Q	.	.	.	.
2.44	0.0113	0.06	Q	.	.	.	.
2.53	0.0118	0.06	Q	.	.	.	.
2.63	0.0122	0.06	Q	.	.	.	.
2.73	0.0127	0.06	Q	.	.	.	.
2.82	0.0132	0.06	Q	.	.	.	.

2.92	0.0137	0.06	Q	.	.	.	.
3.01	0.0141	0.06	Q	.	.	.	.
3.11	0.0146	0.06	Q	.	.	.	.
3.20	0.0151	0.06	Q	.	.	.	.
3.30	0.0156	0.06	Q	.	.	.	.
3.39	0.0160	0.06	Q	.	.	.	.
3.49	0.0165	0.06	Q	.	.	.	.
3.58	0.0170	0.06	Q	.	.	.	.
3.68	0.0175	0.06	Q	.	.	.	.
3.78	0.0180	0.06	Q	.	.	.	.
3.87	0.0185	0.06	Q	.	.	.	.
3.97	0.0189	0.06	Q	.	.	.	.
4.06	0.0194	0.06	Q	.	.	.	.
4.16	0.0199	0.06	Q	.	.	.	.
4.25	0.0204	0.06	Q	.	.	.	.
4.35	0.0209	0.06	Q	.	.	.	.
4.44	0.0214	0.06	Q	.	.	.	.
4.54	0.0219	0.06	Q	.	.	.	.
4.64	0.0224	0.06	Q	.	.	.	.
4.73	0.0229	0.06	Q	.	.	.	.
4.83	0.0234	0.06	Q	.	.	.	.
4.92	0.0239	0.06	Q	.	.	.	.
5.02	0.0244	0.06	Q	.	.	.	.
5.11	0.0249	0.06	Q	.	.	.	.
5.21	0.0255	0.07	Q	.	.	.	.
5.30	0.0260	0.07	Q	.	.	.	.
5.40	0.0265	0.07	Q	.	.	.	.
5.50	0.0270	0.07	Q	.	.	.	.
5.59	0.0275	0.07	Q	.	.	.	.
5.69	0.0281	0.07	Q	.	.	.	.
5.78	0.0286	0.07	Q	.	.	.	.
5.88	0.0291	0.07	Q	.	.	.	.
5.97	0.0296	0.07	Q	.	.	.	.
6.07	0.0302	0.07	Q	.	.	.	.
6.16	0.0307	0.07	Q	.	.	.	.
6.26	0.0312	0.07	Q	.	.	.	.
6.35	0.0318	0.07	Q	.	.	.	.
6.45	0.0323	0.07	Q	.	.	.	.
6.55	0.0329	0.07	Q	.	.	.	.
6.64	0.0334	0.07	Q	.	.	.	.
6.74	0.0340	0.07	Q	.	.	.	.
6.83	0.0345	0.07	Q	.	.	.	.
6.93	0.0351	0.07	Q	.	.	.	.
7.02	0.0356	0.07	Q	.	.	.	.
7.12	0.0362	0.07	Q	.	.	.	.
7.21	0.0367	0.07	Q	.	.	.	.
7.31	0.0373	0.07	Q	.	.	.	.
7.40	0.0379	0.07	Q	.	.	.	.
7.50	0.0384	0.07	Q	.	.	.	.
7.60	0.0390	0.07	Q	.	.	.	.
7.69	0.0396	0.07	Q	.	.	.	.
7.79	0.0402	0.07	Q	.	.	.	.
7.88	0.0407	0.07	Q	.	.	.	.
7.98	0.0413	0.07	Q	.	.	.	.
8.07	0.0419	0.07	Q	.	.	.	.
8.17	0.0425	0.07	Q	.	.	.	.
8.26	0.0431	0.08	Q	.	.	.	.
8.36	0.0437	0.08	Q	.	.	.	.
8.46	0.0443	0.08	Q	.	.	.	.

8.55	0.0449	0.08	Q	.	.	.	.
8.65	0.0455	0.08	Q	.	.	.	.
8.74	0.0461	0.08	Q	.	.	.	.
8.84	0.0467	0.08	Q	.	.	.	.
8.93	0.0473	0.08	Q	.	.	.	.
9.03	0.0480	0.08	Q	.	.	.	.
9.12	0.0486	0.08	Q	.	.	.	.
9.22	0.0492	0.08	Q	.	.	.	.
9.32	0.0498	0.08	Q	.	.	.	.
9.41	0.0505	0.08	Q	.	.	.	.
9.51	0.0511	0.08	Q	.	.	.	.
9.60	0.0518	0.08	Q	.	.	.	.
9.70	0.0524	0.08	Q	.	.	.	.
9.79	0.0531	0.08	Q	.	.	.	.
9.89	0.0537	0.08	Q	.	.	.	.
9.98	0.0544	0.08	Q	.	.	.	.
10.08	0.0550	0.08	Q	.	.	.	.
10.17	0.0557	0.09	Q	.	.	.	.
10.27	0.0564	0.09	Q	.	.	.	.
10.37	0.0571	0.09	Q	.	.	.	.
10.46	0.0578	0.09	Q	.	.	.	.
10.56	0.0584	0.09	Q	.	.	.	.
10.65	0.0591	0.09	Q	.	.	.	.
10.75	0.0598	0.09	Q	.	.	.	.
10.84	0.0606	0.09	Q	.	.	.	.
10.94	0.0613	0.09	Q	.	.	.	.
11.03	0.0620	0.09	Q	.	.	.	.
11.13	0.0627	0.09	Q	.	.	.	.
11.23	0.0634	0.09	Q	.	.	.	.
11.32	0.0642	0.09	Q	.	.	.	.
11.42	0.0649	0.09	Q	.	.	.	.
11.51	0.0657	0.10	Q	.	.	.	.
11.61	0.0664	0.10	Q	.	.	.	.
11.70	0.0672	0.10	Q	.	.	.	.
11.80	0.0680	0.10	Q	.	.	.	.
11.89	0.0688	0.10	Q	.	.	.	.
11.99	0.0695	0.10	Q	.	.	.	.
12.08	0.0704	0.11	Q	.	.	.	.
12.18	0.0713	0.12	Q	.	.	.	.
12.28	0.0722	0.12	Q	.	.	.	.
12.37	0.0731	0.12	Q	.	.	.	.
12.47	0.0741	0.12	Q	.	.	.	.
12.56	0.0750	0.12	Q	.	.	.	.
12.66	0.0760	0.12	Q	.	.	.	.
12.75	0.0769	0.12	Q	.	.	.	.
12.85	0.0779	0.12	Q	.	.	.	.
12.94	0.0789	0.13	Q	.	.	.	.
13.04	0.0799	0.13	Q	.	.	.	.
13.13	0.0809	0.13	Q	.	.	.	.
13.23	0.0819	0.13	Q	.	.	.	.
13.33	0.0830	0.13	Q	.	.	.	.
13.42	0.0840	0.13	Q	.	.	.	.
13.52	0.0851	0.14	Q	.	.	.	.
13.61	0.0862	0.14	Q	.	.	.	.
13.71	0.0873	0.14	Q	.	.	.	.
13.80	0.0884	0.14	Q	.	.	.	.
13.90	0.0895	0.14	Q	.	.	.	.
13.99	0.0906	0.15	Q	.	.	.	.
14.09	0.0918	0.15	Q	.	.	.	.

14.19	0.0930	0.15	Q	.	.	.	.
14.28	0.0941	0.15	Q	.	.	.	.
14.38	0.0953	0.15	Q	.	.	.	.
14.47	0.0965	0.16	Q	.	.	.	.
14.57	0.0978	0.16	Q	.	.	.	.
14.66	0.0991	0.16	Q	.	.	.	.
14.76	0.1004	0.17	Q	.	.	.	.
14.85	0.1017	0.17	Q	.	.	.	.
14.95	0.1031	0.18	Q	.	.	.	.
15.05	0.1046	0.18	Q	.	.	.	.
15.14	0.1061	0.19	Q	.	.	.	.
15.24	0.1076	0.20	Q	.	.	.	.
15.33	0.1092	0.21	Q	.	.	.	.
15.43	0.1109	0.20	Q	.	.	.	.
15.52	0.1125	0.20	Q	.	.	.	.
15.62	0.1141	0.21	Q	.	.	.	.
15.71	0.1159	0.25	Q	.	.	.	.
15.81	0.1179	0.27	.Q	.	.	.	.
15.90	0.1205	0.37	.Q	.	.	.	.
16.00	0.1239	0.48	.Q	.	.	.	.
16.10	0.1320	**1.59**	.	**Q**	.	.	.
16.19	0.1395	0.31	.Q	.	.	.	.
16.29	0.1417	0.23	Q	.	.	.	.
16.38	0.1433	0.19	Q	.	.	.	.
16.48	0.1448	0.21	Q	.	.	.	.
16.57	0.1464	0.19	Q	.	.	.	.
16.67	0.1478	0.18	Q	.	.	.	.
16.76	0.1492	0.17	Q	.	.	.	.
16.86	0.1505	0.16	Q	.	.	.	.
16.95	0.1517	0.15	Q	.	.	.	.
17.05	0.1529	0.15	Q	.	.	.	.
17.15	0.1540	0.15	Q	.	.	.	.
17.24	0.1551	0.14	Q	.	.	.	.
17.34	0.1562	0.14	Q	.	.	.	.
17.43	0.1573	0.13	Q	.	.	.	.
17.53	0.1583	0.13	Q	.	.	.	.
17.62	0.1593	0.13	Q	.	.	.	.
17.72	0.1603	0.12	Q	.	.	.	.
17.81	0.1613	0.12	Q	.	.	.	.
17.91	0.1623	0.12	Q	.	.	.	.
18.01	0.1632	0.12	Q	.	.	.	.
18.10	0.1640	0.10	Q	.	.	.	.
18.20	0.1648	0.10	Q	.	.	.	.
18.29	0.1656	0.10	Q	.	.	.	.
18.39	0.1664	0.10	Q	.	.	.	.
18.48	0.1671	0.09	Q	.	.	.	.
18.58	0.1678	0.09	Q	.	.	.	.
18.67	0.1686	0.09	Q	.	.	.	.
18.77	0.1693	0.09	Q	.	.	.	.
18.86	0.1700	0.09	Q	.	.	.	.
18.96	0.1706	0.09	Q	.	.	.	.
19.06	0.1713	0.09	Q	.	.	.	.
19.15	0.1720	0.08	Q	.	.	.	.
19.25	0.1726	0.08	Q	.	.	.	.
19.34	0.1733	0.08	Q	.	.	.	.
19.44	0.1739	0.08	Q	.	.	.	.
19.53	0.1746	0.08	Q	.	.	.	.
19.63	0.1752	0.08	Q	.	.	.	.
19.72	0.1758	0.08	Q	.	.	.	.

19.82	0.1764	0.08	Q	.	.	.	.
19.92	0.1770	0.08	Q	.	.	.	.
20.01	0.1776	0.08	Q	.	.	.	.
20.11	0.1782	0.07	Q	.	.	.	.
20.20	0.1788	0.07	Q	.	.	.	.
20.30	0.1794	0.07	Q	.	.	.	.
20.39	0.1799	0.07	Q	.	.	.	.
20.49	0.1805	0.07	Q	.	.	.	.
20.58	0.1811	0.07	Q	.	.	.	.
20.68	0.1816	0.07	Q	.	.	.	.
20.77	0.1822	0.07	Q	.	.	.	.
20.87	0.1827	0.07	Q	.	.	.	.
20.97	0.1833	0.07	Q	.	.	.	.
21.06	0.1838	0.07	Q	.	.	.	.
21.16	0.1843	0.07	Q	.	.	.	.
21.25	0.1849	0.07	Q	.	.	.	.
21.35	0.1854	0.07	Q	.	.	.	.
21.44	0.1859	0.07	Q	.	.	.	.
21.54	0.1864	0.06	Q	.	.	.	.
21.63	0.1869	0.06	Q	.	.	.	.
21.73	0.1874	0.06	Q	.	.	.	.
21.83	0.1879	0.06	Q	.	.	.	.
21.92	0.1884	0.06	Q	.	.	.	.
22.02	0.1889	0.06	Q	.	.	.	.
22.11	0.1894	0.06	Q	.	.	.	.
22.21	0.1899	0.06	Q	.	.	.	.
22.30	0.1904	0.06	Q	.	.	.	.
22.40	0.1909	0.06	Q	.	.	.	.
22.49	0.1914	0.06	Q	.	.	.	.
22.59	0.1918	0.06	Q	.	.	.	.
22.68	0.1923	0.06	Q	.	.	.	.
22.78	0.1928	0.06	Q	.	.	.	.
22.88	0.1932	0.06	Q	.	.	.	.
22.97	0.1937	0.06	Q	.	.	.	.
23.07	0.1942	0.06	Q	.	.	.	.
23.16	0.1946	0.06	Q	.	.	.	.
23.26	0.1951	0.06	Q	.	.	.	.
23.35	0.1955	0.06	Q	.	.	.	.
23.45	0.1960	0.06	Q	.	.	.	.
23.54	0.1964	0.06	Q	.	.	.	.
23.64	0.1969	0.06	Q	.	.	.	.
23.74	0.1973	0.06	Q	.	.	.	.
23.83	0.1978	0.06	Q	.	.	.	.
23.93	0.1982	0.06	Q	.	.	.	.
24.02	0.1986	0.06	Q	.	.	.	.
24.12	0.1988	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1444.0
10%	137.5
20%	17.2
30%	11.5

40%		5.7
50%		5.7
60%		5.7
70%		5.7
80%		5.7
90%	5.7	

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 3, PROPOSED CONDITION 10-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.82
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.320
LOW LOSS FRACTION = 0.660
TIME OF CONCENTRATION(MIN.) = 5.64
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **10**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.39
30-MINUTE POINT RAINFALL VALUE(INCHES) = 0.96
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.35
3-HOUR POINT RAINFALL VALUE(INCHES) = 2.62
6-HOUR POINT RAINFALL VALUE(INCHES) = 4.08
24-HOUR POINT RAINFALL VALUE(INCHES) = 9.16
(From NOAA 14 Rainfall Data)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.24
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.39

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.02	0.0000	0.00	Q	.	.	.	.
0.11	0.0002	0.06	Q	.	.	.	.
0.21	0.0007	0.06	Q	.	.	.	.
0.30	0.0011	0.06	Q	.	.	.	.
0.40	0.0015	0.06	Q	.	.	.	.
0.49	0.0020	0.06	Q	.	.	.	.
0.58	0.0024	0.06	Q	.	.	.	.
0.68	0.0028	0.06	Q	.	.	.	.
0.77	0.0033	0.06	Q	.	.	.	.
0.87	0.0037	0.06	Q	.	.	.	.
0.96	0.0042	0.06	Q	.	.	.	.
1.05	0.0046	0.06	Q	.	.	.	.
1.15	0.0051	0.06	Q	.	.	.	.
1.24	0.0055	0.06	Q	.	.	.	.
1.34	0.0060	0.06	Q	.	.	.	.
1.43	0.0064	0.06	Q	.	.	.	.
1.52	0.0069	0.06	Q	.	.	.	.
1.62	0.0073	0.06	Q	.	.	.	.
1.71	0.0078	0.06	Q	.	.	.	.
1.81	0.0082	0.06	Q	.	.	.	.
1.90	0.0087	0.06	Q	.	.	.	.
1.99	0.0091	0.06	Q	.	.	.	.
2.09	0.0096	0.06	Q	.	.	.	.
2.18	0.0100	0.06	Q	.	.	.	.
2.28	0.0105	0.06	Q	.	.	.	.
2.37	0.0110	0.06	Q	.	.	.	.
2.46	0.0114	0.06	Q	.	.	.	.
2.56	0.0119	0.06	Q	.	.	.	.
2.65	0.0124	0.06	Q	.	.	.	.
2.75	0.0128	0.06	Q	.	.	.	.

2.84	0.0133	0.06	Q	.	.	.	.
2.93	0.0138	0.06	Q	.	.	.	.
3.03	0.0142	0.06	Q	.	.	.	.
3.12	0.0147	0.06	Q	.	.	.	.
3.22	0.0152	0.06	Q	.	.	.	.
3.31	0.0157	0.06	Q	.	.	.	.
3.40	0.0161	0.06	Q	.	.	.	.
3.50	0.0166	0.06	Q	.	.	.	.
3.59	0.0171	0.06	Q	.	.	.	.
3.69	0.0176	0.06	Q	.	.	.	.
3.78	0.0181	0.06	Q	.	.	.	.
3.87	0.0186	0.06	Q	.	.	.	.
3.97	0.0190	0.06	Q	.	.	.	.
4.06	0.0195	0.06	Q	.	.	.	.
4.16	0.0200	0.06	Q	.	.	.	.
4.25	0.0205	0.06	Q	.	.	.	.
4.34	0.0210	0.06	Q	.	.	.	.
4.44	0.0215	0.06	Q	.	.	.	.
4.53	0.0220	0.06	Q	.	.	.	.
4.63	0.0225	0.06	Q	.	.	.	.
4.72	0.0230	0.06	Q	.	.	.	.
4.81	0.0235	0.06	Q	.	.	.	.
4.91	0.0240	0.06	Q	.	.	.	.
5.00	0.0245	0.07	Q	.	.	.	.
5.10	0.0250	0.07	Q	.	.	.	.
5.19	0.0255	0.07	Q	.	.	.	.
5.28	0.0260	0.07	Q	.	.	.	.
5.38	0.0265	0.07	Q	.	.	.	.
5.47	0.0271	0.07	Q	.	.	.	.
5.57	0.0276	0.07	Q	.	.	.	.
5.66	0.0281	0.07	Q	.	.	.	.
5.75	0.0286	0.07	Q	.	.	.	.
5.85	0.0291	0.07	Q	.	.	.	.
5.94	0.0297	0.07	Q	.	.	.	.
6.04	0.0302	0.07	Q	.	.	.	.
6.13	0.0307	0.07	Q	.	.	.	.
6.22	0.0312	0.07	Q	.	.	.	.
6.32	0.0318	0.07	Q	.	.	.	.
6.41	0.0323	0.07	Q	.	.	.	.
6.51	0.0328	0.07	Q	.	.	.	.
6.60	0.0334	0.07	Q	.	.	.	.
6.69	0.0339	0.07	Q	.	.	.	.
6.79	0.0345	0.07	Q	.	.	.	.
6.88	0.0350	0.07	Q	.	.	.	.
6.98	0.0356	0.07	Q	.	.	.	.
7.07	0.0361	0.07	Q	.	.	.	.
7.16	0.0367	0.07	Q	.	.	.	.
7.26	0.0372	0.07	Q	.	.	.	.
7.35	0.0378	0.07	Q	.	.	.	.
7.45	0.0383	0.07	Q	.	.	.	.
7.54	0.0389	0.07	Q	.	.	.	.
7.63	0.0395	0.07	Q	.	.	.	.
7.73	0.0400	0.07	Q	.	.	.	.
7.82	0.0406	0.07	Q	.	.	.	.
7.92	0.0412	0.07	Q	.	.	.	.
8.01	0.0418	0.07	Q	.	.	.	.
8.10	0.0423	0.07	Q	.	.	.	.
8.20	0.0429	0.08	Q	.	.	.	.
8.29	0.0435	0.08	Q	.	.	.	.

8.39	0.0441	0.08	Q	.	.	.	.
8.48	0.0447	0.08	Q	.	.	.	.
8.57	0.0453	0.08	Q	.	.	.	.
8.67	0.0459	0.08	Q	.	.	.	.
8.76	0.0465	0.08	Q	.	.	.	.
8.86	0.0471	0.08	Q	.	.	.	.
8.95	0.0477	0.08	Q	.	.	.	.
9.04	0.0483	0.08	Q	.	.	.	.
9.14	0.0489	0.08	Q	.	.	.	.
9.23	0.0495	0.08	Q	.	.	.	.
9.33	0.0501	0.08	Q	.	.	.	.
9.42	0.0508	0.08	Q	.	.	.	.
9.51	0.0514	0.08	Q	.	.	.	.
9.61	0.0520	0.08	Q	.	.	.	.
9.70	0.0526	0.08	Q	.	.	.	.
9.80	0.0533	0.08	Q	.	.	.	.
9.89	0.0539	0.08	Q	.	.	.	.
9.98	0.0546	0.08	Q	.	.	.	.
10.08	0.0552	0.08	Q	.	.	.	.
10.17	0.0559	0.08	Q	.	.	.	.
10.27	0.0565	0.09	Q	.	.	.	.
10.36	0.0572	0.09	Q	.	.	.	.
10.45	0.0579	0.09	Q	.	.	.	.
10.55	0.0585	0.09	Q	.	.	.	.
10.64	0.0592	0.09	Q	.	.	.	.
10.74	0.0599	0.09	Q	.	.	.	.
10.83	0.0606	0.09	Q	.	.	.	.
10.92	0.0613	0.09	Q	.	.	.	.
11.02	0.0620	0.09	Q	.	.	.	.
11.11	0.0627	0.09	Q	.	.	.	.
11.21	0.0634	0.09	Q	.	.	.	.
11.30	0.0641	0.09	Q	.	.	.	.
11.39	0.0648	0.09	Q	.	.	.	.
11.49	0.0656	0.09	Q	.	.	.	.
11.58	0.0663	0.09	Q	.	.	.	.
11.68	0.0670	0.10	Q	.	.	.	.
11.77	0.0678	0.10	Q	.	.	.	.
11.86	0.0685	0.10	Q	.	.	.	.
11.96	0.0693	0.10	Q	.	.	.	.
12.05	0.0701	0.10	Q	.	.	.	.
12.15	0.0709	0.11	Q	.	.	.	.
12.24	0.0717	0.11	Q	.	.	.	.
12.33	0.0726	0.11	Q	.	.	.	.
12.43	0.0735	0.11	Q	.	.	.	.
12.52	0.0743	0.11	Q	.	.	.	.
12.62	0.0752	0.11	Q	.	.	.	.
12.71	0.0761	0.12	Q	.	.	.	.
12.80	0.0770	0.12	Q	.	.	.	.
12.90	0.0780	0.12	Q	.	.	.	.
12.99	0.0789	0.12	Q	.	.	.	.
13.09	0.0798	0.12	Q	.	.	.	.
13.18	0.0808	0.12	Q	.	.	.	.
13.27	0.0817	0.13	Q	.	.	.	.
13.37	0.0828	0.13	Q	.	.	.	.
13.46	0.0838	0.14	Q	.	.	.	.
13.56	0.0849	0.14	Q	.	.	.	.
13.65	0.0860	0.15	Q	.	.	.	.
13.74	0.0872	0.15	Q	.	.	.	.
13.84	0.0884	0.16	Q	.	.	.	.

13.93	0.0897	0.16	Q	.	.	.	.
14.03	0.0910	0.17	Q	.	.	.	.
14.12	0.0923	0.16	Q	.	.	.	.
14.21	0.0935	0.17	Q	.	.	.	.
14.31	0.0948	0.17	Q	.	.	.	.
14.40	0.0962	0.18	Q	.	.	.	.
14.50	0.0976	0.19	Q	.	.	.	.
14.59	0.0992	0.20	Q	.	.	.	.
14.68	0.1008	0.21	Q	.	.	.	.
14.78	0.1025	0.23	Q	.	.	.	.
14.87	0.1043	0.24	Q	.	.	.	.
14.97	0.1062	0.26	.Q	.	.	.	.
15.06	0.1082	0.27	.Q	.	.	.	.
15.15	0.1104	0.30	.Q	.	.	.	.
15.25	0.1128	0.31	.Q	.	.	.	.
15.34	0.1153	0.35	.Q	.	.	.	.
15.44	0.1179	0.30	.Q	.	.	.	.
15.53	0.1202	0.32	.Q	.	.	.	.
15.62	0.1228	0.35	.Q	.	.	.	.
15.72	0.1260	0.45	.Q	.	.	.	.
15.81	0.1298	0.53	. Q	.	.	.	.
15.91	0.1350	0.80	. Q	.	.	.	.
16.00	0.1424	1.11	. Q	.	.	.	.
16.09	0.1585	**3.04**	.	. **Q**	.	.	.
16.19	0.1728	0.63	. Q	.	.	.	.
16.28	0.1768	0.40	.Q	.	.	.	.
16.38	0.1794	0.29	.Q	.	.	.	.
16.47	0.1818	0.33	.Q	.	.	.	.
16.56	0.1842	0.28	.Q	.	.	.	.
16.66	0.1862	0.25	Q	.	.	.	.
16.75	0.1880	0.22	Q	.	.	.	.
16.85	0.1896	0.20	Q	.	.	.	.
16.94	0.1911	0.18	Q	.	.	.	.
17.03	0.1924	0.16	Q	.	.	.	.
17.13	0.1937	0.17	Q	.	.	.	.
17.22	0.1949	0.16	Q	.	.	.	.
17.32	0.1961	0.15	Q	.	.	.	.
17.41	0.1972	0.14	Q	.	.	.	.
17.50	0.1982	0.13	Q	.	.	.	.
17.60	0.1992	0.12	Q	.	.	.	.
17.69	0.2001	0.12	Q	.	.	.	.
17.79	0.2010	0.12	Q	.	.	.	.
17.88	0.2019	0.11	Q	.	.	.	.
17.97	0.2028	0.11	Q	.	.	.	.
18.07	0.2036	0.11	Q	.	.	.	.
18.16	0.2044	0.10	Q	.	.	.	.
18.26	0.2052	0.10	Q	.	.	.	.
18.35	0.2059	0.09	Q	.	.	.	.
18.44	0.2066	0.09	Q	.	.	.	.
18.54	0.2073	0.09	Q	.	.	.	.
18.63	0.2080	0.09	Q	.	.	.	.
18.73	0.2087	0.09	Q	.	.	.	.
18.82	0.2094	0.09	Q	.	.	.	.
18.91	0.2101	0.09	Q	.	.	.	.
19.01	0.2108	0.08	Q	.	.	.	.
19.10	0.2114	0.08	Q	.	.	.	.
19.20	0.2121	0.08	Q	.	.	.	.
19.29	0.2127	0.08	Q	.	.	.	.
19.38	0.2133	0.08	Q	.	.	.	.

19.48	0.2140	0.08	Q	.	.	.	.
19.57	0.2146	0.08	Q	.	.	.	.
19.67	0.2152	0.08	Q	.	.	.	.
19.76	0.2158	0.08	Q	.	.	.	.
19.85	0.2164	0.08	Q	.	.	.	.
19.95	0.2170	0.08	Q	.	.	.	.
20.04	0.2176	0.07	Q	.	.	.	.
20.14	0.2181	0.07	Q	.	.	.	.
20.23	0.2187	0.07	Q	.	.	.	.
20.32	0.2193	0.07	Q	.	.	.	.
20.42	0.2198	0.07	Q	.	.	.	.
20.51	0.2204	0.07	Q	.	.	.	.
20.61	0.2209	0.07	Q	.	.	.	.
20.70	0.2215	0.07	Q	.	.	.	.
20.79	0.2220	0.07	Q	.	.	.	.
20.89	0.2226	0.07	Q	.	.	.	.
20.98	0.2231	0.07	Q	.	.	.	.
21.08	0.2236	0.07	Q	.	.	.	.
21.17	0.2242	0.07	Q	.	.	.	.
21.26	0.2247	0.07	Q	.	.	.	.
21.36	0.2252	0.07	Q	.	.	.	.
21.45	0.2257	0.07	Q	.	.	.	.
21.55	0.2262	0.07	Q	.	.	.	.
21.64	0.2267	0.07	Q	.	.	.	.
21.73	0.2272	0.06	Q	.	.	.	.
21.83	0.2277	0.06	Q	.	.	.	.
21.92	0.2282	0.06	Q	.	.	.	.
22.02	0.2287	0.06	Q	.	.	.	.
22.11	0.2292	0.06	Q	.	.	.	.
22.20	0.2297	0.06	Q	.	.	.	.
22.30	0.2302	0.06	Q	.	.	.	.
22.39	0.2307	0.06	Q	.	.	.	.
22.49	0.2312	0.06	Q	.	.	.	.
22.58	0.2316	0.06	Q	.	.	.	.
22.67	0.2321	0.06	Q	.	.	.	.
22.77	0.2326	0.06	Q	.	.	.	.
22.86	0.2330	0.06	Q	.	.	.	.
22.96	0.2335	0.06	Q	.	.	.	.
23.05	0.2340	0.06	Q	.	.	.	.
23.14	0.2344	0.06	Q	.	.	.	.
23.24	0.2349	0.06	Q	.	.	.	.
23.33	0.2353	0.06	Q	.	.	.	.
23.43	0.2358	0.06	Q	.	.	.	.
23.52	0.2362	0.06	Q	.	.	.	.
23.61	0.2367	0.06	Q	.	.	.	.
23.71	0.2371	0.06	Q	.	.	.	.
23.80	0.2376	0.06	Q	.	.	.	.
23.90	0.2380	0.06	Q	.	.	.	.
23.99	0.2384	0.06	Q	.	.	.	.
24.08	0.2389	0.06	Q	.	.	.	.
24.18	0.2391	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1443.8
10%	67.7
20%	22.6
30%	11.3
40%	5.6
50%	5.6
60%	5.6
70%	5.6
80%	5.6
90%	5.6

UNIT HYDROGRAPH ANALYSIS
DOVID OVED RETREAT CENTER PROJECT, RUNNING SPRINGS, CA
AREA 3, PROPOSED CONDITION 25-YEAR STORM ANALYSIS

RATIONAL METHOD CALIBRATION COEFFICIENT = 0.90
TOTAL CATCHMENT AREA(ACRES) = 0.82
SOIL-LOSS RATE, Fm,(INCH/HR) = 0.320
LOW LOSS FRACTION = 0.660
TIME OF CONCENTRATION(MIN.) = 5.60 (From Rational Method Calcs)
SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
USER SPECIFIED RAINFALL VALUES ARE USED
RETURN FREQUENCY(YEARS) = **25**
5-MINUTE POINT RAINFALL VALUE(INCHES) = 0.49
30-MINUTE POINT RAINFALL VALUE(INCHES) = 1.19
1-HOUR POINT RAINFALL VALUE(INCHES) = 1.68
3-HOUR POINT RAINFALL VALUE(INCHES) = 3.26
6-HOUR POINT RAINFALL VALUE(INCHES) = 5.08
24-HOUR POINT RAINFALL VALUE(INCHES) = 11.50
(From NOAA 14 Rainfall Data)

TOTAL CATCHMENT RUNOFF VOLUME(ACRE-FEET) = 0.33
TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) = 0.46

****

TIME (HOURS)	VOLUME (AF)	Q (CFS)	0.	2.5	5.0	7.5	10.0
0.04	0.0001	0.07	Q	.	.	.	.
0.13	0.0007	0.07	Q	.	.	.	.
0.23	0.0012	0.07	Q	.	.	.	.
0.32	0.0018	0.07	Q	.	.	.	.
0.41	0.0023	0.07	Q	.	.	.	.
0.51	0.0029	0.07	Q	.	.	.	.
0.60	0.0034	0.07	Q	.	.	.	.
0.69	0.0040	0.07	Q	.	.	.	.
0.79	0.0045	0.07	Q	.	.	.	.
0.88	0.0051	0.07	Q	.	.	.	.
0.97	0.0056	0.07	Q	.	.	.	.
1.07	0.0062	0.07	Q	.	.	.	.
1.16	0.0068	0.07	Q	.	.	.	.
1.25	0.0073	0.07	Q	.	.	.	.
1.35	0.0079	0.07	Q	.	.	.	.
1.44	0.0085	0.07	Q	.	.	.	.
1.53	0.0090	0.07	Q	.	.	.	.
1.63	0.0096	0.07	Q	.	.	.	.
1.72	0.0102	0.07	Q	.	.	.	.
1.81	0.0107	0.07	Q	.	.	.	.
1.91	0.0113	0.07	Q	.	.	.	.
2.00	0.0119	0.07	Q	.	.	.	.
2.09	0.0125	0.07	Q	.	.	.	.
2.19	0.0130	0.08	Q	.	.	.	.
2.28	0.0136	0.08	Q	.	.	.	.
2.37	0.0142	0.08	Q	.	.	.	.
2.47	0.0148	0.08	Q	.	.	.	.
2.56	0.0154	0.08	Q	.	.	.	.
2.65	0.0160	0.08	Q	.	.	.	.
2.75	0.0166	0.08	Q	.	.	.	.

2.84	0.0171	0.08	Q	.	.	.	.
2.93	0.0177	0.08	Q	.	.	.	.
3.03	0.0183	0.08	Q	.	.	.	.
3.12	0.0189	0.08	Q	.	.	.	.
3.21	0.0195	0.08	Q	.	.	.	.
3.31	0.0201	0.08	Q	.	.	.	.
3.40	0.0207	0.08	Q	.	.	.	.
3.49	0.0213	0.08	Q	.	.	.	.
3.59	0.0219	0.08	Q	.	.	.	.
3.68	0.0225	0.08	Q	.	.	.	.
3.77	0.0231	0.08	Q	.	.	.	.
3.87	0.0237	0.08	Q	.	.	.	.
3.96	0.0244	0.08	Q	.	.	.	.
4.05	0.0250	0.08	Q	.	.	.	.
4.15	0.0256	0.08	Q	.	.	.	.
4.24	0.0262	0.08	Q	.	.	.	.
4.33	0.0268	0.08	Q	.	.	.	.
4.43	0.0274	0.08	Q	.	.	.	.
4.52	0.0281	0.08	Q	.	.	.	.
4.61	0.0287	0.08	Q	.	.	.	.
4.71	0.0293	0.08	Q	.	.	.	.
4.80	0.0300	0.08	Q	.	.	.	.
4.89	0.0306	0.08	Q	.	.	.	.
4.99	0.0312	0.08	Q	.	.	.	.
5.08	0.0319	0.08	Q	.	.	.	.
5.17	0.0325	0.08	Q	.	.	.	.
5.27	0.0331	0.08	Q	.	.	.	.
5.36	0.0338	0.08	Q	.	.	.	.
5.45	0.0344	0.08	Q	.	.	.	.
5.55	0.0351	0.08	Q	.	.	.	.
5.64	0.0357	0.08	Q	.	.	.	.
5.73	0.0364	0.08	Q	.	.	.	.
5.83	0.0370	0.09	Q	.	.	.	.
5.92	0.0377	0.09	Q	.	.	.	.
6.01	0.0383	0.09	Q	.	.	.	.
6.11	0.0390	0.09	Q	.	.	.	.
6.20	0.0397	0.09	Q	.	.	.	.
6.29	0.0403	0.09	Q	.	.	.	.
6.39	0.0410	0.09	Q	.	.	.	.
6.48	0.0417	0.09	Q	.	.	.	.
6.57	0.0424	0.09	Q	.	.	.	.
6.67	0.0430	0.09	Q	.	.	.	.
6.76	0.0437	0.09	Q	.	.	.	.
6.85	0.0444	0.09	Q	.	.	.	.
6.95	0.0451	0.09	Q	.	.	.	.
7.04	0.0458	0.09	Q	.	.	.	.
7.13	0.0465	0.09	Q	.	.	.	.
7.23	0.0472	0.09	Q	.	.	.	.
7.32	0.0479	0.09	Q	.	.	.	.
7.41	0.0486	0.09	Q	.	.	.	.
7.51	0.0493	0.09	Q	.	.	.	.
7.60	0.0500	0.09	Q	.	.	.	.
7.69	0.0507	0.09	Q	.	.	.	.
7.79	0.0514	0.09	Q	.	.	.	.
7.88	0.0521	0.09	Q	.	.	.	.
7.97	0.0528	0.09	Q	.	.	.	.
8.07	0.0536	0.09	Q	.	.	.	.
8.16	0.0543	0.09	Q	.	.	.	.
8.25	0.0550	0.10	Q	.	.	.	.

8.35	0.0558	0.10	Q	.	.	.	.
8.44	0.0565	0.10	Q	.	.	.	.
8.53	0.0572	0.10	Q	.	.	.	.
8.63	0.0580	0.10	Q	.	.	.	.
8.72	0.0587	0.10	Q	.	.	.	.
8.81	0.0595	0.10	Q	.	.	.	.
8.91	0.0603	0.10	Q	.	.	.	.
9.00	0.0610	0.10	Q	.	.	.	.
9.09	0.0618	0.10	Q	.	.	.	.
9.19	0.0626	0.10	Q	.	.	.	.
9.28	0.0633	0.10	Q	.	.	.	.
9.37	0.0641	0.10	Q	.	.	.	.
9.47	0.0649	0.10	Q	.	.	.	.
9.56	0.0657	0.10	Q	.	.	.	.
9.65	0.0665	0.10	Q	.	.	.	.
9.75	0.0673	0.10	Q	.	.	.	.
9.84	0.0681	0.10	Q	.	.	.	.
9.93	0.0689	0.11	Q	.	.	.	.
10.03	0.0697	0.11	Q	.	.	.	.
10.12	0.0705	0.11	Q	.	.	.	.
10.21	0.0713	0.11	Q	.	.	.	.
10.31	0.0722	0.11	Q	.	.	.	.
10.40	0.0730	0.11	Q	.	.	.	.
10.49	0.0738	0.11	Q	.	.	.	.
10.59	0.0747	0.11	Q	.	.	.	.
10.68	0.0755	0.11	Q	.	.	.	.
10.77	0.0764	0.11	Q	.	.	.	.
10.87	0.0772	0.11	Q	.	.	.	.
10.96	0.0781	0.11	Q	.	.	.	.
11.05	0.0790	0.11	Q	.	.	.	.
11.15	0.0799	0.11	Q	.	.	.	.
11.24	0.0808	0.12	Q	.	.	.	.
11.33	0.0817	0.12	Q	.	.	.	.
11.43	0.0826	0.12	Q	.	.	.	.
11.52	0.0835	0.12	Q	.	.	.	.
11.61	0.0844	0.12	Q	.	.	.	.
11.71	0.0853	0.12	Q	.	.	.	.
11.80	0.0863	0.12	Q	.	.	.	.
11.89	0.0872	0.12	Q	.	.	.	.
11.99	0.0882	0.13	Q	.	.	.	.
12.08	0.0892	0.14	Q	.	.	.	.
12.17	0.0904	0.17	Q	.	.	.	.
12.27	0.0917	0.17	Q	.	.	.	.
12.36	0.0931	0.18	Q	.	.	.	.
12.45	0.0944	0.18	Q	.	.	.	.
12.55	0.0958	0.18	Q	.	.	.	.
12.64	0.0972	0.19	Q	.	.	.	.
12.73	0.0987	0.19	Q	.	.	.	.
12.83	0.1002	0.19	Q	.	.	.	.
12.92	0.1017	0.20	Q	.	.	.	.
13.01	0.1032	0.20	Q	.	.	.	.
13.11	0.1048	0.21	Q	.	.	.	.
13.20	0.1065	0.21	Q	.	.	.	.
13.29	0.1081	0.22	Q	.	.	.	.
13.39	0.1099	0.22	Q	.	.	.	.
13.48	0.1116	0.23	Q	.	.	.	.
13.57	0.1134	0.24	Q	.	.	.	.
13.67	0.1153	0.24	Q	.	.	.	.
13.76	0.1172	0.25	Q	.	.	.	.

13.85	0.1191	0.26	.Q	.	.	.	.
13.95	0.1212	0.26	.Q	.	.	.	.
14.04	0.1232	0.27	.Q	.	.	.	.
14.13	0.1252	0.25	.Q	.	.	.	.
14.23	0.1272	0.26	.Q	.	.	.	.
14.32	0.1293	0.27	.Q	.	.	.	.
14.41	0.1314	0.29	.Q	.	.	.	.
14.51	0.1337	0.29	.Q	.	.	.	.
14.60	0.1360	0.31	.Q	.	.	.	.
14.69	0.1385	0.32	.Q	.	.	.	.
14.79	0.1410	0.34	.Q	.	.	.	.
14.88	0.1437	0.35	.Q	.	.	.	.
14.97	0.1465	0.38	.Q	.	.	.	.
15.07	0.1495	0.39	.Q	.	.	.	.
15.16	0.1527	0.43	.Q	.	.	.	.
15.25	0.1561	0.45	.Q	.	.	.	.
15.35	0.1597	0.49	.Q	.	.	.	.
15.44	0.1632	0.42	.Q	.	.	.	.
15.53	0.1666	0.46	.Q	.	.	.	.
15.63	0.1703	0.50	. Q	.	.	.	.
15.72	0.1747	0.63	. Q	.	.	.	.
15.81	0.1798	0.72	. Q	.	.	.	.
15.91	0.1867	1.05	. Q	.	.	.	.
16.00	0.1963	1.44	. Q	.	.	.	.
16.09	0.2167	**3.85**	.	.	**Q**	.	.
16.19	0.2348	0.85	. Q	.	.	.	.
16.28	0.2403	0.56	. Q	.	.	.	.
16.37	0.2440	0.42	.Q	.	.	.	.
16.47	0.2474	0.47	.Q	.	.	.	.
16.56	0.2508	0.41	.Q	.	.	.	.
16.65	0.2538	0.37	.Q	.	.	.	.
16.75	0.2565	0.33	.Q	.	.	.	.
16.84	0.2590	0.30	.Q	.	.	.	.
16.93	0.2612	0.28	.Q	.	.	.	.
17.03	0.2633	0.26	.Q	.	.	.	.
17.12	0.2653	0.27	.Q	.	.	.	.
17.21	0.2673	0.25	.Q	.	.	.	.
17.31	0.2692	0.24	Q	.	.	.	.
17.40	0.2710	0.23	Q	.	.	.	.
17.49	0.2728	0.22	Q	.	.	.	.
17.59	0.2744	0.21	Q	.	.	.	.
17.68	0.2759	0.20	Q	.	.	.	.
17.77	0.2774	0.19	Q	.	.	.	.
17.87	0.2788	0.18	Q	.	.	.	.
17.96	0.2802	0.17	Q	.	.	.	.
18.05	0.2815	0.17	Q	.	.	.	.
18.15	0.2826	0.13	Q	.	.	.	.
18.24	0.2836	0.12	Q	.	.	.	.
18.33	0.2845	0.12	Q	.	.	.	.
18.43	0.2854	0.12	Q	.	.	.	.
18.52	0.2863	0.12	Q	.	.	.	.
18.61	0.2872	0.11	Q	.	.	.	.
18.71	0.2881	0.11	Q	.	.	.	.
18.80	0.2889	0.11	Q	.	.	.	.
18.89	0.2898	0.11	Q	.	.	.	.
18.99	0.2906	0.11	Q	.	.	.	.
19.08	0.2914	0.11	Q	.	.	.	.
19.17	0.2923	0.10	Q	.	.	.	.
19.27	0.2931	0.10	Q	.	.	.	.

19.36	0.2939	0.10	Q	.	.	.	.
19.45	0.2946	0.10	Q	.	.	.	.
19.55	0.2954	0.10	Q	.	.	.	.
19.64	0.2962	0.10	Q	.	.	.	.
19.73	0.2969	0.10	Q	.	.	.	.
19.83	0.2977	0.10	Q	.	.	.	.
19.92	0.2984	0.10	Q	.	.	.	.
20.01	0.2992	0.09	Q	.	.	.	.
20.11	0.2999	0.09	Q	.	.	.	.
20.20	0.3006	0.09	Q	.	.	.	.
20.29	0.3013	0.09	Q	.	.	.	.
20.39	0.3020	0.09	Q	.	.	.	.
20.48	0.3027	0.09	Q	.	.	.	.
20.57	0.3034	0.09	Q	.	.	.	.
20.67	0.3041	0.09	Q	.	.	.	.
20.76	0.3048	0.09	Q	.	.	.	.
20.85	0.3055	0.09	Q	.	.	.	.
20.95	0.3062	0.09	Q	.	.	.	.
21.04	0.3068	0.09	Q	.	.	.	.
21.13	0.3075	0.09	Q	.	.	.	.
21.23	0.3081	0.08	Q	.	.	.	.
21.32	0.3088	0.08	Q	.	.	.	.
21.41	0.3094	0.08	Q	.	.	.	.
21.51	0.3101	0.08	Q	.	.	.	.
21.60	0.3107	0.08	Q	.	.	.	.
21.69	0.3114	0.08	Q	.	.	.	.
21.79	0.3120	0.08	Q	.	.	.	.
21.88	0.3126	0.08	Q	.	.	.	.
21.97	0.3132	0.08	Q	.	.	.	.
22.07	0.3139	0.08	Q	.	.	.	.
22.16	0.3145	0.08	Q	.	.	.	.
22.25	0.3151	0.08	Q	.	.	.	.
22.35	0.3157	0.08	Q	.	.	.	.
22.44	0.3163	0.08	Q	.	.	.	.
22.53	0.3169	0.08	Q	.	.	.	.
22.63	0.3175	0.08	Q	.	.	.	.
22.72	0.3181	0.08	Q	.	.	.	.
22.81	0.3187	0.08	Q	.	.	.	.
22.91	0.3192	0.08	Q	.	.	.	.
23.00	0.3198	0.08	Q	.	.	.	.
23.09	0.3204	0.07	Q	.	.	.	.
23.19	0.3210	0.07	Q	.	.	.	.
23.28	0.3216	0.07	Q	.	.	.	.
23.37	0.3221	0.07	Q	.	.	.	.
23.47	0.3227	0.07	Q	.	.	.	.
23.56	0.3233	0.07	Q	.	.	.	.
23.65	0.3238	0.07	Q	.	.	.	.
23.75	0.3244	0.07	Q	.	.	.	.
23.84	0.3249	0.07	Q	.	.	.	.
23.93	0.3255	0.07	Q	.	.	.	.
24.03	0.3260	0.07	Q	.	.	.	.
24.12	0.3263	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1444.8
10%	95.2
20%	22.4
30%	11.2
40%	5.6
50%	5.6
60%	5.6
70%	5.6
80%	5.6
90%	5.6