DRAINAGE REPORT

For

Balazs Residence

PDS2022-LDGRMJ-30446

San Diego County CA 92075

APN 267-147-06

June 5th, 2025

PREPARED BY:

AP CONSULTING

CIVIL ENGINEERING - WATER RESOURCES PLANNING

Tel. 619-227-8941

2371 Fenton Street, Suite 100

Chula Vista, CA 91914

TABLE OF CONTENTS

Appendix

1 Existing Conditions Calculations & Drainage Map

2 Developed Conditions Calculations & Drainage Map

3 Modified-Puls Detention Routing

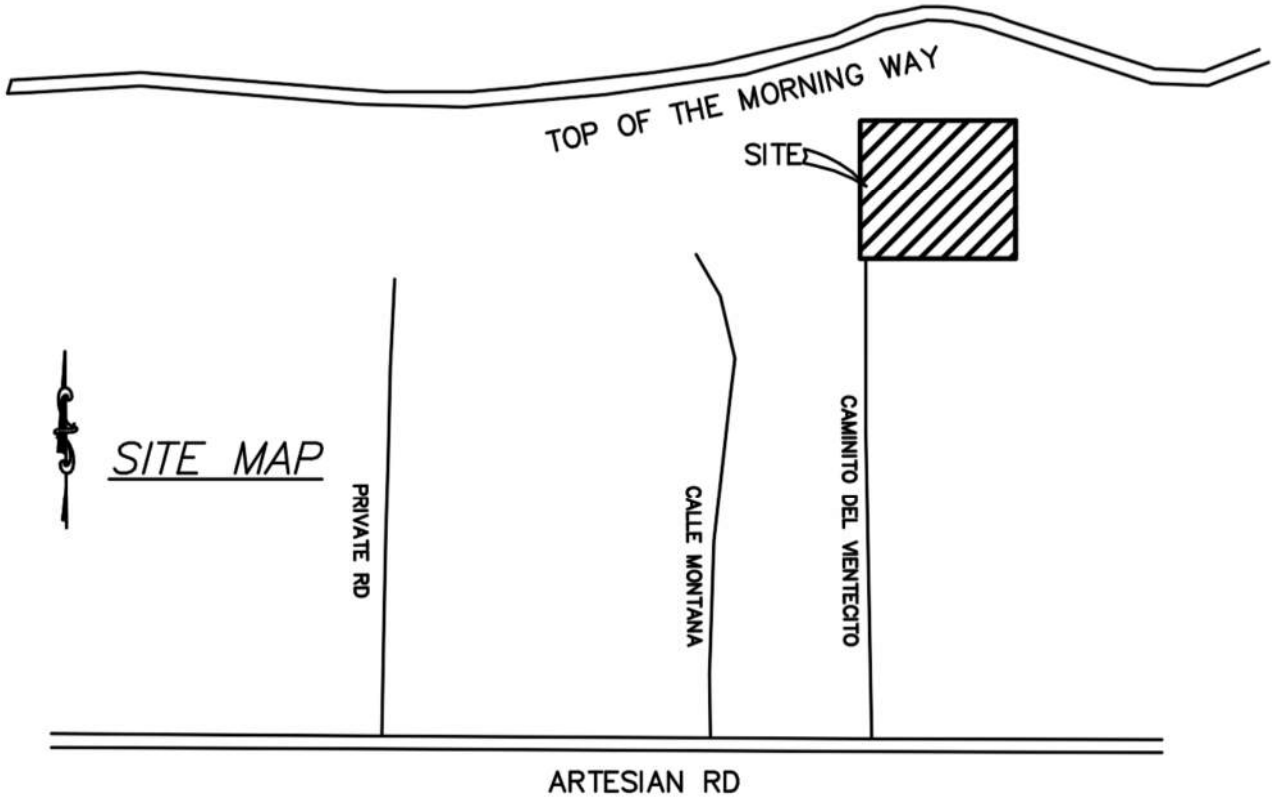
4 Maps and Charts

Introduction

This Drainage Study for the proposed single-family residence for APN 267-147-06, has been prepared to analyze the hydrologic and hydraulic characteristics of the existing and proposed project site. This report intends to present both the methodology and the calculations used for determining the runoff from the project site in both the pre-developed (existing) conditions and the post-developed (proposed) conditions produced by the 100-year, 6-hour storm per County of San Diego Hydrology.

Elevation range within the project site is approximately 458.0 feet above mean sea level (mls) at the southwest corner of the property to approximately 387.0 msl at the northeast corner of the property.

PROJECT VICINITY MAP



Existing Drainage Conditions

The existing property consist of a 3.16 acre gross parcel, undeveloped land with moderate slopes to the west. Runoff drains into an existing well defined natural creek that conveys downstream south all predevelopment flows.

Proposed Drainage Conditions

The project proposes a new one-story single-family residence constructed with wood framing and supported by continuous spread footings with a slab-on-grade floor system. Site improvements include a paved access driveway and installation of associated wet and dry utilities.
All runoff generated from new impervious surfaces will be collected and conveyed to an on-site Tree Well facility designed to provide both hydromodification management and water quality treatment in accordance with applicable stormwater standards.
Emergency overflow from the Tree Well facility, and from the adjacent flood control basin, will be safely discharged over a level retaining wall designed to function as a level spreader. This discharge area is located within a hardened berm, not a native soils condition, and is engineered to prevent erosion or concentration of flows. As such, the level spreader does not create any adverse drainage impacts or negative downstream conditions.
Stage-storage and outflow modeling for the proposed facilities has been performed using CivilD hydrologic software to verify adequate capacity, peak attenuation, and compliance with drainage design criteria

Proposed Condition Peak Drainage Flow Rates

Table 3 below shows a comparison between the peak flow rates for the proposed project and the existing condition for the respective rainfall events. The unmitigated peak flow rates changed when compared to the existing condition primarily due to increased imperviousness.

As shown in Table 3, mitigated flows decreased when routed through the tree well and released at a controlled rate.

Study Methodology

The method of analysis was based on the Rational Method according to the San Diego County Hydrology Manual.
Runoff calculations for this study were accomplished by using the Rational Method. The Rational Method is a physically-based numerical method where runoff is assumed to be directly proportional to rainfall and area, less losses for infiltration and depression storage.
Flows were computed based on the Rational formula:

$$Q = CIA$$

Where Q = Peak discharge (cfs);

C = runoff coefficient, based on land use and soil type
I = rainfall intensity (in/he)
A = watershed area (acre)

(1) Runoff Coefficient, C

Table 4-1 lists the estimated coefficients for urban areas.

Table 4-1

		RUNOFF COEFFICIENT			
	(%)	Hydrologic Soil Type			
LAND USE (County Elements)	Imperv.	A	B	C	D
Permanent Open Space		0.20	0.25	0.30	0.35
Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Neighborhood Commercial	80	0.76	0.77	0.78	0.79
General Commercial	85	0.80	0.80	0.81	0.82
Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Limited Industrial	90	0.83	0.84	0.84	0.85
General Industrial	95	0.87	0.87	0.87	0.87

The runoff coefficient C for this site is calculated as follows pursuant to section 3.1.2 of the County Hydrology Manual.

The runoff coefficient (C) represents the ratio of rainfall that runs off the watershed versus the portion that infiltrates to the soil. The runoff coefficient is dependent on the land use coverage and soil type (Table 4-1).

Runoff Coefficient Table	
Soil Type	D
Impervious	0.9
Pervious (landscape)	0.35

Post-Project Drainage						
Basin ID	Total Area (ac)	Pervious Area - Soil Type D (sq-ft)	Impervious Area - Soil Type D (sq-ft)	% Impervious	% Pervious	Weighted Runoff Coef C:
A.1	0.02	871	0	0%	100%	0.35
A.2	0.06	2614	0	0%	100%	0.35
A.3	0.08	1959	1700	46%	54%	0.61
A.4	0.24	10454	0	0%	100%	0.35
A.5	0.02	180	691	79%	21%	0.79
A.6	0.64	4478	23183	84%	16%	0.81
A.7	0.17	7187	0	0%	100%	0.35
A.8	0.05	0	2178	100%	0%	0.90
A.9	0.12	5009	0	0%	100%	0.35
A.10	0.15	6534	0	0%	100%	0.35
A.11	0.03	1198	0	0%	100%	0.35
A.12	0.03	1198	0	0%	100%	0.35
A.13	0.26	11326	0	0%	100%	0.35
A.14	0.51	22216	0	0%	100%	0.35

(2) Rainfall Intensity, I

Average rainfall intensity for a duration equal to the Tc for the area, in inches per hour.

The storm frequency for this study has a 100-year recurrence interval. The six-hour anticipated precipitation for the project site subject to the design storm frequency.

P_6 = 2.70 in
P_{24} = 4.60 in
P_6 is in the range of 45% to 65% of P_{24} and therefore doesn't need to be adjusted.

The RM equation assumes that the storm event being analyzed delivers precipitation to the entire basin uniformly, and therefore the peak discharge rate will occur when a raindrop falls at the most remote portion of the basin arrives at the point of analysis. The RM also assumes that the fraction of rainfall that becomes runoff or the runoff coefficient C is not affected by the storm intensity, I, or the precipitation zone number.

(1) Time of Concentration, Tc

The time of concentration is the time required for runoff to flow from the most remote part of the watershed to the outlet point under consideration.
The time of concentration for each sub-area on site, *Tc* is determined from the following formula (San Diego County Hydrology Manual, dated June 2003) with the initial lengths and times adjusted per Table 3-2 of the Manual for slope and land use.

$$T_c = \frac{1.8(1.1-C)\sqrt{D}}{\sqrt[3]{S}}$$ (For overland time of flow)

Where,

T_c = Time of Concentration (hours)

D = Watercourse Distance (ft)

S = Slope (%)

C = Runoff Coefficient

$$T_c = \left(\frac{11.9L^3}{\Delta E}\right)^{0.385}$$ (For natural watersheds)

Where,

T_c = Time of Concentration in hours (hours)

L = Watercourse Distance (miles)

ΔE = Change in elevation along effective slope line (ft)

The average rainfall intensity is calculated from the following equation (San Diego County Hydrology Manual, June 2003).

$$I = 7.44 \times P_6 \times D^{-0.645}$$

Where,

I = Rainfall Intensity (in/hr)

P_6 = Six hour precipitation (inches)

D = Duration (min.)

There is an illustration of this formula in Figure 2, which is per County 2003 Hydrology Manual. Time of concentration (T_C) is composed of two components: The initial time of concentration (T_i), and the travel time (T_t).
The maximum overland flow length (L_M) is used from Table 4 in calculating the initial time of concentration. The source for this chart is the San Diego County Hydrology Manual (Table 3.2), June 2003.

Table 4 - Maximum Overland Flow Length (L_M) & Initial Time of Concentration (T_i)

Element	DU/ Acre	0.50%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	103.0	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com.		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com.		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com.		50	41.0	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

In addition to the above Ration Method assumptions, the conservative assumption that all runoff coefficients utilized for this report are based on **Type "D"**

The County of San Diego Method program within CivilDesign was utilized in calculating runoff for all basins smaller than 0.5 square miles in size.

Summary

Upon performing hydrologic analysis of the project site in both the proposed developed and existing condition, the following results were produced:

Table 1 - Summary of existing conditions

Drainage Area	Year	Effective C	Time of Concentration TC	I (in/hr)	A (ac.)	Q (cfs)
BASIN A1 – A2	100	0.32	7.9	5.3	1.70	3.16
BASIN B1 – B2	100	0.32	7.8	5.3	0.77	1.44
TOTAL					**2.47**	**4.60**

Table 2 – Summary of unmitigated- developed conditions

Drainage Area	Year	Effective C	Time of Concentration TC	I (in/hr)	A (ac.)	Q (cfs)
BASIN A1 – A14	100	0.49	5.10	7.10	2.38	8.30
TOTAL					**2.38**	**8.30**

Table 2A – Summary of unmitigated CONFLUENCED flows

NODE #	A (ac.)	Q (cfs)
70	2.30	8.30

Storm Drains used for the discharge of the proposed water quality areas have been included in the report calculations. Calculations are shown as part of the CivilD results on Appendix 2.

Table 3 – Summary of Mitigated Peak Flows.

NODE # PRE/POST	Area (ac)			100-Yr peak Flows (cfs)			
	Existing	Developed	Diff	Existing	Developed Unmitigated	Developed Mitigated	Diff
20/30 Pre 70 Post	2.47	2.38	-0.11	4.60	8.30	**4.59**	**-0.01**

As shown in the above table, the proposed project will result in a net decrease of peak flow discharged from the project site.

Hydromodification
The project is considered a Priority Project according to the County of San Diego Storm Water Standards and will need to manage hydromodification. The hydromodification results are provided in the SWQMP.

Conclusions

The proposed storm drain system was designed in accordance with the guidelines set by the County of San Diego. During the design of the proposed drainage systems precautions were taken to limit adverse downstream effects and to maintain existing drainage characteristics wherever possible.

Please refer to the project SWQMP for the water quality impacts and mitigation measures for the proposed improvements. A summary of the facts and findings associated with this project and the measures addressed by this report is as follows:

- The project will not significantly alter drainage patterns on the site.
- The ultimate discharge points will not be changed.
- Graded areas will be landscaped to reduce or eliminate sediment discharge.
- Construction and post-construction BMPs will address mitigation measures to protect water quality and protection of water quality objectives and beneficial uses to the maximum extent practicable.
- The storm drain system for the project is designed to route and convey all resulting runoff from developed conditions to the existing points of discharge.

References
"San Diego County Hydrology Manual", revised June 2003, County of San Diego, Department of Public Works, Flood Control Section.

"California Regional Water Quality Control Board Order No. 2001-07," California Regional Water Control Board, San Diego Region (SDRWQCB).

Declaration of Responsible Charge

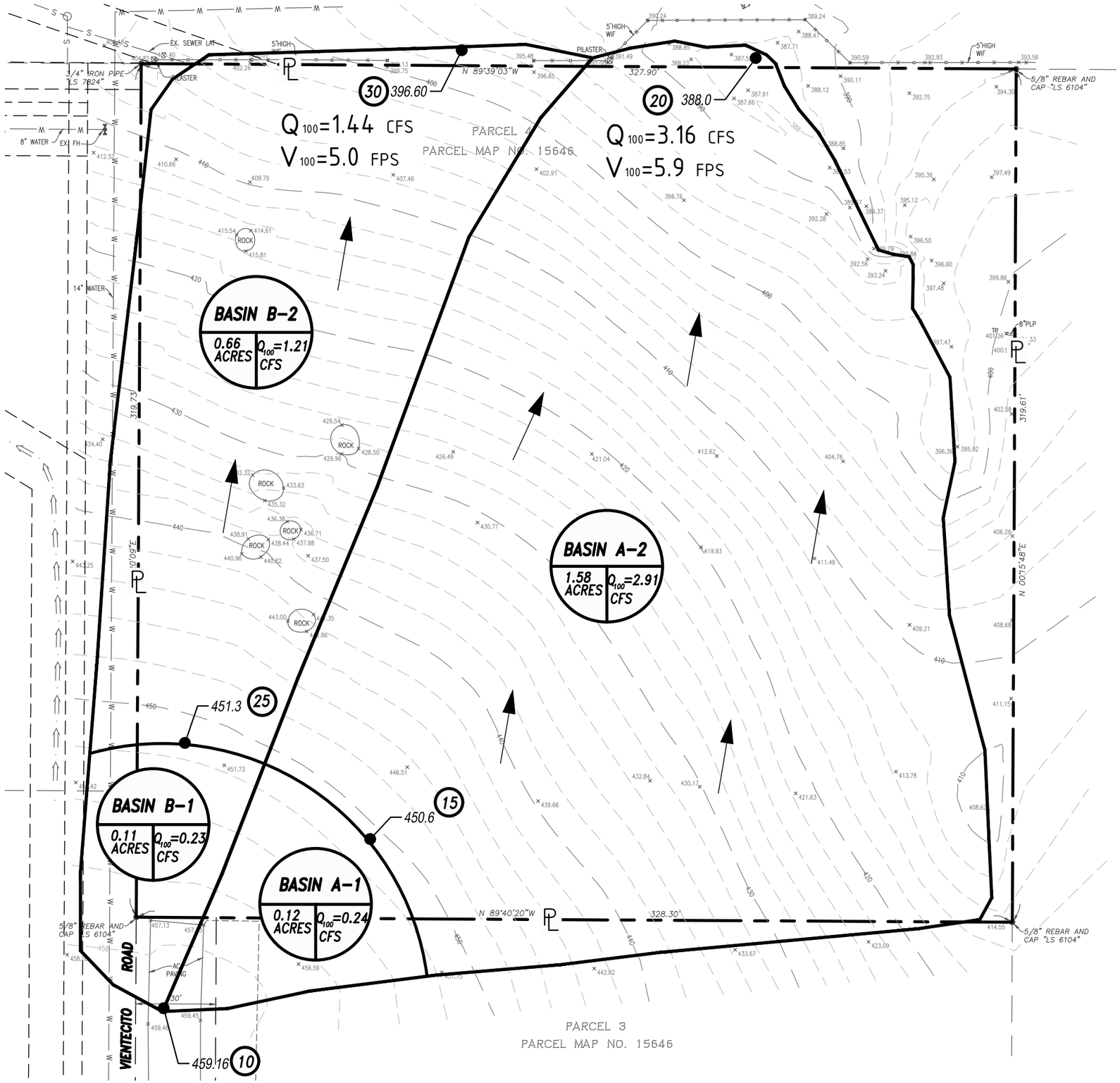
I, hereby declare that I am the engineer of work for this Drainage Study, that I have exercised responsible charge over the preparation of said study as defined in section 6703 of the Business and
Professions Code, and that the recommendations are consistent with Current standards.

I understand that the check of this drainage study by the county of San Diego is confined to a review only and does not relieve me, as Engineer of work, of my responsibilities.

Engineer of Work:

Victor Rodriguez-Fernandez, PE C-35373 Date: 03/12/25

APPENDIX 1
Existing Conditions Calculations & Drainage Map



LEGEND

ITEM	SYMBOL
SUBBASIN BOUNDARY	
DRAINAGE DIRECTION	
NODE	(10)
DRAINAGE DESCRIPTION	BASIN A.1 — 0.06 ACRES — Q_{100}=0.13 CFS

SCALE: 1" = 50'

50 25 0 50 100 150

BASIN MAP
PRE DEVELOPMENT

BASIN MAP FOR:

Balazs Residence

DESIGNED BY:	DRAWN BY:	SHEET 1 OF 1

PRE DEVELOPMENT HYDROLOGY

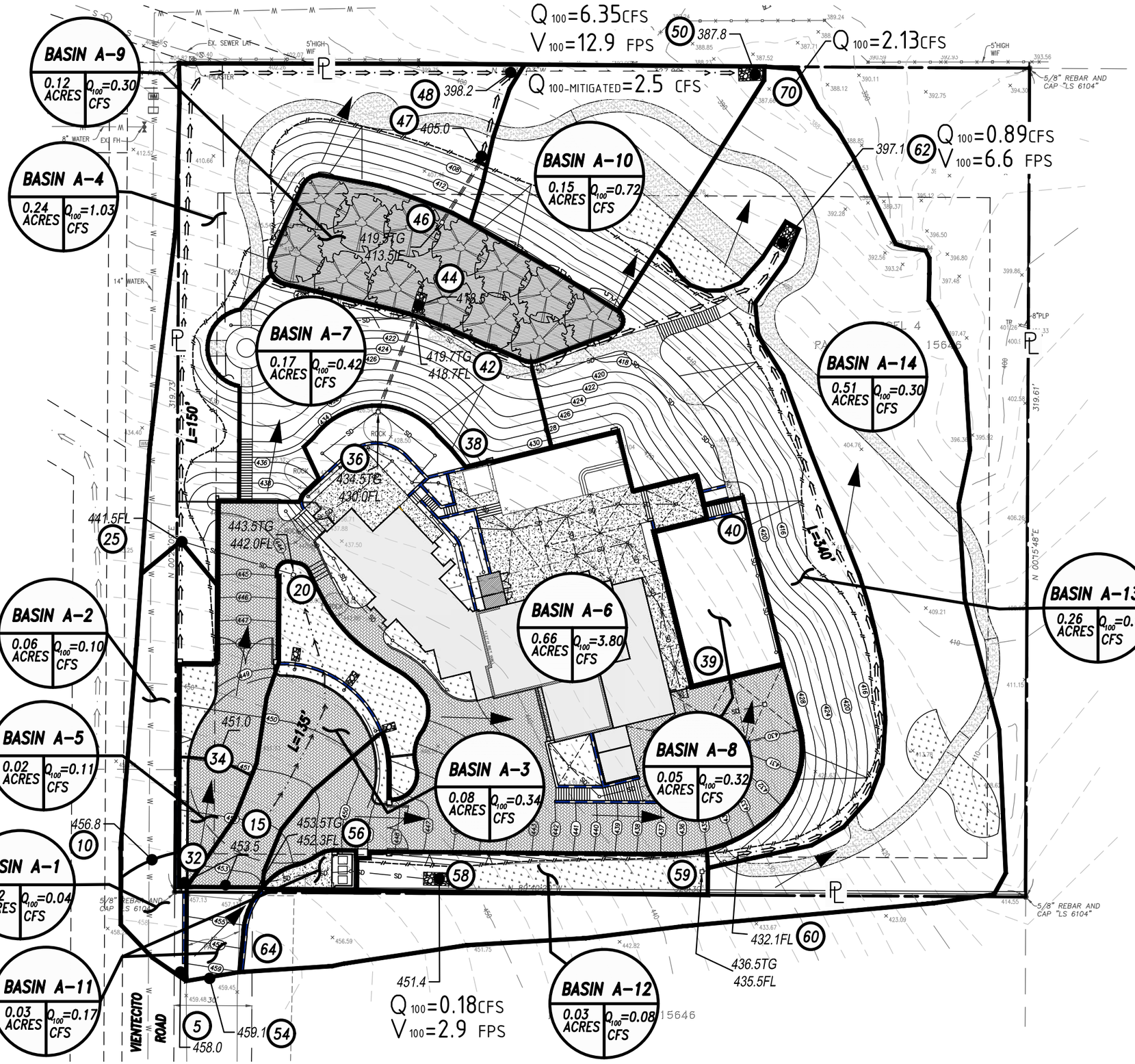
```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
       Rational Hydrology Study        Date: 12/29/23
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

------------------------------------------------------------------------


Program License Serial Number 6499

------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.700
24 hour precipitation(inches) =  4.600
P6/P24 =    58.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       15.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  459.160(Ft.)
Lowest elevation =  450.600(Ft.)
Elevation difference =    8.560(Ft.) Slope =  8.560 %
Top of Initial Area Slope adjusted by User to  7.890 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   7.89 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.78 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   7.890^(1/3)]=   6.78
Rainfall intensity (I) =      5.844(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.245(CFS)
Total initial stream area =        0.120(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       20.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   450.600(Ft.)
Downstream point elevation =   388.000(Ft.)
Channel length thru subarea  =   340.000(Ft.)
```

```
Channel base width  =    0.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =      1.742(CFS)
Manning's 'N'    = 0.025
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      1.742(CFS)
Depth of flow =   0.184(Ft.), Average velocity =   5.172(Ft/s)
Channel flow top width =    3.671(Ft.)
Flow Velocity =    5.17(Ft/s)
Travel time  =    1.10 min.
Time of concentration =    7.88 min.
Critical depth =      0.285(Ft.)
 Adding area flow to channel
Rainfall intensity (I) =      5.306(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.306(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.595
Subarea runoff =      2.912(CFS) for      1.580(Ac.)
Total runoff =      3.157(CFS)   Total area =       1.700(Ac.)
Depth of flow =   0.229(Ft.), Average velocity =   6.001(Ft/s)
Critical depth =      0.361(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       20.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.700(Ac.)
Runoff from this stream =      3.157(CFS)
Time of concentration =    7.88 min.
Rainfall intensity =     5.306(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.157      7.88            5.306
Qmax(1) =
         1.000 *    1.000 *     3.157) + =       3.157

Total of 1 streams to confluence:
Flow rates before confluence point:
       3.157
Maximum flow rates at confluence using above data:
        3.157
Area of streams before confluence:
        1.700
Results of confluence:
Total flow rate =      3.157(CFS)
Time of concentration =     7.877 min.
Effective stream area after confluence =      1.700(Ac.)
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       25.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  459.200(Ft.)
Lowest elevation =  451.300(Ft.)
Elevation difference =    7.900(Ft.) Slope =  7.900 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   7.90 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   6.78 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   7.900^(1/3)]=   6.78
Rainfall intensity (I) =      5.846(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.225(CFS)
Total initial stream area =        0.110(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       30.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________________
Upstream point elevation =   451.300(Ft.)
Downstream point elevation =   396.600(Ft.)
Channel length thru subarea  =   281.000(Ft.)
Channel base width  =    0.000(Ft.)
Slope or 'Z' of left channel bank =  10.000
Slope or 'Z' of right channel bank =  10.000
Estimated mean flow rate at midpoint of channel =      0.865(CFS)
Manning's 'N'    = 0.025
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      0.865(CFS)
Depth of flow =   0.140(Ft.), Average velocity =   4.434(Ft/s)
Channel flow top width =    2.794(Ft.)
Flow Velocity =    4.43(Ft/s)
Travel time  =    1.06 min.
Time of concentration =    7.83 min.
Critical depth =      0.215(Ft.)
 Adding area flow to channel
Rainfall intensity (I) =      5.325(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.325(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.269
Subarea runoff =      1.210(CFS) for      0.660(Ac.)
```

```
Total runoff =      1.435(CFS)    Total area =       0.770(Ac.)
Depth of flow =   0.169(Ft.), Average velocity =   5.031(Ft/s)
Critical depth =      0.264(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       20.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.770(Ac.)
Runoff from this stream =      1.435(CFS)
Time of concentration =    7.83 min.
Rainfall intensity =     5.325(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        3.157      7.88            5.306
2        1.435      7.83            5.325
Qmax(1) =
          1.000 *    1.000 *     3.157) +
          0.997 *    1.000 *     1.435) + =       4.587
Qmax(2) =
          1.000 *    0.995 *     3.157) +
          1.000 *    1.000 *     1.435) + =       4.575

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.157       1.435
Maximum flow rates at confluence using above data:
        4.587        4.575
Area of streams before confluence:
        1.700        0.770
Results of confluence:
Total flow rate =      4.587(CFS)
Time of concentration =     7.877 min.
Effective stream area after confluence =      2.470(Ac.)
End of computations, total study area =           2.470 (Ac.)
```

APPENDIX 2
Developed Conditions Calculations & Drainage Map



LEGEND

ITEM	SYMBOL
SUBBASIN BOUNDARY	
DRAINAGE DIRECTION	
NODE	(10)
DRAINAGE DESCRIPTION	BASIN A.1 — 0.06 ACRES — Q_{100}=0.13 CFS

BASIN MAP
POST DEVELOPMENT

BASIN MAP FOR:

Balazs Residence

DESIGNED BY:	DRAWN BY:	SHEET 1 OF 1

POST DEVELOPMENT HYDROLOGY

```
       San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
 Rational Hydrology Study        Date: 10/25/24
--------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

--------------------------------------------------------------------------


Program License Serial Number 6499

--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.700
24 hour precipitation(inches) =  4.600
P6/P24 =    58.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station       10.000
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   50.000(Ft.)
Highest elevation =  458.000(Ft.)
Lowest elevation =  456.800(Ft.)
Elevation difference =    1.200(Ft.) Slope =  2.400 %
Top of Initial Area Slope adjusted by User to  4.800 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   4.80 %, in a development type of
 Permanent Open Space
In Accordance With Table 3-2
Initial Area Time of Concentration =   8.70 minutes
 (for slope value of   5.00 %)
Rainfall intensity (I) =      4.977(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.035(CFS)
Total initial stream area =        0.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       25.000
**** SUBAREA FLOW ADDITION ****
__________________________________________________________________________
Rainfall intensity (I) =      4.977(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Time of concentration =     8.70 min.
Rainfall intensity =      4.977(In/Hr) for a   100.0 year storm
```

```
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.028
Subarea runoff =      0.105(CFS) for      0.060(Ac.)
Total runoff =      0.139(CFS)    Total area =       0.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       25.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.080(Ac.)
Runoff from this stream =      0.139(CFS)
Time of concentration =    8.70 min.
Rainfall intensity =     4.977(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        0.139      8.70            4.977
Qmax(1) =
    1.000 *    1.000 *     0.139) + =       0.139

Total of 1 streams to confluence:
Flow rates before confluence point:
       0.139
Maximum flow rates at confluence using above data:
        0.139
Area of streams before confluence:
        0.080
Results of confluence:
Total flow rate =      0.139(CFS)
Time of concentration =     8.700 min.
Effective stream area after confluence =      0.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       20.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                 ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =  135.000(Ft.)
Highest elevation =  453.500(Ft.)
Lowest elevation =  443.500(Ft.)
Elevation difference =   10.000(Ft.) Slope =  7.407 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   7.41 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.62 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*( 100.000^.5)/(   7.407^(1/3)]=   4.62
The initial area total distance of  135.00 (Ft.) entered leaves a
remaining distance of   35.00 (Ft.)
```

```
Using Figure 3-4, the travel time for this distance is   0.33 minutes
for a distance of  35.00 (Ft.) and a slope of  7.41 %
with an elevation difference of   2.59(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    0.329 Minutes
Tt=[(11.9*0.0066^3)/(  2.59)]^.385=  0.33
Total initial area Ti =   4.62 minutes from Figure 3-3 formula plus
  0.33 minutes from the Figure 3-4 formula =   4.95 minutes
Calculated TC of    4.946 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.341(CFS)
Total initial stream area =        0.080(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       20.000 to Point/Station       25.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   442.000(Ft.)
Downstream point/station elevation =   441.500(Ft.)
Pipe length  =    43.00(Ft.) Slope =   0.0116  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.341(CFS)
Given pipe size =      6.00(In.)
Calculated individual pipe flow  =     0.341(CFS)
Normal flow depth in pipe =    3.22(In.)
Flow top width inside pipe =    5.98(In.)
Critical Depth =    3.56(In.)
Pipe flow velocity =      3.17(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =     5.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       25.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.080(Ac.)
Runoff from this stream =      0.341(CFS)
Time of concentration =    5.17 min.
Rainfall intensity =     6.961(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        0.139      8.70            4.977
2        0.341      5.17            6.961
Qmax(1) =
    1.000 *    1.000 *     0.139) +
    0.715 *    1.000 *     0.341) + =       0.383
Qmax(2) =
    1.000 *    0.594 *     0.139) +
    1.000 *    1.000 *     0.341) + =       0.424

Total of 2 streams to confluence:
Flow rates before confluence point:
       0.139       0.341
Maximum flow rates at confluence using above data:
        0.383        0.424
Area of streams before confluence:
```

```
        0.080        0.080
Results of confluence:
Total flow rate =      0.424(CFS)
Time of concentration =     5.171 min.
Effective stream area after confluence =      0.160(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       25.000 to Point/Station       48.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.743(CFS)
Depth of flow =   0.172(Ft.), Average velocity =   7.163(Ft/s)
 ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
 1              0.00              1.00
 2              0.40              0.50
 3              0.80              0.20
 4              1.50              0.00
 5              2.20              0.20
 6              2.60              0.50
 7              3.00              1.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      0.743(CFS)
  '     '      flow top width =      1.205(Ft.)
  '     '    velocity=    7.163(Ft/s)
  '     '      area =      0.104(Sq.Ft)
  '     '      Froude number =     4.303

Upstream point elevation =   441.500(Ft.)
Downstream point elevation =   398.000(Ft.)
Flow length =   300.000(Ft.)
Travel time  =    0.70 min.
Time of concentration =    5.87 min.
Depth of flow =   0.172(Ft.)
Average velocity =   7.163(Ft/s)
Total irregular channel flow =     0.743(CFS)
Irregular channel normal depth above invert elev. =   0.172(Ft.)
Average velocity of channel(s) =   7.163(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      6.415(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Rainfall intensity =      6.415(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.400  CA =      0.160
Subarea runoff =      0.602(CFS) for      0.240(Ac.)
Total runoff =      1.026(CFS)    Total area =       0.400(Ac.)
Depth of flow =   0.194(Ft.), Average velocity =   7.767(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       48.000 to Point/Station       48.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.400(Ac.)
Runoff from this stream =      1.026(CFS)
Time of concentration =    5.87 min.
Rainfall intensity =     6.415(In/Hr)
Summary of stream data:
```

```
Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        1.026      5.87            6.415
Qmax(1) =
    1.000 *    1.000 *     1.026) + =       1.026

Total of 1 streams to confluence:
Flow rates before confluence point:
       1.026
Maximum flow rates at confluence using above data:
        1.026
Area of streams before confluence:
        0.400
Results of confluence:
Total flow rate =      1.026(CFS)
Time of concentration =     5.870 min.
Effective stream area after confluence =      0.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       32.000 to Point/Station       34.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Initial subarea total flow distance  =   50.000(Ft.)
Highest elevation =  453.500(Ft.)
Lowest elevation =  451.000(Ft.)
Elevation difference =    2.500(Ft.) Slope =  5.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 95.00 (Ft)
for the top area slope value of   5.00 %, in a development type of
 43.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.18 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7900)*(  95.000^.5)/(   5.000^(1/3)]=   3.18
Calculated TC of    3.181 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.790
Subarea runoff =      0.112(CFS)
Total initial stream area =        0.020(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       34.000 to Point/Station       36.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   451.000(Ft.)
Downstream point elevation =   434.500(Ft.)
Channel length thru subarea  =   390.000(Ft.)
Channel base width   =    2.000(Ft.)
Slope or 'Z' of left channel bank =   2.000
Slope or 'Z' of right channel bank =   2.000
Estimated mean flow rate at midpoint of channel =      1.911(CFS)
```

```
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.300(Ft.)
Flow(q) thru subarea =      1.911(CFS)
Depth of flow =   0.155(Ft.), Average velocity =   5.318(Ft/s)
Channel flow top width =    2.622(Ft.)
Flow Velocity =    5.32(Ft/s)
Travel time  =    1.22 min.
Time of concentration =    4.40 min.
Critical depth =      0.277(Ft.)
 Adding area flow to channel
Calculated TC of    4.403 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.810 given for subarea
Rainfall intensity =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.809  CA =      0.534
Subarea runoff =      3.688(CFS) for      0.640(Ac.)
Total runoff =      3.800(CFS)    Total area =       0.660(Ac.)
Depth of flow =   0.231(Ft.), Average velocity =   6.678(Ft/s)
Critical depth =      0.410(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       36.000 to Point/Station       42.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =   430.000(Ft.)
Downstream point/station elevation =   418.700(Ft.)
Pipe length  =    39.50(Ft.) Slope =   0.2861  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.800(CFS)
Given pipe size =     12.00(In.)
Calculated individual pipe flow  =     3.800(CFS)
Normal flow depth in pipe =    3.63(In.)
Flow top width inside pipe =   11.03(In.)
Critical Depth =    9.95(In.)
Pipe flow velocity =     18.93(Ft/s)
Travel time through pipe =    0.03 min.
Time of concentration (TC) =     4.44 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       38.000 to Point/Station       42.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Calculated TC of    4.438 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Time of concentration =     4.44 min.
Rainfall intensity =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.715  CA =      0.594
Subarea runoff =      0.423(CFS) for      0.170(Ac.)
Total runoff =      4.223(CFS)    Total area =       0.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       39.000 to Point/Station       40.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
Calculated TC of    4.438 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
```

```
User specified 'C' value of 0.900 given for subarea
Time of concentration =     4.44 min.
Rainfall intensity =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.726  CA =      0.639
Subarea runoff =      0.320(CFS) for      0.050(Ac.)
Total runoff =      4.544(CFS)    Total area =       0.880(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       42.000 to Point/Station       44.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   418.700(Ft.)
Downstream point/station elevation =   418.500(Ft.)
Pipe length  =     4.00(Ft.) Slope =   0.0500  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.544(CFS)
Given pipe size =     12.00(In.)
Calculated individual pipe flow  =     4.544(CFS)
Normal flow depth in pipe =    6.49(In.)
Flow top width inside pipe =   11.96(In.)
Critical Depth =   10.68(In.)
Pipe flow velocity =     10.48(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     4.44 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       44.000 to Point/Station       46.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Calculated TC of    4.444 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Time of concentration =     4.44 min.
Rainfall intensity =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.681  CA =      0.681
Subarea runoff =      0.299(CFS) for      0.120(Ac.)
Total runoff =      4.842(CFS)    Total area =       1.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       46.000 to Point/Station       46.000
**** 6 HOUR HYDROGRAPH ****
________________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =   4.44
Basin Area =     1.40 Acres
6 Hour Rainfall =  2.700 Inches
Runoff Coefficient =  0.486
Peak Discharge =     4.84 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       4               0.109
       8               0.110
       12               0.112
       16               0.113
       20               0.114
       24               0.115
```

28	0.117
32	0.118
36	0.120
40	0.121
44	0.123
48	0.124
52	0.126
56	0.128
60	0.130
64	0.131
68	0.134
72	0.135
76	0.138
80	0.139
84	0.142
88	0.144
92	0.147
96	0.149
100	0.152
104	0.154
108	0.158
112	0.160
116	0.165
120	0.167
124	0.172
128	0.174
132	0.180
136	0.182
140	0.188
144	0.192
148	0.199
152	0.202
156	0.210
160	0.214
164	0.224
168	0.229
172	0.240
176	0.246
180	0.259
184	0.266
188	0.283
192	0.292
196	0.313
200	0.326
204	0.354
208	0.371
212	0.411
216	0.436
220	0.500
224	0.542
228	0.662
232	0.754
236	1.107
240	1.560
244	4.842
248	0.888
252	0.594
256	0.465
260	0.389
264	0.339
268	0.302
272	0.274
276	0.252
280	0.234

284	0.219
288	0.206
292	0.195
296	0.185
300	0.177
304	0.169
308	0.162
312	0.156
316	0.151
320	0.145
324	0.141
328	0.136
332	0.132
336	0.129
340	0.125
344	0.122
348	0.119
352	0.116
356	0.113
360	0.111
364	0.109

++

6 - H O U R S T O R M

R u n o f f H y d r o g r a p h

Hydrograph in 1 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	1.2	2.4	3.6	4.8
0+ 0	0.0000	0.00	Q	|	|	|	|
0+ 1	0.0000	0.03	Q	|	|	|	|
0+ 2	0.0001	0.05	Q	|	|	|	|
0+ 3	0.0002	0.08	Q	|	|	|	|
0+ 4	0.0004	0.11	Q	|	|	|	|
0+ 5	0.0005	0.11	Q	|	|	|	|
0+ 6	0.0007	0.11	Q	|	|	|	|
0+ 7	0.0008	0.11	Q	|	|	|	|
0+ 8	0.0010	0.11	Q	|	|	|	|
0+ 9	0.0011	0.11	Q	|	|	|	|
0+10	0.0013	0.11	Q	|	|	|	|
0+11	0.0014	0.11	Q	|	|	|	|
0+12	0.0016	0.11	Q	|	|	|	|
0+13	0.0017	0.11	Q	|	|	|	|
0+14	0.0019	0.11	Q	|	|	|	|
0+15	0.0021	0.11	Q	|	|	|	|
0+16	0.0022	0.11	Q	|	|	|	|
0+17	0.0024	0.11	Q	|	|	|	|
0+18	0.0025	0.11	Q	|	|	|	|
0+19	0.0027	0.11	Q	|	|	|	|
0+20	0.0028	0.11	Q	|	|	|	|
0+21	0.0030	0.11	Q	|	|	|	|
0+22	0.0032	0.11	Q	|	|	|	|
0+23	0.0033	0.12	Q	|	|	|	|
0+24	0.0035	0.12	Q	|	|	|	|
0+25	0.0036	0.12	Q	|	|	|	|
0+26	0.0038	0.12	QV	|	|	|	|
0+27	0.0040	0.12	QV	|	|	|	|
0+28	0.0041	0.12	QV	|	|	|	|
0+29	0.0043	0.12	QV	|	|	|	|
0+30	0.0044	0.12	QV	|	|	|	|
0+31	0.0046	0.12	QV	|	|	|	|
0+32	0.0048	0.12	QV	|	|	|	|
0+33	0.0049	0.12	QV	|	|	|	|

```
0+34       0.0051      0.12  QV        |          |          |          |
0+35       0.0053      0.12  QV        |          |          |          |
0+36       0.0054      0.12  QV        |          |          |          |
0+37       0.0056      0.12  QV        |          |          |          |
0+38       0.0058      0.12  QV        |          |          |          |
0+39       0.0059      0.12  QV        |          |          |          |
0+40       0.0061      0.12  QV        |          |          |          |
0+41       0.0063      0.12  |Q        |          |          |          |
0+42       0.0064      0.12  |Q        |          |          |          |
0+43       0.0066      0.12  |Q        |          |          |          |
0+44       0.0068      0.12  |Q        |          |          |          |
0+45       0.0069      0.12  |Q        |          |          |          |
0+46       0.0071      0.12  |Q        |          |          |          |
0+47       0.0073      0.12  |Q        |          |          |          |
0+48       0.0074      0.12  |QV       |          |          |          |
0+49       0.0076      0.12  |QV       |          |          |          |
0+50       0.0078      0.13  |QV       |          |          |          |
0+51       0.0080      0.13  |QV       |          |          |          |
0+52       0.0081      0.13  |QV       |          |          |          |
0+53       0.0083      0.13  |QV       |          |          |          |
0+54       0.0085      0.13  |QV       |          |          |          |
0+55       0.0087      0.13  |QV       |          |          |          |
0+56       0.0088      0.13  |QV       |          |          |          |
0+57       0.0090      0.13  |QV       |          |          |          |
0+58       0.0092      0.13  |QV       |          |          |          |
0+59       0.0094      0.13  |QV       |          |          |          |
1+ 0       0.0095      0.13  |QV       |          |          |          |
1+ 1       0.0097      0.13  |QV       |          |          |          |
1+ 2       0.0099      0.13  |QV       |          |          |          |
1+ 3       0.0101      0.13  |QV       |          |          |          |
1+ 4       0.0103      0.13  |QV       |          |          |          |
1+ 5       0.0104      0.13  |QV       |          |          |          |
1+ 6       0.0106      0.13  |QV       |          |          |          |
1+ 7       0.0108      0.13  |QV       |          |          |          |
1+ 8       0.0110      0.13  |QV       |          |          |          |
1+ 9       0.0112      0.13  |Q V      |          |          |          |
1+10       0.0114      0.13  |Q V      |          |          |          |
1+11       0.0116      0.13  |Q V      |          |          |          |
1+12       0.0117      0.14  |Q V      |          |          |          |
1+13       0.0119      0.14  |Q V      |          |          |          |
1+14       0.0121      0.14  |Q V      |          |          |          |
1+15       0.0123      0.14  |Q V      |          |          |          |
1+16       0.0125      0.14  |Q V      |          |          |          |
1+17       0.0127      0.14  |Q V      |          |          |          |
1+18       0.0129      0.14  |Q V      |          |          |          |
1+19       0.0131      0.14  |Q V      |          |          |          |
1+20       0.0133      0.14  |Q V      |          |          |          |
1+21       0.0134      0.14  |Q V      |          |          |          |
1+22       0.0136      0.14  |Q V      |          |          |          |
1+23       0.0138      0.14  |Q V      |          |          |          |
1+24       0.0140      0.14  |Q V      |          |          |          |
1+25       0.0142      0.14  |Q V      |          |          |          |
1+26       0.0144      0.14  |Q V      |          |          |          |
1+27       0.0146      0.14  |Q V      |          |          |          |
1+28       0.0148      0.14  |Q V      |          |          |          |
1+29       0.0150      0.14  |Q  V     |          |          |          |
1+30       0.0152      0.15  |Q  V     |          |          |          |
1+31       0.0154      0.15  |Q  V     |          |          |          |
1+32       0.0156      0.15  |Q  V     |          |          |          |
1+33       0.0158      0.15  |Q  V     |          |          |          |
1+34       0.0160      0.15  |Q  V     |          |          |          |
1+35       0.0162      0.15  |Q  V     |          |          |          |
1+36       0.0164      0.15  |Q  V     |          |          |          |
1+37       0.0166      0.15  |Q  V     |          |          |          |
```

```
1+38       0.0169      0.15  |Q  V     |          |          |          |
1+39       0.0171      0.15  |Q  V     |          |          |          |
1+40       0.0173      0.15  |Q  V     |          |          |          |
1+41       0.0175      0.15  |Q  V     |          |          |          |
1+42       0.0177      0.15  |Q  V     |          |          |          |
1+43       0.0179      0.15  |Q  V     |          |          |          |
1+44       0.0181      0.15  |Q  V     |          |          |          |
1+45       0.0183      0.16  |Q  V     |          |          |          |
1+46       0.0186      0.16  |Q  V     |          |          |          |
1+47       0.0188      0.16  |Q   V    |          |          |          |
1+48       0.0190      0.16  |Q   V    |          |          |          |
1+49       0.0192      0.16  |Q   V    |          |          |          |
1+50       0.0194      0.16  |Q   V    |          |          |          |
1+51       0.0196      0.16  |Q   V    |          |          |          |
1+52       0.0199      0.16  |Q   V    |          |          |          |
1+53       0.0201      0.16  |Q   V    |          |          |          |
1+54       0.0203      0.16  |Q   V    |          |          |          |
1+55       0.0205      0.16  |Q   V    |          |          |          |
1+56       0.0208      0.16  |Q   V    |          |          |          |
1+57       0.0210      0.17  |Q   V    |          |          |          |
1+58       0.0212      0.17  |Q   V    |          |          |          |
1+59       0.0214      0.17  |Q   V    |          |          |          |
2+ 0       0.0217      0.17  |Q   V    |          |          |          |
2+ 1       0.0219      0.17  |Q   V    |          |          |          |
2+ 2       0.0221      0.17  |Q   V    |          |          |          |
2+ 3       0.0224      0.17  |Q    V   |          |          |          |
2+ 4       0.0226      0.17  |Q    V   |          |          |          |
2+ 5       0.0228      0.17  |Q    V   |          |          |          |
2+ 6       0.0231      0.17  |Q    V   |          |          |          |
2+ 7       0.0233      0.17  |Q    V   |          |          |          |
2+ 8       0.0236      0.17  |Q    V   |          |          |          |
2+ 9       0.0238      0.18  |Q    V   |          |          |          |
2+10       0.0241      0.18  |Q    V   |          |          |          |
2+11       0.0243      0.18  |Q    V   |          |          |          |
2+12       0.0245      0.18  |Q    V   |          |          |          |
2+13       0.0248      0.18  |Q    V   |          |          |          |
2+14       0.0250      0.18  |Q    V   |          |          |          |
2+15       0.0253      0.18  |Q    V   |          |          |          |
2+16       0.0255      0.18  |Q    V   |          |          |          |
2+17       0.0258      0.18  |Q    V   |          |          |          |
2+18       0.0261      0.19  |Q     V  |          |          |          |
2+19       0.0263      0.19  |Q     V  |          |          |          |
2+20       0.0266      0.19  |Q     V  |          |          |          |
2+21       0.0268      0.19  |Q     V  |          |          |          |
2+22       0.0271      0.19  |Q     V  |          |          |          |
2+23       0.0274      0.19  |Q     V  |          |          |          |
2+24       0.0276      0.19  |Q     V  |          |          |          |
2+25       0.0279      0.19  |Q     V  |          |          |          |
2+26       0.0282      0.20  |Q     V  |          |          |          |
2+27       0.0284      0.20  |Q     V  |          |          |          |
2+28       0.0287      0.20  |Q     V  |          |          |          |
2+29       0.0290      0.20  |Q     V  |          |          |          |
2+30       0.0292      0.20  |Q     V  |          |          |          |
2+31       0.0295      0.20  |Q     V  |          |          |          |
2+32       0.0298      0.20  |Q      V |          |          |          |
2+33       0.0301      0.20  |Q      V |          |          |          |
2+34       0.0304      0.21  |Q      V |          |          |          |
2+35       0.0307      0.21  |Q      V |          |          |          |
2+36       0.0309      0.21  |Q      V |          |          |          |
2+37       0.0312      0.21  |Q      V |          |          |          |
2+38       0.0315      0.21  |Q      V |          |          |          |
2+39       0.0318      0.21  |Q      V |          |          |          |
2+40       0.0321      0.21  |Q      V |          |          |          |
2+41       0.0324      0.22  |Q      V |          |          |          |
```

```
2+42       0.0327      0.22  |Q      V |          |          |          |
2+43       0.0330      0.22  |Q      V |          |          |          |
2+44       0.0333      0.22  |Q      V |          |          |          |
2+45       0.0336      0.23  |Q       V|          |          |          |
2+46       0.0340      0.23  |Q       V|          |          |          |
2+47       0.0343      0.23  |Q       V|          |          |          |
2+48       0.0346      0.23  |Q       V|          |          |          |
2+49       0.0349      0.23  |Q       V|          |          |          |
2+50       0.0352      0.23  |Q       V|          |          |          |
2+51       0.0356      0.24  |Q       V|          |          |          |
2+52       0.0359      0.24  |Q       V|          |          |          |
2+53       0.0362      0.24  |Q       V|          |          |          |
2+54       0.0365      0.24  | Q      V|          |          |          |
2+55       0.0369      0.24  | Q      V|          |          |          |
2+56       0.0372      0.25  | Q       V          |          |          |
2+57       0.0376      0.25  | Q       V          |          |          |
2+58       0.0379      0.25  | Q       V          |          |          |
2+59       0.0383      0.26  | Q       V          |          |          |
3+ 0       0.0386      0.26  | Q       V          |          |          |
3+ 1       0.0390      0.26  | Q       V          |          |          |
3+ 2       0.0393      0.26  | Q       V          |          |          |
3+ 3       0.0397      0.26  | Q       V          |          |          |
3+ 4       0.0401      0.27  | Q       V          |          |          |
3+ 5       0.0404      0.27  | Q       V          |          |          |
3+ 6       0.0408      0.27  | Q       |V         |          |          |
3+ 7       0.0412      0.28  | Q       |V         |          |          |
3+ 8       0.0416      0.28  | Q       |V         |          |          |
3+ 9       0.0420      0.29  | Q       |V         |          |          |
3+10       0.0424      0.29  | Q       |V         |          |          |
3+11       0.0428      0.29  | Q       |V         |          |          |
3+12       0.0432      0.29  | Q       |V         |          |          |
3+13       0.0436      0.30  | Q       |V         |          |          |
3+14       0.0440      0.30  | Q       |V         |          |          |
3+15       0.0444      0.31  | Q       |V         |          |          |
3+16       0.0449      0.31  | Q       | V        |          |          |
3+17       0.0453      0.32  | Q       | V        |          |          |
3+18       0.0458      0.32  | Q       | V        |          |          |
3+19       0.0462      0.32  | Q       | V        |          |          |
3+20       0.0466      0.33  | Q       | V        |          |          |
3+21       0.0471      0.33  | Q       | V        |          |          |
3+22       0.0476      0.34  | Q       | V        |          |          |
3+23       0.0480      0.35  | Q       | V        |          |          |
3+24       0.0485      0.35  | Q       |  V       |          |          |
3+25       0.0490      0.36  | Q       |  V       |          |          |
3+26       0.0495      0.36  | Q       |  V       |          |          |
3+27       0.0500      0.37  |  Q      |  V       |          |          |
3+28       0.0505      0.37  |  Q      |  V       |          |          |
3+29       0.0511      0.38  |  Q      |  V       |          |          |
3+30       0.0516      0.39  |  Q      |  V       |          |          |
3+31       0.0522      0.40  |  Q      |   V      |          |          |
3+32       0.0527      0.41  |  Q      |   V      |          |          |
3+33       0.0533      0.42  |  Q      |   V      |          |          |
3+34       0.0539      0.42  |  Q      |   V      |          |          |
3+35       0.0545      0.43  |  Q      |   V      |          |          |
3+36       0.0551      0.44  |  Q      |   V      |          |          |
3+37       0.0557      0.45  |  Q      |    V     |          |          |
3+38       0.0563      0.47  |  Q      |    V     |          |          |
3+39       0.0570      0.48  |  Q      |    V     |          |          |
3+40       0.0577      0.50  |   Q     |    V     |          |          |
3+41       0.0584      0.51  |   Q     |    V     |          |          |
3+42       0.0591      0.52  |   Q     |    V     |          |          |
3+43       0.0598      0.53  |   Q     |     V    |          |          |
3+44       0.0606      0.54  |   Q     |     V    |          |          |
3+45       0.0614      0.57  |   Q     |     V    |          |          |
```

```
3+46        0.0622      0.60  |   Q      |      V   |          |          |
3+47        0.0631      0.63  |    Q     |      V   |          |          |
3+48        0.0640      0.66  |    Q     |       V  |          |          |
3+49        0.0649      0.69  |    Q     |       V  |          |          |
3+50        0.0659      0.71  |    Q     |       V  |          |          |
3+51        0.0669      0.73  |     Q    |        V |          |          |
3+52        0.0680      0.75  |     Q    |        V |          |          |
3+53        0.0691      0.84  |     Q    |        V |          |          |
3+54        0.0704      0.93  |      Q   |        V |          |          |
3+55        0.0718      1.02  |       Q  |         V|          |          |
3+56        0.0733      1.11  |        Q |         V|          |          |
3+57        0.0750      1.22  |          Q          V          |          |
3+58        0.0768      1.33  |          |Q         V          |          |
3+59        0.0788      1.45  |          |Q         |V         |          |
4+ 0        0.0810      1.56  |          | Q        |V         |          |
4+ 1        0.0843      2.38  |          |          Q| V       |          |
4+ 2        0.0887      3.20  |          |           |  V  Q    |          |
4+ 3        0.0942      4.02  |          |           |    V     |  Q       |
4+ 4        0.1009      4.84  |          |           |       V  |          Q
4+ 5        0.1062      3.85  |          |           |          V |Q        |
4+ 6        0.1101      2.87  |          |           |  Q       V|         |
4+ 7        0.1127      1.88  |          |    Q      |          V         |
4+ 8        0.1139      0.89  |       Q  |           |          V         |
4+ 9        0.1151      0.81  |      Q   |           |          |V        |
4+10        0.1161      0.74  |      Q   |           |          |V        |
4+11        0.1170      0.67  |     Q    |           |          |V        |
4+12        0.1178      0.59  |    Q     |           |          |V        |
4+13        0.1186      0.56  |    Q     |           |          |V        |
4+14        0.1193      0.53  |    Q     |           |          | V       |
4+15        0.1200      0.50  |    Q     |           |          | V       |
4+16        0.1207      0.46  |   Q      |           |          | V       |
4+17        0.1213      0.45  |   Q      |           |          | V       |
4+18        0.1219      0.43  |   Q      |           |          | V       |
4+19        0.1224      0.41  |   Q      |           |          | V       |
4+20        0.1230      0.39  |   Q      |           |          |  V      |
4+21        0.1235      0.38  |   Q      |           |          |  V      |
4+22        0.1240      0.36  |   Q      |           |          |  V      |
4+23        0.1245      0.35  |  Q       |           |          |  V      |
4+24        0.1249      0.34  |  Q       |           |          |  V      |
4+25        0.1254      0.33  |  Q       |           |          |  V      |
4+26        0.1258      0.32  |  Q       |           |          |  V      |
4+27        0.1263      0.31  |  Q       |           |          |   V     |
4+28        0.1267      0.30  |  Q       |           |          |   V     |
4+29        0.1271      0.30  |  Q       |           |          |   V     |
4+30        0.1275      0.29  |  Q       |           |          |   V     |
4+31        0.1279      0.28  |  Q       |           |          |   V     |
4+32        0.1282      0.27  |  Q       |           |          |   V     |
4+33        0.1286      0.27  |  Q       |           |          |   V     |
4+34        0.1290      0.26  |  Q       |           |          |   V     |
4+35        0.1293      0.26  |  Q       |           |          |   V     |
4+36        0.1297      0.25  |  Q       |           |          |   V     |
4+37        0.1300      0.25  |  Q       |           |          |    V    |
4+38        0.1304      0.24  |  Q       |           |          |    V    |
4+39        0.1307      0.24  |Q         |           |          |    V    |
4+40        0.1310      0.23  |Q         |           |          |    V    |
4+41        0.1313      0.23  |Q         |           |          |    V    |
4+42        0.1316      0.23  |Q         |           |          |    V    |
4+43        0.1319      0.22  |Q         |           |          |    V    |
4+44        0.1322      0.22  |Q         |           |          |    V    |
4+45        0.1325      0.22  |Q         |           |          |    V    |
4+46        0.1328      0.21  |Q         |           |          |    V    |
4+47        0.1331      0.21  |Q         |           |          |    V    |
4+48        0.1334      0.21  |Q         |           |          |    V    |
4+49        0.1337      0.20  |Q         |           |          |     V   |
```

```
4+50       0.1340      0.20  |Q        |          |          |     V   |
4+51       0.1342      0.20  |Q        |          |          |     V   |
4+52       0.1345      0.20  |Q        |          |          |     V   |
4+53       0.1348      0.19  |Q        |          |          |     V   |
4+54       0.1350      0.19  |Q        |          |          |     V   |
4+55       0.1353      0.19  |Q        |          |          |     V   |
4+56       0.1355      0.19  |Q        |          |          |     V   |
4+57       0.1358      0.18  |Q        |          |          |     V   |
4+58       0.1360      0.18  |Q        |          |          |     V   |
4+59       0.1363      0.18  |Q        |          |          |     V   |
5+ 0       0.1365      0.18  |Q        |          |          |     V   |
5+ 1       0.1368      0.17  |Q        |          |          |     V   |
5+ 2       0.1370      0.17  |Q        |          |          |     V   |
5+ 3       0.1372      0.17  |Q        |          |          |     V   |
5+ 4       0.1375      0.17  |Q        |          |          |      V  |
5+ 5       0.1377      0.17  |Q        |          |          |      V  |
5+ 6       0.1379      0.17  |Q        |          |          |      V  |
5+ 7       0.1382      0.16  |Q        |          |          |      V  |
5+ 8       0.1384      0.16  |Q        |          |          |      V  |
5+ 9       0.1386      0.16  |Q        |          |          |      V  |
5+10       0.1388      0.16  |Q        |          |          |      V  |
5+11       0.1390      0.16  |Q        |          |          |      V  |
5+12       0.1393      0.16  |Q        |          |          |      V  |
5+13       0.1395      0.15  |Q        |          |          |      V  |
5+14       0.1397      0.15  |Q        |          |          |      V  |
5+15       0.1399      0.15  |Q        |          |          |      V  |
5+16       0.1401      0.15  |Q        |          |          |      V  |
5+17       0.1403      0.15  |Q        |          |          |      V  |
5+18       0.1405      0.15  |Q        |          |          |      V  |
5+19       0.1407      0.15  |Q        |          |          |      V  |
5+20       0.1409      0.15  |Q        |          |          |      V  |
5+21       0.1411      0.14  |Q        |          |          |       V |
5+22       0.1413      0.14  |Q        |          |          |       V |
5+23       0.1415      0.14  |Q        |          |          |       V |
5+24       0.1417      0.14  |Q        |          |          |       V |
5+25       0.1419      0.14  |Q        |          |          |       V |
5+26       0.1421      0.14  |Q        |          |          |       V |
5+27       0.1423      0.14  |Q        |          |          |       V |
5+28       0.1425      0.14  |Q        |          |          |       V |
5+29       0.1427      0.14  |Q        |          |          |       V |
5+30       0.1428      0.13  |Q        |          |          |       V |
5+31       0.1430      0.13  |Q        |          |          |       V |
5+32       0.1432      0.13  |Q        |          |          |       V |
5+33       0.1434      0.13  |Q        |          |          |       V |
5+34       0.1436      0.13  |Q        |          |          |       V |
5+35       0.1437      0.13  |Q        |          |          |       V |
5+36       0.1439      0.13  |Q        |          |          |       V |
5+37       0.1441      0.13  |Q        |          |          |       V |
5+38       0.1443      0.13  |Q        |          |          |       V |
5+39       0.1444      0.13  |Q        |          |          |       V |
5+40       0.1446      0.13  |Q        |          |          |       V |
5+41       0.1448      0.12  |Q        |          |          |        V|
5+42       0.1450      0.12  |Q        |          |          |        V|
5+43       0.1451      0.12  |Q        |          |          |        V|
5+44       0.1453      0.12  |Q        |          |          |        V|
5+45       0.1455      0.12  |Q        |          |          |        V|
5+46       0.1456      0.12  Q        |          |          |        V|
5+47       0.1458      0.12  Q        |          |          |        V|
5+48       0.1460      0.12  Q        |          |          |        V|
5+49       0.1461      0.12  Q        |          |          |        V|
5+50       0.1463      0.12  Q        |          |          |        V|
5+51       0.1464      0.12  Q        |          |          |        V|
5+52       0.1466      0.12  Q        |          |          |        V|
5+53       0.1468      0.12  Q        |          |          |        V|
```

```
    5+54       0.1469      0.11  Q          |          |          |        V|
    5+55       0.1471      0.11  Q          |          |          |        V|
    5+56       0.1472      0.11  Q          |          |          |        V|
    5+57       0.1474      0.11  Q          |          |          |        V|
    5+58       0.1475      0.11  Q          |          |          |        V|
    5+59       0.1477      0.11  Q          |          |          |        V|
    6+ 0       0.1479      0.11  Q          |          |          |        V|
    6+ 1       0.1480      0.11  Q          |          |          |        V|
    6+ 2       0.1482      0.11  Q          |          |          |        V|
    6+ 3       0.1483      0.11  Q          |          |          |        V|
    6+ 4       0.1485      0.11  Q          |          |          |        V|
-------------------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       46.000 to Point/Station       47.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________________
Upstream point/station elevation =   413.500(Ft.)
Downstream point/station elevation =   405.000(Ft.)
Pipe length  =    26.50(Ft.) Slope =   0.3208  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.842(CFS)
Given pipe size =     12.00(In.)
Calculated individual pipe flow  =     4.842(CFS)
Normal flow depth in pipe =    4.00(In.)
Flow top width inside pipe =   11.32(In.)
Critical Depth =   10.90(In.)
Pipe flow velocity =     21.11(Ft/s)
Travel time through pipe =    0.02 min.
Time of concentration (TC) =     4.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       47.000 to Point/Station       48.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________________
Depth of flow =   0.343(Ft.), Average velocity =  13.180(Ft/s)
 ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
 1              0.00              1.00
 2              0.40              0.50
 3              0.80              0.20
 4              1.50              0.00
 5              2.20              0.20
 6              2.60              0.50
 7              3.00              1.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      4.842(CFS)
  '     '      flow top width =      1.781(Ft.)
  '     '    velocity=   13.180(Ft/s)
  '     '      area =      0.367(Sq.Ft)
  '     '      Froude number =     5.114

Upstream point elevation =   405.000(Ft.)
Downstream point elevation =   398.200(Ft.)
Flow length =    42.000(Ft.)
Travel time  =    0.05 min.
```

```
Time of concentration =    4.52 min.
Depth of flow =   0.343(Ft.)
Average velocity =  13.180(Ft/s)
Total irregular channel flow =     4.842(CFS)
Irregular channel normal depth above invert elev. =   0.343(Ft.)
Average velocity of channel(s) =  13.180(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       48.000 to Point/Station       48.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.000(Ac.)
Runoff from this stream =      4.842(CFS)
Time of concentration =    4.52 min.
Rainfall intensity =     7.114(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        1.026      5.87            6.415
2        4.842      4.52            7.114
Qmax(1) =
    1.000 *    1.000 *     1.026) +
    0.902 *    1.000 *     4.842) + =       5.393
Qmax(2) =
    1.000 *    0.770 *     1.026) +
    1.000 *    1.000 *     4.842) + =       5.632

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.026       4.842
Maximum flow rates at confluence using above data:
        5.393        5.632
Area of streams before confluence:
        0.400        1.000
Results of confluence:
Total flow rate =      5.632(CFS)
Time of concentration =     4.518 min.
Effective stream area after confluence =      1.400(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       48.000 to Point/Station       50.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      5.964(CFS)
Depth of flow =   0.398(Ft.), Average velocity =  12.727(Ft/s)
 ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
 1              0.00              1.00
 2              0.40              0.50
 3              0.80              0.20
 4              1.50              0.00
 5              2.20              0.20
 6              2.60              0.50
 7              3.00              1.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
```

```
Sub-Channel flow  =      5.964(CFS)
  '     '      flow top width =      1.927(Ft.)
  '     '    velocity=   12.727(Ft/s)
  '     '      area =      0.469(Sq.Ft)
  '     '      Froude number =     4.548

Upstream point elevation =   398.200(Ft.)
Downstream point elevation =   387.800(Ft.)
Flow length =    84.500(Ft.)
Travel time  =    0.11 min.
Time of concentration =    4.63 min.
Depth of flow =   0.398(Ft.)
Average velocity =  12.727(Ft/s)
Total irregular channel flow =     5.964(CFS)
Irregular channel normal depth above invert elev. =   0.398(Ft.)
Average velocity of channel(s) =  12.727(Ft/s)
 Adding area flow to channel
Calculated TC of    4.629 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Rainfall intensity =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.576  CA =      0.893
Subarea runoff =      0.722(CFS) for      0.150(Ac.)
Total runoff =      6.354(CFS)    Total area =       1.550(Ac.)
Depth of flow =   0.409(Ft.), Average velocity =  12.964(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       50.000 to Point/Station       50.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.550(Ac.)
Runoff from this stream =      6.354(CFS)
Time of concentration =    4.63 min.
Rainfall intensity =     7.114(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        6.354      4.63            7.114
Qmax(1) =
    1.000 *    1.000 *     6.354) + =       6.354

Total of 1 streams to confluence:
Flow rates before confluence point:
       6.354
Maximum flow rates at confluence using above data:
        6.354
Area of streams before confluence:
        1.550
Results of confluence:
Total flow rate =      6.354(CFS)
Time of concentration =     4.629 min.
Effective stream area after confluence =      1.550(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       54.000 to Point/Station       56.000
**** INITIAL AREA EVALUATION ****
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[COMMERCIAL area type                        ]
(General Commercial    )
Impervious value, Ai = 0.850
Sub-Area C Value = 0.820
Initial subarea total flow distance  =   58.000(Ft.)
Highest elevation =  459.100(Ft.)
Lowest elevation =  453.500(Ft.)
Elevation difference =    5.600(Ft.) Slope =  9.655 %
Top of Initial Area Slope adjusted by User to 13.111 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  13.11 %, in a development type of
 General Commercial
In Accordance With Table 3-2
Initial Area Time of Concentration =   2.40 minutes
 (for slope value of  10.00 %)
Calculated TC of    2.400 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.820
Subarea runoff =      0.175(CFS)
Total initial stream area =        0.030(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       56.000 to Point/Station       58.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   452.300(Ft.)
Downstream point/station elevation =   451.400(Ft.)
Pipe length  =    63.00(Ft.) Slope =   0.0143  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.175(CFS)
Given pipe size =      6.00(In.)
Calculated individual pipe flow  =     0.175(CFS)
Normal flow depth in pipe =    2.09(In.)
Flow top width inside pipe =    5.72(In.)
Critical Depth =    2.51(In.)
Pipe flow velocity =      2.87(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =     2.77 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       58.000 to Point/Station       59.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   451.400(Ft.)
Downstream point elevation =   436.500(Ft.)
Channel length thru subarea  =   105.000(Ft.)
Channel base width   =   10.000(Ft.)
Slope or 'Z' of left channel bank =   0.000
Slope or 'Z' of right channel bank =   0.000
Estimated mean flow rate at midpoint of channel =      0.237(CFS)
Manning's 'N'    = 0.030
Maximum depth of channel  =    0.250(Ft.)
Flow(q) thru subarea =      0.237(CFS)
Depth of flow =   0.018(Ft.), Average velocity =   1.294(Ft/s)
Channel flow top width =   10.000(Ft.)
Flow Velocity =    1.29(Ft/s)
```

```
Travel time  =    1.35 min.
Time of concentration =    4.12 min.
Critical depth =      0.026(Ft.)
 Adding area flow to channel
Calculated TC of    4.117 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.114(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Rainfall intensity =      7.114(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.585  CA =      0.035
Subarea runoff =      0.075(CFS) for      0.030(Ac.)
Total runoff =      0.250(CFS)    Total area =       0.060(Ac.)
Depth of flow =   0.019(Ft.), Average velocity =   1.321(Ft/s)
Critical depth =      0.027(Ft.)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       59.000 to Point/Station       60.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
________________________________________________________________________
Upstream point/station elevation =   435.500(Ft.)
Downstream point/station elevation =   432.100(Ft.)
Pipe length  =    18.00(Ft.) Slope =   0.1889  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     0.250(CFS)
Given pipe size =      6.00(In.)
Calculated individual pipe flow  =     0.250(CFS)
Normal flow depth in pipe =    1.30(In.)
Flow top width inside pipe =    4.94(In.)
Critical Depth =    3.02(In.)
Pipe flow velocity =      8.00(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     4.15 min.

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       60.000 to Point/Station       62.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
________________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.597(CFS)
Depth of flow =   0.169(Ft.), Average velocity =   5.964(Ft/s)
 ******* Irregular Channel Data ***********
------------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
 1              0.00              1.00
 2              0.40              0.50
 3              0.80              0.20
 4              1.50              0.00
 5              2.20              0.20
 6              2.60              0.50
 7              3.00              1.00
Manning's 'N' friction factor =   0.015
------------------------------------------------------------------
Sub-Channel flow  =      0.597(CFS)
  '     '      flow top width =      1.183(Ft.)
  '     '    velocity=    5.964(Ft/s)
  '     '      area =      0.100(Sq.Ft)
  '     '      Froude number =     3.615

Upstream point elevation =   432.100(Ft.)
Downstream point elevation =   397.100(Ft.)
Flow length =   340.000(Ft.)
Travel time  =    0.95 min.
Time of concentration =    5.11 min.
Depth of flow =   0.169(Ft.)
```

```
Average velocity =   5.964(Ft/s)
Total irregular channel flow =     0.597(CFS)
Irregular channel normal depth above invert elev. =   0.169(Ft.)
Average velocity of channel(s) =   5.964(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      7.019(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Rainfall intensity =      7.019(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.394  CA =      0.126
Subarea runoff =      0.635(CFS) for      0.260(Ac.)
Total runoff =      0.885(CFS)    Total area =       0.320(Ac.)
Depth of flow =   0.196(Ft.), Average velocity =   6.582(Ft/s)

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       64.000 to Point/Station       66.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Rainfall intensity (I) =      7.019(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.350 given for subarea
Time of concentration =     5.11 min.
Rainfall intensity =      7.019(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.367  CA =      0.305
Subarea runoff =      1.253(CFS) for      0.510(Ac.)
Total runoff =      2.138(CFS)    Total area =       0.830(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       66.000 to Point/Station       66.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.830(Ac.)
Runoff from this stream =      2.138(CFS)
Time of concentration =    5.11 min.
Rainfall intensity =     7.019(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        6.354      4.63            7.114
2        2.138      5.11            7.019
Qmax(1) =
    1.000 *    1.000 *     6.354) +
    1.000 *    0.907 *     2.138) + =       8.293
Qmax(2) =
    0.987 *    1.000 *     6.354) +
    1.000 *    1.000 *     2.138) + =       8.302

Total of 2 streams to confluence:
Flow rates before confluence point:
       6.354       2.138
Maximum flow rates at confluence using above data:
        8.293        8.302
Area of streams before confluence:
        1.550        0.830
Results of confluence:
Total flow rate =      8.302(CFS)
Time of concentration =     5.105 min.
Effective stream area after confluence =      2.380(Ac.)
End of computations, total study area =          2.380 (Ac.)
```

APPENDIX 3
Modified-Puls Detention Routing

Outlet structure for Tree Well Pit

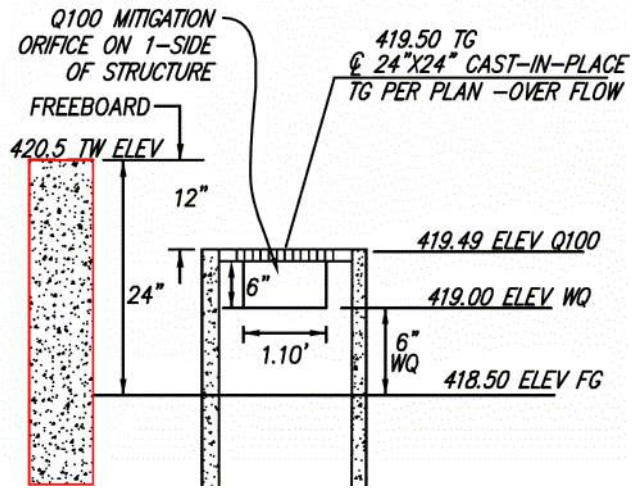
Discharge vs Elevation Table

		Emergency		
Low orifice:	**0.0**	Weir		
Number:	0	Invert:	**0.500**	
Cg-low:	0.62	B:	**1.10**	Length

h (ft)	H/D-low -	H/D-mid -	Qemer (cfs)	Qtot (cfs)
0.000	0.000	0.000	0.000	**0.000**
0.100	60.000	0.000	0.000	**0.000**
0.200	120.000	0.000	0.000	**0.000**
0.300	180.000	0.000	0.000	**0.000**
0.400	240.000	0.000	0.000	**0.000**
0.500	300.000	0.000	0.000	**0.000**
0.600	360.000	1.200	0.108	**0.108**
0.700	420.000	2.400	0.305	**0.305**
0.800	480.000	3.600	0.560	**0.560**
0.900	540.000	4.800	0.863	**0.863**
1.000	600.000	6.000	1.206	**1.206**

Tree Well

Elevation	Elev. Difference	Area (sf)	Acre-feet
0.00	0.00	5220	0.0000
0.10	0.10	5220	0.0120
0.20	0.10	5220	0.0240
0.30	0.10	5220	0.0360
0.40	0.10	5220	0.0479
0.50	0.10	5220	0.0599



FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
Study date: 10/24/24

Program License Serial Number 6499

********** HYDROGRAPH INFORMATION **********

From study/file name: balpropo.rte

**********HYDROGRAPH DATA**********

Number of intervals = 364
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 4.842 (CFS)
Total volume = 0.148 (Ac.Ft)
Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

++

Process from Point/Station 46.000 to Point/Station 46.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 364
Hydrograph time unit = 1.000 (Min.)
Initial depth in storage basin = 0.00(Ft.)

Initial basin depth = 0.00 (Ft.)
Initial basin storage = 0.00 (Ac.Ft)
Initial basin outflow = 0.00 (CFS)

Depth vs. Storage and Depth vs. Discharge data:

Basin Depth (Ft.)	Storage (Ac.Ft)	Outflow (CFS)	(S-O*dt/2) (Ac.Ft)	(S+O*dt/2) (Ac.Ft)
0.000	0.000	0.000	0.000	0.000
0.100	0.012	0.108	0.012	0.012
0.200	0.024	0.305	0.024	0.024
0.300	0.036	0.560	0.036	0.036
0.400	0.048	0.863	0.047	0.049
0.500	0.060	1.206	0.059	0.061

Hydrograph Detention Basin Routing

Graph values: 'I'= unit inflow; 'O'=outflow at time shown

Time (Hours)	Inflow (CFS)	Outflow (CFS)	Storage (Ac.Ft)	.0	1.2	2.42	3.63	4.84	Depth (Ft.)
0.017	0.03	0.00	0.000	O	|	|	|	|	0.00
0.033	0.05	0.00	0.000	O	|	|	|	|	0.00
0.050	0.08	0.00	0.000	O	|	|	|	|	0.00
0.067	0.11	0.00	0.000	O	|	|	|	|	0.00
0.083	0.11	0.00	0.000	O	|	|	|	|	0.00

0.100	0.11	0.01	0.001	O	|	|	|	0.00
0.117	0.11	0.01	0.001	O	|	|	|	0.01
0.133	0.11	0.01	0.001	O	|	|	|	0.01
0.150	0.11	0.01	0.001	O	|	|	|	0.01
0.167	0.11	0.01	0.001	O	|	|	|	0.01
0.183	0.11	0.01	0.001	O	|	|	|	0.01
0.200	0.11	0.01	0.001	O	|	|	|	0.01
0.217	0.11	0.01	0.002	O	|	|	|	0.01
0.233	0.11	0.02	0.002	O	|	|	|	0.01
0.250	0.11	0.02	0.002	O	|	|	|	0.02
0.267	0.11	0.02	0.002	O	|	|	|	0.02
0.283	0.11	0.02	0.002	O	|	|	|	0.02
0.300	0.11	0.02	0.002	O	|	|	|	0.02
0.317	0.11	0.02	0.002	O	|	|	|	0.02
0.333	0.11	0.02	0.002	O	|	|	|	0.02
0.350	0.11	0.02	0.003	O	|	|	|	0.02
0.367	0.11	0.02	0.003	O	|	|	|	0.02
0.383	0.12	0.03	0.003	O	|	|	|	0.02
0.400	0.12	0.03	0.003	O	|	|	|	0.02
0.417	0.12	0.03	0.003	O	|	|	|	0.03
0.433	0.12	0.03	0.003	O	|	|	|	0.03
0.450	0.12	0.03	0.003	O	|	|	|	0.03
0.467	0.12	0.03	0.003	O	|	|	|	0.03
0.483	0.12	0.03	0.004	O	|	|	|	0.03
0.500	0.12	0.03	0.004	O	|	|	|	0.03
0.517	0.12	0.03	0.004	O	|	|	|	0.03
0.533	0.12	0.04	0.004	O	|	|	|	0.03
0.550	0.12	0.04	0.004	O	|	|	|	0.03
0.567	0.12	0.04	0.004	O	|	|	|	0.03
0.583	0.12	0.04	0.004	O	|	|	|	0.04
0.600	0.12	0.04	0.004	O	|	|	|	0.04
0.617	0.12	0.04	0.004	O	|	|	|	0.04
0.633	0.12	0.04	0.005	O	|	|	|	0.04
0.650	0.12	0.04	0.005	O	|	|	|	0.04
0.667	0.12	0.04	0.005	O	|	|	|	0.04
0.683	0.12	0.04	0.005	O	|	|	|	0.04
0.700	0.12	0.05	0.005	O	|	|	|	0.04
0.717	0.12	0.05	0.005	O	|	|	|	0.04
0.733	0.12	0.05	0.005	O	|	|	|	0.04
0.750	0.12	0.05	0.005	O	|	|	|	0.04
0.767	0.12	0.05	0.005	O	|	|	|	0.05
0.783	0.12	0.05	0.006	O	|	|	|	0.05
0.800	0.12	0.05	0.006	O	|	|	|	0.05
0.817	0.12	0.05	0.006	O	|	|	|	0.05
0.833	0.13	0.05	0.006	O	|	|	|	0.05
0.850	0.13	0.05	0.006	O	|	|	|	0.05
0.867	0.13	0.05	0.006	O	|	|	|	0.05
0.883	0.13	0.06	0.006	O	|	|	|	0.05
0.900	0.13	0.06	0.006	O	|	|	|	0.05
0.917	0.13	0.06	0.006	O	|	|	|	0.05
0.933	0.13	0.06	0.006	O	|	|	|	0.05
0.950	0.13	0.06	0.007	O	|	|	|	0.05
0.967	0.13	0.06	0.007	O	|	|	|	0.06
0.983	0.13	0.06	0.007	O	|	|	|	0.06
1.000	0.13	0.06	0.007	O	|	|	|	0.06
1.017	0.13	0.06	0.007	O	|	|	|	0.06
1.033	0.13	0.06	0.007	O	|	|	|	0.06
1.050	0.13	0.06	0.007	O	|	|	|	0.06
1.067	0.13	0.06	0.007	O	|	|	|	0.06
1.083	0.13	0.07	0.007	O	|	|	|	0.06
1.100	0.13	0.07	0.007	O	|	|	|	0.06
1.117	0.13	0.07	0.007	O	|	|	|	0.06
1.133	0.13	0.07	0.008	O	|	|	|	0.06
1.150	0.13	0.07	0.008	O	|	|	|	0.06

1.167	0.13	0.07	0.008	O	|	|	|	0.06
1.183	0.13	0.07	0.008	O	|	|	|	0.07
1.200	0.14	0.07	0.008	O	|	|	|	0.07
1.217	0.14	0.07	0.008	O	|	|	|	0.07
1.233	0.14	0.07	0.008	O	|	|	|	0.07
1.250	0.14	0.07	0.008	O	|	|	|	0.07
1.267	0.14	0.07	0.008	O	|	|	|	0.07
1.283	0.14	0.08	0.008	O	|	|	|	0.07
1.300	0.14	0.08	0.008	O	|	|	|	0.07
1.317	0.14	0.08	0.009	O	|	|	|	0.07
1.333	0.14	0.08	0.009	O	|	|	|	0.07
1.350	0.14	0.08	0.009	O	|	|	|	0.07
1.367	0.14	0.08	0.009	O	|	|	|	0.07
1.383	0.14	0.08	0.009	O	|	|	|	0.07
1.400	0.14	0.08	0.009	O	|	|	|	0.07
1.417	0.14	0.08	0.009	O	|	|	|	0.08
1.433	0.14	0.08	0.009	O	|	|	|	0.08
1.450	0.14	0.08	0.009	O	|	|	|	0.08
1.467	0.14	0.08	0.009	O	|	|	|	0.08
1.483	0.14	0.08	0.009	O	|	|	|	0.08
1.500	0.15	0.09	0.009	O	|	|	|	0.08
1.517	0.15	0.09	0.010	O	|	|	|	0.08
1.533	0.15	0.09	0.010	O	|	|	|	0.08
1.550	0.15	0.09	0.010	O	|	|	|	0.08
1.567	0.15	0.09	0.010	O	|	|	|	0.08
1.583	0.15	0.09	0.010	O	|	|	|	0.08
1.600	0.15	0.09	0.010	O	|	|	|	0.08
1.617	0.15	0.09	0.010	O	|	|	|	0.08
1.633	0.15	0.09	0.010	O	|	|	|	0.08
1.650	0.15	0.09	0.010	OI	|	|	|	0.08
1.667	0.15	0.09	0.010	OI	|	|	|	0.09
1.683	0.15	0.09	0.010	OI	|	|	|	0.09
1.700	0.15	0.09	0.010	OI	|	|	|	0.09
1.717	0.15	0.09	0.011	OI	|	|	|	0.09
1.733	0.15	0.10	0.011	OI	|	|	|	0.09
1.750	0.16	0.10	0.011	OI	|	|	|	0.09
1.767	0.16	0.10	0.011	OI	|	|	|	0.09
1.783	0.16	0.10	0.011	OI	|	|	|	0.09
1.800	0.16	0.10	0.011	OI	|	|	|	0.09
1.817	0.16	0.10	0.011	OI	|	|	|	0.09
1.833	0.16	0.10	0.011	OI	|	|	|	0.09
1.850	0.16	0.10	0.011	OI	|	|	|	0.09
1.867	0.16	0.10	0.011	OI	|	|	|	0.09
1.883	0.16	0.10	0.011	OI	|	|	|	0.09
1.900	0.16	0.10	0.011	OI	|	|	|	0.10
1.917	0.16	0.10	0.012	OI	|	|	|	0.10
1.933	0.16	0.10	0.012	OI	|	|	|	0.10
1.950	0.17	0.10	0.012	OI	|	|	|	0.10
1.967	0.17	0.11	0.012	OI	|	|	|	0.10
1.983	0.17	0.11	0.012	OI	|	|	|	0.10
2.000	0.17	0.11	0.012	OI	|	|	|	0.10
2.017	0.17	0.11	0.012	OI	|	|	|	0.10
2.033	0.17	0.11	0.012	OI	|	|	|	0.10
2.050	0.17	0.11	0.012	OI	|	|	|	0.10
2.067	0.17	0.11	0.012	OI	|	|	|	0.10
2.083	0.17	0.11	0.012	OI	|	|	|	0.10
2.100	0.17	0.11	0.012	OI	|	|	|	0.10
2.117	0.17	0.12	0.012	OI	|	|	|	0.10
2.133	0.17	0.12	0.013	OI	|	|	|	0.10
2.150	0.18	0.12	0.013	OI	|	|	|	0.11
2.167	0.18	0.12	0.013	OI	|	|	|	0.11
2.183	0.18	0.12	0.013	OI	|	|	|	0.11
2.200	0.18	0.12	0.013	OI	|	|	|	0.11
2.217	0.18	0.12	0.013	OI	|	|	|	0.11

2.233	0.18	0.12	0.013	OI	|	|	|	0.11
2.250	0.18	0.13	0.013	OI	|	|	|	0.11
2.267	0.18	0.13	0.013	OI	|	|	|	0.11
2.283	0.18	0.13	0.013	OI	|	|	|	0.11
2.300	0.19	0.13	0.013	OI	|	|	|	0.11
2.317	0.19	0.13	0.013	OI	|	|	|	0.11
2.333	0.19	0.13	0.013	OI	|	|	|	0.11
2.350	0.19	0.13	0.014	OI	|	|	|	0.11
2.367	0.19	0.14	0.014	OI	|	|	|	0.11
2.383	0.19	0.14	0.014	OI	|	|	|	0.11
2.400	0.19	0.14	0.014	OI	|	|	|	0.11
2.417	0.19	0.14	0.014	OI	|	|	|	0.12
2.433	0.20	0.14	0.014	OI	|	|	|	0.12
2.450	0.20	0.14	0.014	OI	|	|	|	0.12
2.467	0.20	0.14	0.014	OI	|	|	|	0.12
2.483	0.20	0.14	0.014	OI	|	|	|	0.12
2.500	0.20	0.14	0.014	OI	|	|	|	0.12
2.517	0.20	0.15	0.014	OI	|	|	|	0.12
2.533	0.20	0.15	0.014	OI	|	|	|	0.12
2.550	0.20	0.15	0.014	OI	|	|	|	0.12
2.567	0.21	0.15	0.015	OI	|	|	|	0.12
2.583	0.21	0.15	0.015	OI	|	|	|	0.12
2.600	0.21	0.15	0.015	|O	|	|	|	0.12
2.617	0.21	0.15	0.015	|O	|	|	|	0.12
2.633	0.21	0.16	0.015	|O	|	|	|	0.12
2.650	0.21	0.16	0.015	|O	|	|	|	0.12
2.667	0.21	0.16	0.015	|O	|	|	|	0.13
2.683	0.22	0.16	0.015	|O	|	|	|	0.13
2.700	0.22	0.16	0.015	|O	|	|	|	0.13
2.717	0.22	0.16	0.015	|O	|	|	|	0.13
2.733	0.22	0.16	0.015	|O	|	|	|	0.13
2.750	0.23	0.16	0.015	|O	|	|	|	0.13
2.767	0.23	0.17	0.016	|O	|	|	|	0.13
2.783	0.23	0.17	0.016	|O	|	|	|	0.13
2.800	0.23	0.17	0.016	|O	|	|	|	0.13
2.817	0.23	0.17	0.016	|O	|	|	|	0.13
2.833	0.23	0.17	0.016	|O	|	|	|	0.13
2.850	0.24	0.17	0.016	|O	|	|	|	0.13
2.867	0.24	0.17	0.016	|O	|	|	|	0.13
2.883	0.24	0.18	0.016	|O	|	|	|	0.13
2.900	0.24	0.18	0.016	|O	|	|	|	0.14
2.917	0.24	0.18	0.016	|O	|	|	|	0.14
2.933	0.25	0.18	0.016	|O	|	|	|	0.14
2.950	0.25	0.18	0.016	|O	|	|	|	0.14
2.967	0.25	0.18	0.017	|O	|	|	|	0.14
2.983	0.26	0.18	0.017	|O	|	|	|	0.14
3.000	0.26	0.19	0.017	|O	|	|	|	0.14
3.017	0.26	0.19	0.017	|O	|	|	|	0.14
3.033	0.26	0.19	0.017	|O	|	|	|	0.14
3.050	0.26	0.19	0.017	|O	|	|	|	0.14
3.067	0.27	0.19	0.017	|O	|	|	|	0.14
3.083	0.27	0.19	0.017	|O	|	|	|	0.14
3.100	0.27	0.20	0.017	|O	|	|	|	0.14
3.117	0.28	0.20	0.017	|O	|	|	|	0.15
3.133	0.28	0.20	0.018	|O	|	|	|	0.15
3.150	0.29	0.20	0.018	|O	|	|	|	0.15
3.167	0.29	0.20	0.018	|O	|	|	|	0.15
3.183	0.29	0.21	0.018	|O	|	|	|	0.15
3.200	0.29	0.21	0.018	|O	|	|	|	0.15
3.217	0.30	0.21	0.018	|O	|	|	|	0.15
3.233	0.30	0.21	0.018	|OI	|	|	|	0.15
3.250	0.31	0.21	0.018	|OI	|	|	|	0.15
3.267	0.31	0.22	0.019	|OI	|	|	|	0.15
3.283	0.32	0.22	0.019	|OI	|	|	|	0.16

3.300	0.32	0.22	0.019	|OI	|	|	|	0.16
3.317	0.32	0.22	0.019	|OI	|	|	|	0.16
3.333	0.33	0.22	0.019	|OI	|	|	|	0.16
3.350	0.33	0.23	0.019	|OI	|	|	|	0.16
3.367	0.34	0.23	0.019	|OI	|	|	|	0.16
3.383	0.35	0.23	0.020	|OI	|	|	|	0.16
3.400	0.35	0.23	0.020	|OI	|	|	|	0.16
3.417	0.36	0.24	0.020	|OI	|	|	|	0.17
3.433	0.36	0.24	0.020	|OI	|	|	|	0.17
3.450	0.37	0.24	0.020	|OI	|	|	|	0.17
3.467	0.37	0.25	0.020	|OI	|	|	|	0.17
3.483	0.38	0.25	0.021	|OI	|	|	|	0.17
3.500	0.39	0.25	0.021	|OI	|	|	|	0.17
3.517	0.40	0.26	0.021	|OI	|	|	|	0.17
3.533	0.41	0.26	0.021	|OI	|	|	|	0.18
3.550	0.42	0.26	0.021	|OI	|	|	|	0.18
3.567	0.42	0.27	0.022	|OI	|	|	|	0.18
3.583	0.43	0.27	0.022	|OI	|	|	|	0.18
3.600	0.44	0.27	0.022	|OI	|	|	|	0.18
3.617	0.45	0.28	0.022	|OI	|	|	|	0.19
3.633	0.47	0.28	0.023	|O I	|	|	|	0.19
3.650	0.48	0.28	0.023	|O I	|	|	|	0.19
3.667	0.50	0.29	0.023	|O I	|	|	|	0.19
3.683	0.51	0.29	0.023	|O I	|	|	|	0.19
3.700	0.52	0.30	0.024	|O I	|	|	|	0.20
3.717	0.53	0.30	0.024	| OI	|	|	|	0.20
3.733	0.54	0.31	0.024	| OI	|	|	|	0.20
3.750	0.57	0.32	0.025	| OI	|	|	|	0.21
3.767	0.60	0.33	0.025	| OI	|	|	|	0.21
3.783	0.63	0.33	0.025	| O I	|	|	|	0.21
3.800	0.66	0.34	0.026	| O I	|	|	|	0.21
3.817	0.69	0.35	0.026	| O I	|	|	|	0.22
3.833	0.71	0.36	0.027	| O I	|	|	|	0.22
3.850	0.73	0.37	0.027	| O I	|	|	|	0.23
3.867	0.75	0.38	0.028	| O I	|	|	|	0.23
3.883	0.84	0.40	0.028	| O I	|	|	|	0.24
3.900	0.93	0.41	0.029	| O I	|	|	|	0.24
3.917	1.02	0.43	0.030	| O I	|	|	|	0.25
3.933	1.11	0.44	0.031	| O I|	|	|	|	0.25
3.950	1.22	0.47	0.032	| O I	|	|	|	0.26
3.967	1.33	0.49	0.033	| O I	|	|	|	0.27
3.983	1.45	0.51	0.034	| O |I	|	|	|	0.28
4.000	1.56	0.54	0.035	| O | I	|	|	|	0.29
4.017	2.38	0.59	0.037	| O | I|	|	|	|	0.31
4.033	3.20	0.66	0.040	| O |	| I	|	|	0.33
4.050	4.02	0.76	0.044	| O |	|	| I	|	0.37
4.067	**4.84**	0.89	0.049	| O |	|	|	I	0.41
4.083	3.85	1.03	0.054	| O |	|	|I	|	0.45
4.100	2.87	1.09	0.057	| O|	| I	|	|	0.47
4.117	1.88	1.12	0.059	| O| I	|	|	|	0.49
4.133	0.89	**1.13**	0.059	| I O|	|	|	|	0.49
4.150	0.81	1.12	0.058	| I O|	|	|	|	0.49
4.167	0.74	1.11	0.058	| I O|	|	|	|	0.48
4.183	0.67	1.10	0.057	| I O|	|	|	|	0.48
4.200	0.59	1.10	0.057	| I O|	|	|	|	0.47
4.217	0.56	1.09	0.056	| I O|	|	|	|	0.47
4.233	0.53	1.07	0.055	| I O|	|	|	|	0.46
4.250	0.50	1.05	0.054	| I O |	|	|	|	0.45
4.267	0.46	1.03	0.054	| I O |	|	|	|	0.45
4.283	0.45	1.00	0.053	| I O |	|	|	|	0.44
4.300	0.43	0.98	0.052	| I O |	|	|	|	0.43
4.317	0.41	0.96	0.051	| I O |	|	|	|	0.43
4.333	0.39	0.94	0.051	| I O |	|	|	|	0.42
4.350	0.38	0.92	0.050	| I O |	|	|	|	0.42

4.367	0.36	0.90	0.049	| I O |	|	|	|	0.41
4.383	0.35	0.87	0.048	| I O |	|	|	|	0.40
4.400	0.34	0.86	0.048	| I O |	|	|	|	0.40
4.417	0.33	0.84	0.047	| I O |	|	|	|	0.39
4.433	0.32	0.82	0.046	| I O |	|	|	|	0.39
4.450	0.31	0.80	0.046	| I O |	|	|	|	0.38
4.467	0.30	0.79	0.045	|I O |	|	|	|	0.37
4.483	0.30	0.77	0.044	|I O |	|	|	|	0.37
4.500	0.29	0.75	0.044	|I O |	|	|	|	0.36
4.517	0.28	0.74	0.043	|I O |	|	|	|	0.36
4.533	0.27	0.72	0.042	|I O |	|	|	|	0.35
4.550	0.27	0.71	0.042	|I O |	|	|	|	0.35
4.567	0.26	0.69	0.041	|I O |	|	|	|	0.34
4.583	0.26	0.68	0.041	|I O |	|	|	|	0.34
4.600	0.25	0.66	0.040	|I O |	|	|	|	0.33
4.617	0.25	0.65	0.039	|I O |	|	|	|	0.33
4.633	0.24	0.63	0.039	|I O |	|	|	|	0.32
4.650	0.24	0.62	0.038	|I O |	|	|	|	0.32
4.667	0.23	0.61	0.038	|I O |	|	|	|	0.32
4.683	0.23	0.59	0.037	|I O |	|	|	|	0.31
4.700	0.23	0.58	0.037	|I O |	|	|	|	0.31
4.717	0.22	0.57	0.036	|I O |	|	|	|	0.30
4.733	0.22	0.56	0.036	|I O |	|	|	|	0.30
4.750	0.22	0.55	0.035	|I O |	|	|	|	0.30
4.767	0.21	0.54	0.035	|I O |	|	|	|	0.29
4.783	0.21	0.53	0.035	|I O |	|	|	|	0.29
4.800	0.21	0.52	0.034	|I O |	|	|	|	0.28
4.817	0.20	0.51	0.034	|I O |	|	|	|	0.28
4.833	0.20	0.50	0.033	|I O |	|	|	|	0.28
4.850	0.20	0.49	0.033	|I O |	|	|	|	0.27
4.867	0.20	0.48	0.032	|I O |	|	|	|	0.27
4.883	0.19	0.48	0.032	|I O |	|	|	|	0.27
4.900	0.19	0.47	0.032	|I O |	|	|	|	0.26
4.917	0.19	0.46	0.031	|I O |	|	|	|	0.26
4.933	0.19	0.45	0.031	|IO |	|	|	|	0.26
4.950	0.18	0.44	0.031	|IO |	|	|	|	0.25
4.967	0.18	0.44	0.030	|IO |	|	|	|	0.25
4.983	0.18	0.43	0.030	|IO |	|	|	|	0.25
5.000	0.18	0.42	0.030	|IO |	|	|	|	0.25
5.017	0.17	0.42	0.029	|IO |	|	|	|	0.24
5.033	0.17	0.41	0.029	|IO |	|	|	|	0.24
5.050	0.17	0.40	0.029	|IO |	|	|	|	0.24
5.067	0.17	0.39	0.028	|IO |	|	|	|	0.24
5.083	0.17	0.39	0.028	|IO |	|	|	|	0.23
5.100	0.17	0.38	0.028	|IO |	|	|	|	0.23
5.117	0.16	0.38	0.027	|IO |	|	|	|	0.23
5.133	0.16	0.37	0.027	|IO |	|	|	|	0.23
5.150	0.16	0.36	0.027	|IO |	|	|	|	0.22
5.167	0.16	0.36	0.026	|IO |	|	|	|	0.22
5.183	0.16	0.35	0.026	|IO |	|	|	|	0.22
5.200	0.16	0.35	0.026	|IO |	|	|	|	0.22
5.217	0.15	0.34	0.026	|IO |	|	|	|	0.21
5.233	0.15	0.34	0.025	|IO |	|	|	|	0.21
5.250	0.15	0.33	0.025	|IO |	|	|	|	0.21
5.267	0.15	0.32	0.025	I O |	|	|	|	0.21
5.283	0.15	0.32	0.025	I O |	|	|	|	0.21
5.300	0.15	0.31	0.024	I O |	|	|	|	0.20
5.317	0.15	0.31	0.024	I O |	|	|	|	0.20
5.333	0.15	0.31	0.024	I O |	|	|	|	0.20
5.350	0.14	0.30	0.024	IO |	|	|	|	0.20
5.367	0.14	0.30	0.024	IO |	|	|	|	0.20
5.383	0.14	0.29	0.023	IO |	|	|	|	0.19
5.400	0.14	0.29	0.023	IO |	|	|	|	0.19
5.417	0.14	0.29	0.023	IO |	|	|	|	0.19

5.433	0.14	0.28	0.023	IO				0.19
5.450	0.14	0.28	0.023	IO				0.19
5.467	0.14	0.28	0.022	IO				0.19
5.483	0.14	0.27	0.022	IO				0.18
5.500	0.13	0.27	0.022	IO				0.18
5.517	0.13	0.27	0.022	IO				0.18
5.533	0.13	0.27	0.022	IO				0.18
5.550	0.13	0.26	0.021	IO				0.18
5.567	0.13	0.26	0.021	IO				0.18
5.583	0.13	0.26	0.021	IO				0.18
5.600	0.13	0.25	0.021	IO				0.17
5.617	0.13	0.25	0.021	IO				0.17
5.633	0.13	0.25	0.021	IO				0.17
5.650	0.13	0.25	0.020	IO				0.17
5.667	0.13	0.24	0.020	IO				0.17
5.683	0.12	0.24	0.020	IO				0.17
5.700	0.12	0.24	0.020	IO				0.17
5.717	0.12	0.24	0.020	IO				0.16
5.733	0.12	0.23	0.020	IO				0.16
5.750	0.12	0.23	0.019	IO				0.16
5.767	0.12	0.23	0.019	IO				0.16
5.783	0.12	0.23	0.019	IO				0.16
5.800	0.12	0.22	0.019	IO				0.16
5.817	0.12	0.22	0.019	IO				0.16
5.833	0.12	0.22	0.019	IO				0.16
5.850	0.12	0.22	0.019	IO				0.15
5.867	0.12	0.21	0.018	IO				0.15
5.883	0.12	0.21	0.018	IO				0.15
5.900	0.11	0.21	0.018	IO				0.15
5.917	0.11	0.21	0.018	IO				0.15
5.933	0.11	0.21	0.018	IO				0.15
5.950	0.11	0.20	0.018	IO				0.15
5.967	0.11	0.20	0.018	IO				0.15
5.983	0.11	0.20	0.018	IO				0.15
6.000	0.11	0.20	0.017	IO				0.15
6.017	0.11	0.20	0.017	IO				0.14
6.033	0.11	0.19	0.017	IO				0.14
6.050	0.11	0.19	0.017	IO				0.14
6.067	0.11	0.19	0.017	IO				0.14
6.083	0.00	0.19	0.017	IO				0.14
6.100	0.00	0.18	0.017	IO				0.14
6.117	0.00	0.18	0.016	IO				0.14
6.133	0.00	0.17	0.016	IO				0.13
6.150	0.00	0.17	0.016	IO				0.13
6.167	0.00	0.17	0.016	IO				0.13
6.183	0.00	0.16	0.015	IO				0.13
6.200	0.00	0.16	0.015	IO				0.13
6.217	0.00	0.16	0.015	IO				0.12
6.233	0.00	0.15	0.015	IO				0.12
6.250	0.00	0.15	0.014	O				0.12
6.267	0.00	0.15	0.014	O				0.12
6.283	0.00	0.14	0.014	O				0.12
6.300	0.00	0.14	0.014	O				0.12
6.317	0.00	0.14	0.014	O				0.11
6.333	0.00	0.13	0.014	O				0.11
6.350	0.00	0.13	0.013	O				0.11
6.367	0.00	0.13	0.013	O				0.11
6.383	0.00	0.12	0.013	O				0.11
6.400	0.00	0.12	0.013	O				0.11
6.417	0.00	0.12	0.013	O				0.11
6.433	0.00	0.12	0.012	O				0.10
6.450	0.00	0.11	0.012	O				0.10
6.467	0.00	0.11	0.012	O				0.10
6.483	0.00	0.11	0.012	O				0.10

6.500	0.00	0.11	0.012	O	|	|	|	|	0.10
6.517	0.00	0.11	0.012	O	|	|	|	|	0.10
6.533	0.00	0.10	0.012	O	|	|	|	|	0.10
6.550	0.00	0.10	0.011	O	|	|	|	|	0.10
6.567	0.00	0.10	0.011	O	|	|	|	|	0.09
6.583	0.00	0.10	0.011	O	|	|	|	|	0.09
6.600	0.00	0.10	0.011	O	|	|	|	|	0.09
6.617	0.00	0.10	0.011	O	|	|	|	|	0.09
6.633	0.00	0.10	0.011	O	|	|	|	|	0.09
6.650	0.00	0.10	0.011	O	|	|	|	|	0.09
6.667	0.00	0.09	0.010	O	|	|	|	|	0.09
6.683	0.00	0.09	0.010	O	|	|	|	|	0.09
6.700	0.00	0.09	0.010	O	|	|	|	|	0.09
6.717	0.00	0.09	0.010	O	|	|	|	|	0.08
6.733	0.00	0.09	0.010	O	|	|	|	|	0.08
6.750	0.00	0.09	0.010	O	|	|	|	|	0.08
6.767	0.00	0.09	0.010	O	|	|	|	|	0.08
6.783	0.00	0.09	0.010	O	|	|	|	|	0.08
6.800	0.00	0.09	0.010	O	|	|	|	|	0.08
6.817	0.00	0.08	0.009	O	|	|	|	|	0.08
6.833	0.00	0.08	0.009	O	|	|	|	|	0.08
6.850	0.00	0.08	0.009	O	|	|	|	|	0.08
6.867	0.00	0.08	0.009	O	|	|	|	|	0.08
6.883	0.00	0.08	0.009	O	|	|	|	|	0.07
6.900	0.00	0.08	0.009	O	|	|	|	|	0.07
6.917	0.00	0.08	0.009	O	|	|	|	|	0.07
6.933	0.00	0.08	0.009	O	|	|	|	|	0.07
6.950	0.00	0.08	0.009	O	|	|	|	|	0.07
6.967	0.00	0.08	0.008	O	|	|	|	|	0.07
6.983	0.00	0.07	0.008	O	|	|	|	|	0.07
7.000	0.00	0.07	0.008	O	|	|	|	|	0.07
7.017	0.00	0.07	0.008	O	|	|	|	|	0.07
7.033	0.00	0.07	0.008	O	|	|	|	|	0.07
7.050	0.00	0.07	0.008	O	|	|	|	|	0.07
7.067	0.00	0.07	0.008	O	|	|	|	|	0.06
7.083	0.00	0.07	0.008	O	|	|	|	|	0.06
7.100	0.00	0.07	0.008	O	|	|	|	|	0.06
7.117	0.00	0.07	0.008	O	|	|	|	|	0.06
7.133	0.00	0.07	0.007	O	|	|	|	|	0.06
7.150	0.00	0.07	0.007	O	|	|	|	|	0.06
7.167	0.00	0.07	0.007	O	|	|	|	|	0.06
7.183	0.00	0.06	0.007	O	|	|	|	|	0.06
7.200	0.00	0.06	0.007	O	|	|	|	|	0.06
7.217	0.00	0.06	0.007	O	|	|	|	|	0.06
7.233	0.00	0.06	0.007	O	|	|	|	|	0.06
7.250	0.00	0.06	0.007	O	|	|	|	|	0.06
7.267	0.00	0.06	0.007	O	|	|	|	|	0.06
7.283	0.00	0.06	0.007	O	|	|	|	|	0.06
7.300	0.00	0.06	0.007	O	|	|	|	|	0.05
7.317	0.00	0.06	0.006	O	|	|	|	|	0.05
7.333	0.00	0.06	0.006	O	|	|	|	|	0.05
7.350	0.00	0.06	0.006	O	|	|	|	|	0.05
7.367	0.00	0.06	0.006	O	|	|	|	|	0.05
7.383	0.00	0.06	0.006	O	|	|	|	|	0.05
7.400	0.00	0.05	0.006	O	|	|	|	|	0.05
7.417	0.00	0.05	0.006	O	|	|	|	|	0.05
7.433	0.00	0.05	0.006	O	|	|	|	|	0.05
7.450	0.00	0.05	0.006	O	|	|	|	|	0.05
7.467	0.00	0.05	0.006	O	|	|	|	|	0.05
7.483	0.00	0.05	0.006	O	|	|	|	|	0.05
7.500	0.00	0.05	0.006	O	|	|	|	|	0.05
7.517	0.00	0.05	0.006	O	|	|	|	|	0.05
7.533	0.00	0.05	0.006	O	|	|	|	|	0.05
7.550	0.00	0.05	0.005	O	|	|	|	|	0.05

7.567	0.00	0.05	0.005	O	|	|	|	0.04
7.583	0.00	0.05	0.005	O	|	|	|	0.04
7.600	0.00	0.05	0.005	O	|	|	|	0.04
7.617	0.00	0.05	0.005	O	|	|	|	0.04
7.633	0.00	0.05	0.005	O	|	|	|	0.04
7.650	0.00	0.05	0.005	O	|	|	|	0.04
7.667	0.00	0.04	0.005	O	|	|	|	0.04
7.683	0.00	0.04	0.005	O	|	|	|	0.04
7.700	0.00	0.04	0.005	O	|	|	|	0.04
7.717	0.00	0.04	0.005	O	|	|	|	0.04
7.733	0.00	0.04	0.005	O	|	|	|	0.04
7.750	0.00	0.04	0.005	O	|	|	|	0.04
7.767	0.00	0.04	0.005	O	|	|	|	0.04
7.783	0.00	0.04	0.005	O	|	|	|	0.04
7.800	0.00	0.04	0.005	O	|	|	|	0.04
7.817	0.00	0.04	0.004	O	|	|	|	0.04
7.833	0.00	0.04	0.004	O	|	|	|	0.04
7.850	0.00	0.04	0.004	O	|	|	|	0.04
7.867	0.00	0.04	0.004	O	|	|	|	0.04
7.883	0.00	0.04	0.004	O	|	|	|	0.04
7.900	0.00	0.04	0.004	O	|	|	|	0.03
7.917	0.00	0.04	0.004	O	|	|	|	0.03
7.933	0.00	0.04	0.004	O	|	|	|	0.03
7.950	0.00	0.04	0.004	O	|	|	|	0.03
7.967	0.00	0.04	0.004	O	|	|	|	0.03
7.983	0.00	0.04	0.004	O	|	|	|	0.03
8.000	0.00	0.04	0.004	O	|	|	|	0.03
8.017	0.00	0.03	0.004	O	|	|	|	0.03
8.033	0.00	0.03	0.004	O	|	|	|	0.03
8.050	0.00	0.03	0.004	O	|	|	|	0.03
8.067	0.00	0.03	0.004	O	|	|	|	0.03
8.083	0.00	0.03	0.004	O	|	|	|	0.03
8.100	0.00	0.03	0.004	O	|	|	|	0.03
8.117	0.00	0.03	0.004	O	|	|	|	0.03
8.133	0.00	0.03	0.004	O	|	|	|	0.03
8.150	0.00	0.03	0.003	O	|	|	|	0.03
8.167	0.00	0.03	0.003	O	|	|	|	0.03
8.183	0.00	0.03	0.003	O	|	|	|	0.03
8.200	0.00	0.03	0.003	O	|	|	|	0.03
8.217	0.00	0.03	0.003	O	|	|	|	0.03
8.233	0.00	0.03	0.003	O	|	|	|	0.03
8.250	0.00	0.03	0.003	O	|	|	|	0.03
8.267	0.00	0.03	0.003	O	|	|	|	0.03
8.283	0.00	0.03	0.003	O	|	|	|	0.03
8.300	0.00	0.03	0.003	O	|	|	|	0.03
8.317	0.00	0.03	0.003	O	|	|	|	0.03
8.333	0.00	0.03	0.003	O	|	|	|	0.03
8.350	0.00	0.03	0.003	O	|	|	|	0.03
8.367	0.00	0.03	0.003	O	|	|	|	0.02
8.383	0.00	0.03	0.003	O	|	|	|	0.02
8.400	0.00	0.03	0.003	O	|	|	|	0.02
8.417	0.00	0.03	0.003	O	|	|	|	0.02
8.433	0.00	0.03	0.003	O	|	|	|	0.02
8.450	0.00	0.03	0.003	O	|	|	|	0.02
8.467	0.00	0.02	0.003	O	|	|	|	0.02
8.483	0.00	0.02	0.003	O	|	|	|	0.02
8.500	0.00	0.02	0.003	O	|	|	|	0.02
8.517	0.00	0.02	0.003	O	|	|	|	0.02
8.533	0.00	0.02	0.003	O	|	|	|	0.02
8.550	0.00	0.02	0.003	O	|	|	|	0.02
8.567	0.00	0.02	0.003	O	|	|	|	0.02
8.583	0.00	0.02	0.003	O	|	|	|	0.02
8.600	0.00	0.02	0.002	O	|	|	|	0.02
8.617	0.00	0.02	0.002	O	|	|	|	0.02

8.633	0.00	0.02	0.002	O	|	|	|	|	0.02
8.650	0.00	0.02	0.002	O	|	|	|	|	0.02
8.667	0.00	0.02	0.002	O	|	|	|	|	0.02
8.683	0.00	0.02	0.002	O	|	|	|	|	0.02
8.700	0.00	0.02	0.002	O	|	|	|	|	0.02
8.717	0.00	0.02	0.002	O	|	|	|	|	0.02
8.733	0.00	0.02	0.002	O	|	|	|	|	0.02
8.750	0.00	0.02	0.002	O	|	|	|	|	0.02
8.767	0.00	0.02	0.002	O	|	|	|	|	0.02
8.783	0.00	0.02	0.002	O	|	|	|	|	0.02
8.800	0.00	0.02	0.002	O	|	|	|	|	0.02
8.817	0.00	0.02	0.002	O	|	|	|	|	0.02
8.833	0.00	0.02	0.002	O	|	|	|	|	0.02
8.850	0.00	0.02	0.002	O	|	|	|	|	0.02
8.867	0.00	0.02	0.002	O	|	|	|	|	0.02
8.883	0.00	0.02	0.002	O	|	|	|	|	0.02
8.900	0.00	0.02	0.002	O	|	|	|	|	0.02
8.917	0.00	0.02	0.002	O	|	|	|	|	0.02
8.933	0.00	0.02	0.002	O	|	|	|	|	0.02
8.950	0.00	0.02	0.002	O	|	|	|	|	0.02
8.967	0.00	0.02	0.002	O	|	|	|	|	0.02
8.983	0.00	0.02	0.002	O	|	|	|	|	0.02
9.000	0.00	0.02	0.002	O	|	|	|	|	0.02
9.017	0.00	0.02	0.002	O	|	|	|	|	0.02
9.033	0.00	0.02	0.002	O	|	|	|	|	0.02
9.050	0.00	0.02	0.002	O	|	|	|	|	0.01
9.067	0.00	0.02	0.002	O	|	|	|	|	0.01
9.083	0.00	0.02	0.002	O	|	|	|	|	0.01
9.100	0.00	0.02	0.002	O	|	|	|	|	0.01
9.117	0.00	0.02	0.002	O	|	|	|	|	0.01
9.133	0.00	0.02	0.002	O	|	|	|	|	0.01
9.150	0.00	0.01	0.002	O	|	|	|	|	0.01
9.167	0.00	0.01	0.002	O	|	|	|	|	0.01
9.183	0.00	0.01	0.002	O	|	|	|	|	0.01
9.200	0.00	0.01	0.002	O	|	|	|	|	0.01
9.217	0.00	0.01	0.002	O	|	|	|	|	0.01
9.233	0.00	0.01	0.002	O	|	|	|	|	0.01
9.250	0.00	0.01	0.002	O	|	|	|	|	0.01
9.267	0.00	0.01	0.002	O	|	|	|	|	0.01
9.283	0.00	0.01	0.001	O	|	|	|	|	0.01
9.300	0.00	0.01	0.001	O	|	|	|	|	0.01
9.317	0.00	0.01	0.001	O	|	|	|	|	0.01
9.333	0.00	0.01	0.001	O	|	|	|	|	0.01
9.350	0.00	0.01	0.001	O	|	|	|	|	0.01
9.367	0.00	0.01	0.001	O	|	|	|	|	0.01
9.383	0.00	0.01	0.001	O	|	|	|	|	0.01
9.400	0.00	0.01	0.001	O	|	|	|	|	0.01
9.417	0.00	0.01	0.001	O	|	|	|	|	0.01
9.433	0.00	0.01	0.001	O	|	|	|	|	0.01
9.450	0.00	0.01	0.001	O	|	|	|	|	0.01
9.467	0.00	0.01	0.001	O	|	|	|	|	0.01
9.483	0.00	0.01	0.001	O	|	|	|	|	0.01
9.500	0.00	0.01	0.001	O	|	|	|	|	0.01
9.517	0.00	0.01	0.001	O	|	|	|	|	0.01
9.533	0.00	0.01	0.001	O	|	|	|	|	0.01
9.550	0.00	0.01	0.001	O	|	|	|	|	0.01
9.567	0.00	0.01	0.001	O	|	|	|	|	0.01
9.583	0.00	0.01	0.001	O	|	|	|	|	0.01
9.600	0.00	0.01	0.001	O	|	|	|	|	0.01
9.617	0.00	0.01	0.001	O	|	|	|	|	0.01
9.633	0.00	0.01	0.001	O	|	|	|	|	0.01
9.650	0.00	0.01	0.001	O	|	|	|	|	0.01
9.667	0.00	0.01	0.001	O	|	|	|	|	0.01
9.683	0.00	0.01	0.001	O	|	|	|	|	0.01

9.700	0.00	0.01	0.001	O	|	|	|	|	0.01
9.717	0.00	0.01	0.001	O	|	|	|	|	0.01
9.733	0.00	0.01	0.001	O	|	|	|	|	0.01
9.750	0.00	0.01	0.001	O	|	|	|	|	0.01
9.767	0.00	0.01	0.001	O	|	|	|	|	0.01
9.783	0.00	0.01	0.001	O	|	|	|	|	0.01
9.800	0.00	0.01	0.001	O	|	|	|	|	0.01
9.817	0.00	0.01	0.001	O	|	|	|	|	0.01
9.833	0.00	0.01	0.001	O	|	|	|	|	0.01
9.850	0.00	0.01	0.001	O	|	|	|	|	0.01
9.867	0.00	0.01	0.001	O	|	|	|	|	0.01
9.883	0.00	0.01	0.001	O	|	|	|	|	0.01
9.900	0.00	0.01	0.001	O	|	|	|	|	0.01
9.917	0.00	0.01	0.001	O	|	|	|	|	0.01
9.933	0.00	0.01	0.001	O	|	|	|	|	0.01
9.950	0.00	0.01	0.001	O	|	|	|	|	0.01
9.967	0.00	0.01	0.001	O	|	|	|	|	0.01
9.983	0.00	0.01	0.001	O	|	|	|	|	0.01
10.000	0.00	0.01	0.001	O	|	|	|	|	0.01
10.017	0.00	0.01	0.001	O	|	|	|	|	0.01
10.033	0.00	0.01	0.001	O	|	|	|	|	0.01
10.050	0.00	0.01	0.001	O	|	|	|	|	0.01
10.067	0.00	0.01	0.001	O	|	|	|	|	0.01
10.083	0.00	0.01	0.001	O	|	|	|	|	0.01
10.100	0.00	0.01	0.001	O	|	|	|	|	0.01
10.117	0.00	0.01	0.001	O	|	|	|	|	0.01
10.133	0.00	0.01	0.001	O	|	|	|	|	0.01
10.150	0.00	0.01	0.001	O	|	|	|	|	0.01
10.167	0.00	0.01	0.001	O	|	|	|	|	0.01
10.183	0.00	0.01	0.001	O	|	|	|	|	0.01
10.200	0.00	0.01	0.001	O	|	|	|	|	0.01
10.217	0.00	0.01	0.001	O	|	|	|	|	0.01
10.233	0.00	0.01	0.001	O	|	|	|	|	0.01
10.250	0.00	0.01	0.001	O	|	|	|	|	0.01
10.267	0.00	0.01	0.001	O	|	|	|	|	0.01
10.283	0.00	0.01	0.001	O	|	|	|	|	0.01
10.300	0.00	0.01	0.001	O	|	|	|	|	0.01
10.317	0.00	0.01	0.001	O	|	|	|	|	0.01
10.333	0.00	0.01	0.001	O	|	|	|	|	0.01
10.350	0.00	0.01	0.001	O	|	|	|	|	0.01
10.367	0.00	0.01	0.001	O	|	|	|	|	0.01
10.383	0.00	0.01	0.001	O	|	|	|	|	0.01
10.400	0.00	0.01	0.001	O	|	|	|	|	0.01
10.417	0.00	0.01	0.001	O	|	|	|	|	0.01
10.433	0.00	0.01	0.001	O	|	|	|	|	0.01
10.450	0.00	0.01	0.001	O	|	|	|	|	0.01
10.467	0.00	0.01	0.001	O	|	|	|	|	0.01
10.483	0.00	0.01	0.001	O	|	|	|	|	0.01
10.500	0.00	0.01	0.001	O	|	|	|	|	0.01
10.517	0.00	0.01	0.001	O	|	|	|	|	0.00
10.533	0.00	0.01	0.001	O	|	|	|	|	0.00
10.550	0.00	0.01	0.001	O	|	|	|	|	0.00
10.567	0.00	0.01	0.001	O	|	|	|	|	0.00
10.583	0.00	0.01	0.001	O	|	|	|	|	0.00
10.600	0.00	0.01	0.001	O	|	|	|	|	0.00
10.617	0.00	0.01	0.001	O	|	|	|	|	0.00
10.633	0.00	0.00	0.001	O	|	|	|	|	0.00
10.650	0.00	0.00	0.001	O	|	|	|	|	0.00
10.667	0.00	0.00	0.001	O	|	|	|	|	0.00
10.683	0.00	0.00	0.001	O	|	|	|	|	0.00
10.700	0.00	0.00	0.001	O	|	|	|	|	0.00
10.717	0.00	0.00	0.001	O	|	|	|	|	0.00
10.733	0.00	0.00	0.001	O	|	|	|	|	0.00
10.750	0.00	0.00	0.001	O	|	|	|	|	0.00

10.767	0.00	0.00	0.000	O	|	|	|	|	0.00
10.783	0.00	0.00	0.000	O	|	|	|	|	0.00
10.800	0.00	0.00	0.000	O	|	|	|	|	0.00
10.817	0.00	0.00	0.000	O	|	|	|	|	0.00
10.833	0.00	0.00	0.000	O	|	|	|	|	0.00
10.850	0.00	0.00	0.000	O	|	|	|	|	0.00
10.867	0.00	0.00	0.000	O	|	|	|	|	0.00
10.883	0.00	0.00	0.000	O	|	|	|	|	0.00
10.900	0.00	0.00	0.000	O	|	|	|	|	0.00
10.917	0.00	0.00	0.000	O	|	|	|	|	0.00
10.933	0.00	0.00	0.000	O	|	|	|	|	0.00
10.950	0.00	0.00	0.000	O	|	|	|	|	0.00
10.967	0.00	0.00	0.000	O	|	|	|	|	0.00
10.983	0.00	0.00	0.000	O	|	|	|	|	0.00
11.000	0.00	0.00	0.000	O	|	|	|	|	0.00
11.017	0.00	0.00	0.000	O	|	|	|	|	0.00
11.033	0.00	0.00	0.000	O	|	|	|	|	0.00
11.050	0.00	0.00	0.000	O	|	|	|	|	0.00
11.067	0.00	0.00	0.000	O	|	|	|	|	0.00
11.083	0.00	0.00	0.000	O	|	|	|	|	0.00
11.100	0.00	0.00	0.000	O	|	|	|	|	0.00
11.117	0.00	0.00	0.000	O	|	|	|	|	0.00
11.133	0.00	0.00	0.000	O	|	|	|	|	0.00
11.150	0.00	0.00	0.000	O	|	|	|	|	0.00
11.167	0.00	0.00	0.000	O	|	|	|	|	0.00
11.183	0.00	0.00	0.000	O	|	|	|	|	0.00
11.200	0.00	0.00	0.000	O	|	|	|	|	0.00
11.217	0.00	0.00	0.000	O	|	|	|	|	0.00
11.233	0.00	0.00	0.000	O	|	|	|	|	0.00
11.250	0.00	0.00	0.000	O	|	|	|	|	0.00
11.267	0.00	0.00	0.000	O	|	|	|	|	0.00
11.283	0.00	0.00	0.000	O	|	|	|	|	0.00
11.300	0.00	0.00	0.000	O	|	|	|	|	0.00
11.317	0.00	0.00	0.000	O	|	|	|	|	0.00
11.333	0.00	0.00	0.000	O	|	|	|	|	0.00
11.350	0.00	0.00	0.000	O	|	|	|	|	0.00
11.367	0.00	0.00	0.000	O	|	|	|	|	0.00
11.383	0.00	0.00	0.000	O	|	|	|	|	0.00
11.400	0.00	0.00	0.000	O	|	|	|	|	0.00
11.417	0.00	0.00	0.000	O	|	|	|	|	0.00
11.433	0.00	0.00	0.000	O	|	|	|	|	0.00
11.450	0.00	0.00	0.000	O	|	|	|	|	0.00
11.467	0.00	0.00	0.000	O	|	|	|	|	0.00
11.483	0.00	0.00	0.000	O	|	|	|	|	0.00
11.500	0.00	0.00	0.000	O	|	|	|	|	0.00
11.517	0.00	0.00	0.000	O	|	|	|	|	0.00
11.533	0.00	0.00	0.000	O	|	|	|	|	0.00
11.550	0.00	0.00	0.000	O	|	|	|	|	0.00
11.567	0.00	0.00	0.000	O	|	|	|	|	0.00
11.583	0.00	0.00	0.000	O	|	|	|	|	0.00
11.600	0.00	0.00	0.000	O	|	|	|	|	0.00
11.617	0.00	0.00	0.000	O	|	|	|	|	0.00
11.633	0.00	0.00	0.000	O	|	|	|	|	0.00
11.650	0.00	0.00	0.000	O	|	|	|	|	0.00
11.667	0.00	0.00	0.000	O	|	|	|	|	0.00
11.683	0.00	0.00	0.000	O	|	|	|	|	0.00
11.700	0.00	0.00	0.000	O	|	|	|	|	0.00
11.717	0.00	0.00	0.000	O	|	|	|	|	0.00
11.733	0.00	0.00	0.000	O	|	|	|	|	0.00
11.750	0.00	0.00	0.000	O	|	|	|	|	0.00
11.767	0.00	0.00	0.000	O	|	|	|	|	0.00
11.783	0.00	0.00	0.000	O	|	|	|	|	0.00
11.800	0.00	0.00	0.000	O	|	|	|	|	0.00
11.817	0.00	0.00	0.000	O	|	|	|	|	0.00

11.833	0.00	0.00	0.000	O	|	|	|	|	0.00
11.850	0.00	0.00	0.000	O	|	|	|	|	0.00
11.867	0.00	0.00	0.000	O	|	|	|	|	0.00
11.883	0.00	0.00	0.000	O	|	|	|	|	0.00
11.900	0.00	0.00	0.000	O	|	|	|	|	0.00
11.917	0.00	0.00	0.000	O	|	|	|	|	0.00
11.933	0.00	0.00	0.000	O	|	|	|	|	0.00
11.950	0.00	0.00	0.000	O	|	|	|	|	0.00
11.967	0.00	0.00	0.000	O	|	|	|	|	0.00
11.983	0.00	0.00	0.000	O	|	|	|	|	0.00
12.000	0.00	0.00	0.000	O	|	|	|	|	0.00
12.017	0.00	0.00	0.000	O	|	|	|	|	0.00
12.033	0.00	0.00	0.000	O	|	|	|	|	0.00
12.050	0.00	0.00	0.000	O	|	|	|	|	0.00
12.067	0.00	0.00	0.000	O	|	|	|	|	0.00
12.083	0.00	0.00	0.000	O	|	|	|	|	0.00
12.100	0.00	0.00	0.000	O	|	|	|	|	0.00
12.117	0.00	0.00	0.000	O	|	|	|	|	0.00
12.133	0.00	0.00	0.000	O	|	|	|	|	0.00
12.150	0.00	0.00	0.000	O	|	|	|	|	0.00
12.167	0.00	0.00	0.000	O	|	|	|	|	0.00
12.183	0.00	0.00	0.000	O	|	|	|	|	0.00
12.200	0.00	0.00	0.000	O	|	|	|	|	0.00
12.217	0.00	0.00	0.000	O	|	|	|	|	0.00
12.233	0.00	0.00	0.000	O	|	|	|	|	0.00
12.250	0.00	0.00	0.000	O	|	|	|	|	0.00
12.267	0.00	0.00	0.000	O	|	|	|	|	0.00
12.283	0.00	0.00	0.000	O	|	|	|	|	0.00
12.300	0.00	0.00	0.000	O	|	|	|	|	0.00
12.317	0.00	0.00	0.000	O	|	|	|	|	0.00
12.333	0.00	0.00	0.000	O	|	|	|	|	0.00
12.350	0.00	0.00	0.000	O	|	|	|	|	0.00
12.367	0.00	0.00	0.000	O	|	|	|	|	0.00
12.383	0.00	0.00	0.000	O	|	|	|	|	0.00
12.400	0.00	0.00	0.000	O	|	|	|	|	0.00
12.417	0.00	0.00	0.000	O	|	|	|	|	0.00
12.433	0.00	0.00	0.000	O	|	|	|	|	0.00
12.450	0.00	0.00	0.000	O	|	|	|	|	0.00
12.467	0.00	0.00	0.000	O	|	|	|	|	0.00
12.483	0.00	0.00	0.000	O	|	|	|	|	0.00
12.500	0.00	0.00	0.000	O	|	|	|	|	0.00
12.517	0.00	0.00	0.000	O	|	|	|	|	0.00
12.533	0.00	0.00	0.000	O	|	|	|	|	0.00
12.550	0.00	0.00	0.000	O	|	|	|	|	0.00
12.567	0.00	0.00	0.000	O	|	|	|	|	0.00
12.583	0.00	0.00	0.000	O	|	|	|	|	0.00
12.600	0.00	0.00	0.000	O	|	|	|	|	0.00
12.617	0.00	0.00	0.000	O	|	|	|	|	0.00
12.633	0.00	0.00	0.000	O	|	|	|	|	0.00
12.650	0.00	0.00	0.000	O	|	|	|	|	0.00
12.667	0.00	0.00	0.000	O	|	|	|	|	0.00
12.683	0.00	0.00	0.000	O	|	|	|	|	0.00

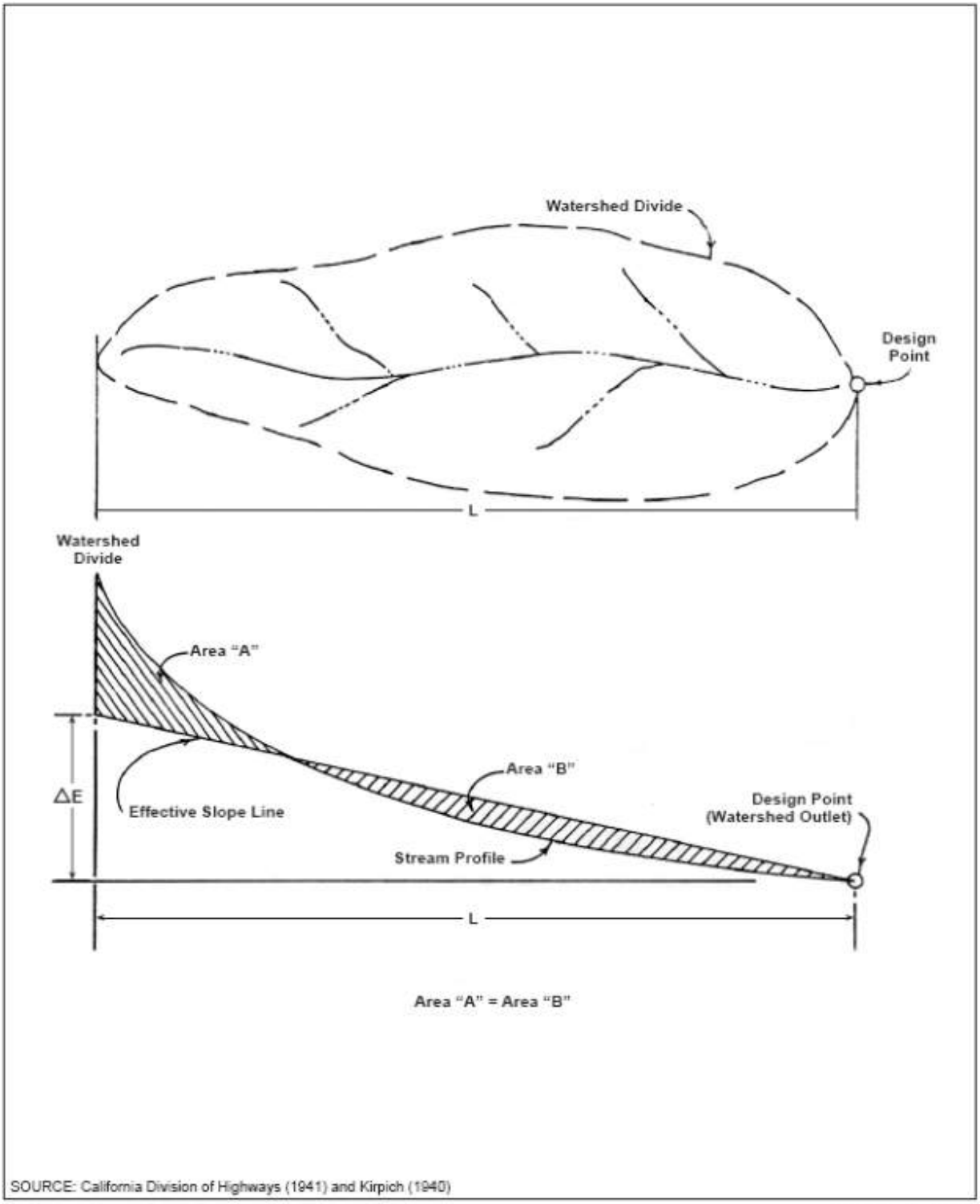
**********HYDROGRAPH DATA**********

Number of intervals = 761
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 1.134 (CFS)
Total volume = 0.148 (Ac.Ft)
Status of hydrographs being held in storage

	Stream 1	Stream 2	Stream 3	Stream 4	Stream 5
Peak (CFS)	0.000	0.000	0.000	0.000	0.000
Vol (Ac.Ft)	0.000	0.000	0.000	0.000	0.000

****

APPENDIX 3
Maps and Charts



SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE

3-5

Computation of Effective Slope for Natural Watersheds

39

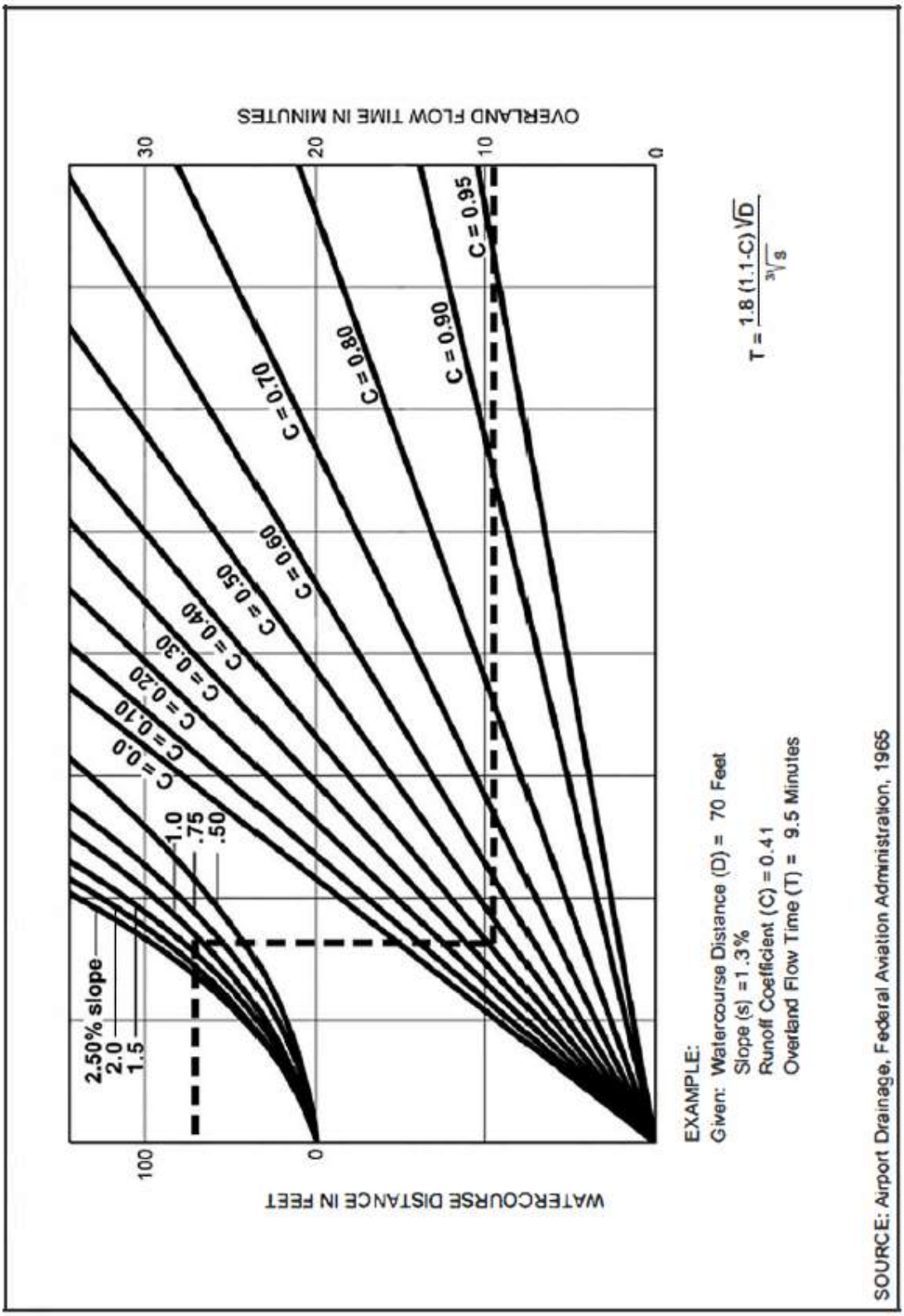


FIGURE 3-3

Rational Formula - Overland Time of Flow Nomograph

43

Manning's *n* Values for Overland Flow[1]

The BMP Design Manuals within the County of San Diego allow for a land surface description other than short prairie grass to be used for hydromodification BMP design only if documentation provided is consistent with Table A.6 of the SWMM 5 User's Manual.

In January 2016, the EPA released the SWMM Reference Manual Volume I – Hydrology (SWMM Hydrology Reference Manual). The SWMM Hydrology Reference Manual complements the SWMM 5 User's Manual by providing an in-depth description of the program's hydrologic components. Table 3-5 of the SWMM Hydrology Reference Manual expounds upon Table A.6 of the SWMM 5 User's Manual by providing Manning's *n* values for additional overland flow surfaces. Therefore, in order to provide SWMM users with a wider range of land surfaces suitable for local application and to provide Copermittees with confidence in the design parameters, we recommend using the values published by Yen and Chow in Table 3-5 of the EPA SWMM Reference Manual Volume I – Hydrology. The values are provided in the table below:

Overland Surface	Manning value (*n*)
Smooth asphalt pavement	0.010
Smooth impervious surface	0.011
Tar and sand pavement	0.012
Concrete pavement	0.014
Rough impervious surface	0.015
Smooth bare packed soil	0.017
Moderate bare packed soil	0.025
Rough bare packed soil	0.032
Gravel soil	0.025
Mowed poor grass	0.030
Average grass, closely clipped sod	0.040
Pasture	0.040
Timberland	0.060
Dense grass	0.060
Shrubs and bushes	0.080
Land Use	
Business	0.014
Semibusiness	0.022
Industrial	0.020
Dense residential	0.025
Suburban residential	0.030
Parks and lawns	0.040

[1]Content summarized from *Improving Accuracy in Continuous Simulation Modeling: Guidance for Selecting Pervious Overland Flow Manning's n Values in the San Diego Region* (TRWE, 2016).

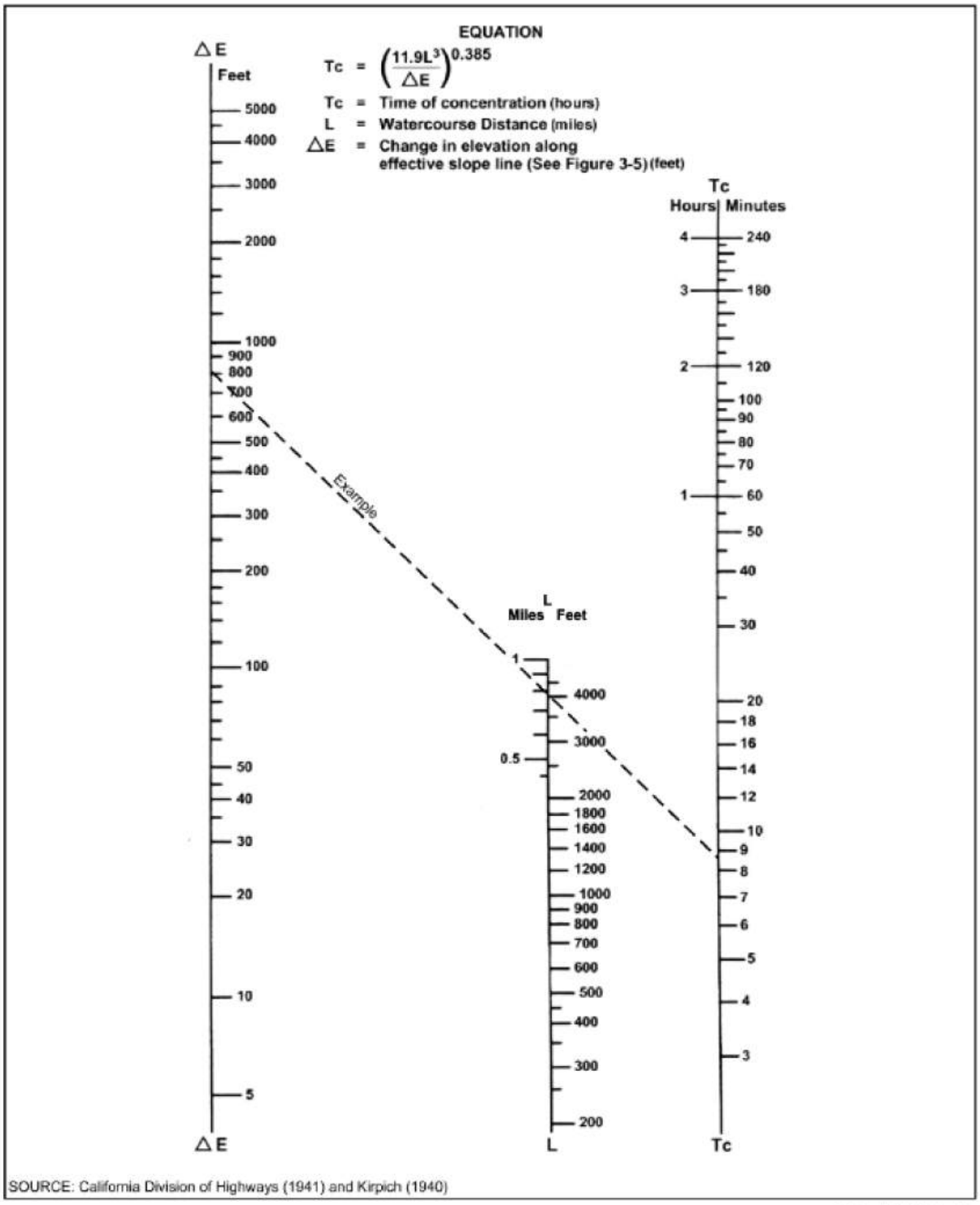
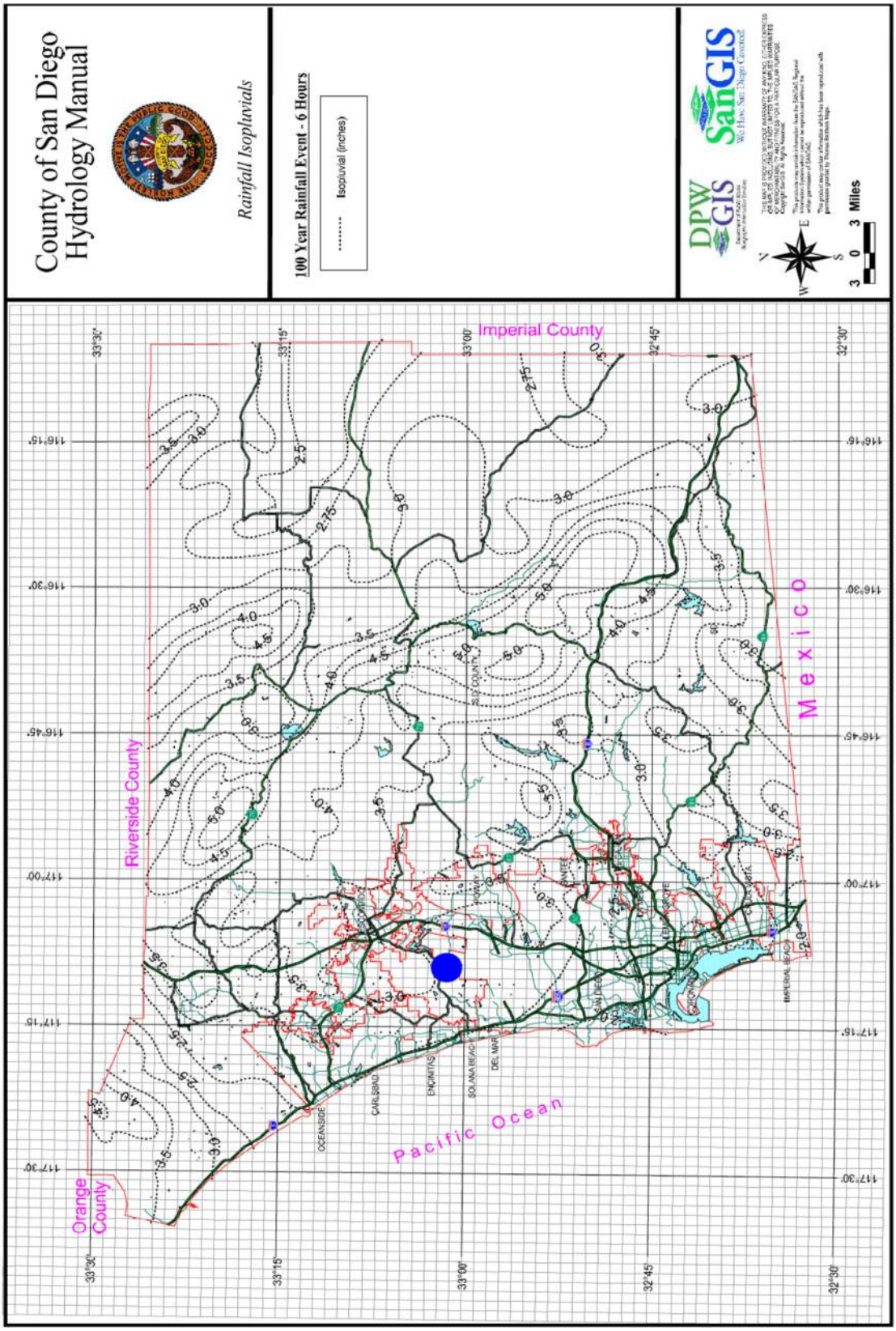
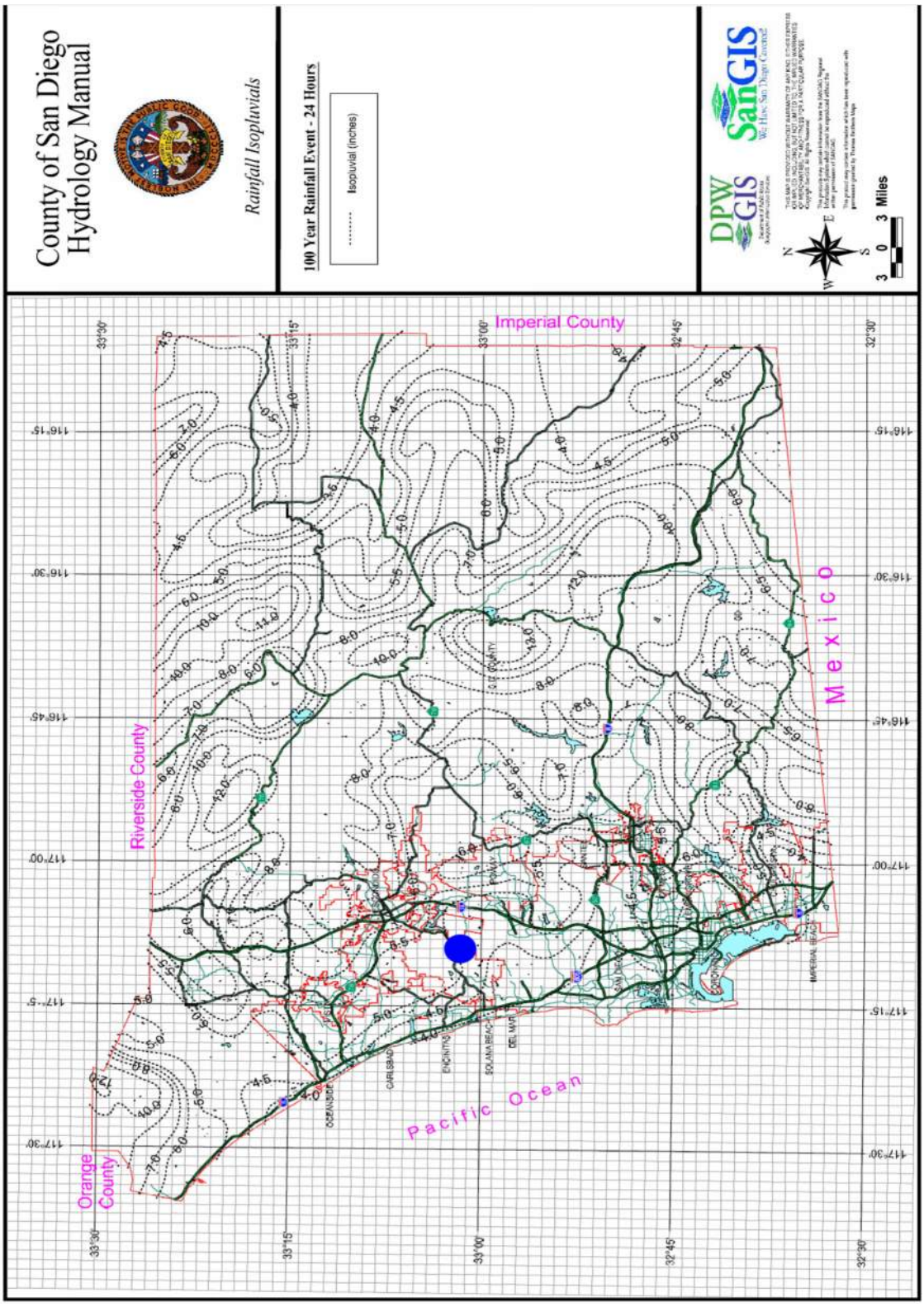


FIGURE 3-4

Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds

27


County of San Diego
Hydrology Manual
Rainfall Isopluvials
100 Year Rainfall Event - 6 Hours
Isopluvial (inches)
DPW GIS
SanGIS
3 0 3 Miles
Imperial County
Riverside County
Orange County
Mexico
Pacific Ocean
OCEANSIDE
CARLSBAD
ENCINITAS
SOLANA BEACH
DEL MAR
SAN DIEGO
CORONADO
IMPERIAL BEACH


County of San Diego
Hydrology Manual
Rainfall Isopluvials
100 Year Rainfall Event - 24 Hours
Isopluvial (inches)
DPW GIS
SanGIS
We Have San Diego Covered
N
S
E
W
3 0 3 Miles
Imperial County
Riverside County
Orange County
Mexico
Pacific Ocean


Hydrologic Soil Group—San Diego County Area, California
(Balazs Residence)
HrC
HrE2
HrD
SnG
HrC
Soil Map may not be valid at this scale.
Map Scale: 1:1,300 if printed on A landscape (11" x 8.5") sheet.
Meters
Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84
Natural Resources
Web Soil Survey
12/26/2022
Page 1 of 4

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 16, 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 24, 2022—Apr 29, 2022

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.