

Preliminary Hydrology Study

Arco Valley Center
Fueling Station and Convenience Store
SWC Valley Center Road and Cole Grade Road
Valley Center, California 92082

Prepared For:

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CLW No. 1269-D

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INTRODUCTION

Determine storm water runoff and site drainage for a 100-year storm event for a proposed new fueling station and convenience store in the City of Valley Center, California. The project site is located at the southwest corner of Valley Center Road and Cole Grade Road in Valley Center. The project area is approximately 38,691 SF.

The proposed site development consists of preparing the site for the construction of a fueling station, convenience store, concrete walkways, parking spaces, driveways, and a bioretention basin. Incidental underground utilities, hardscape, and site landscaping are also proposed with this development. The area is undeveloped with fruit stands and site elevations range from approximately 1346 to 1342 feet above mean sea level (msl). See attachment 1 for the Site Location and Vicinity Maps.

DESIGN CRITERIA AND ASSUMPTIONS

1. The site soil classification as hydrologic soil type C. See Attachment 2.
2. Per the San Diego County Hydrology Manual (2003) Rainfall Isopluvial Map (See Attachment 2):
 - 100 Year Rainfall Event – 6 hours $P_6 = 3.70$ inches/hour
 - 100 Year Rainfall Event – 24 hours $P_{24} = 8.20$ inches/hour
3. Per the San Diego County Hydrology Manual (2003) Table 3.1:
4. Hydrologic calculations were performed using the CIVILCAD/CIVILDESIGN Engineering software version 7.6 per methods as outlined within the San Diego Hydrology Manual (2003). The hydrology calculations for proposed and existing conditions may be found within the hydrology calculations section of this report.

DISCUSSION

EXISTING CONDITIONS

The site is undeveloped and has several fruit stands on it. The project site consists of 2 basins. The southeastern basin of the site drains southeasterly into Cole Grade Road. The majority of the site drains southwesterly toward the western adjacent property. The existing flow along the eastern portion of Valley Center Road does not enter into the site as it is captured in an existing gutter. The frontage of Valley Center Road also does not enter into the site as the runoff is captured in an existing gutter. The northern half of Valley Center Road drains away from the property. See Attachment 5 for existing drainage pattern.

Below is a summary of pre-development criteria for the subject property:

TABLE 2: 100 YEAR PRE-DEVELOPMENT CRITERIA						
Node	C	Tc (Min.)	I (in/hr)	Area (acre)	Q100 (cfs)	V100 (fps)
103	0.40	9.22	6.31	0.711	1.295	0.801
303	0.86	7.35	7.61	0.719	3.871	3.50
402	0.84	5.00	9.75	0.228	1.870	2.30
TOTAL				1.658	7.036	

PROPOSED CONDITIONS

The proposed conditions will consist of twelve basins, see Attachment 6 for proposed drainage patterns. The existing street of Cole Grade Road basins will be modified from the existing condition. This change is due to the fact that the PR-2 basin consists of proposed curb ramp, curb and gutter, sidewalk, and a driveway. PR-4 (same as EX-4) still flows westerly in a gutter with the addition of proposed driveway, curb and gutter, and sidewalk.

The proposed site itself consists of 7 basins. PR-2 is the lower southeastern corner of the lot and discharges into Cole Grade Road through a sidewalk underdrain. The rest of the site will be captured in a proposed bioretention basin located at the northeastern portion of the site. Basin PR-1A includes its own detention basin to reduce the peak flow into the main onsite basin. This basin is only used for detention and is not used for water quality or hydromodification. The two driveway areas, PR-1E and PR-1F, will sheet flow into trench grates and be discharged into the bioretention basin. The convenience store and southwestern portion of the site will be captured

in an inlet and be directed into a storm drain system. This system will also capture the western parking area through a ribbon gutter and inlet. This system will also pick up the roof drainage from the fueling canopy. Lastly, before this system discharges into the proposed bioretention basin, the northern portion of the proposed pavement flow will be captured in a ribbon gutter and directed into the proposed storm drain system. Once all of the runoff has been collected in the proposed basin, it will be discharged into the existing headwall west of the site. The basin is a conjunctive use facility. The basin will be used for the storm water quality requirements, hydromodification requirements, and 100-year storm requirements. The hydrology detention calculations include the area above the 6" water quality depth. The water quality volume was excluded from the detention analysis.

The proposed hydrologic conditions are summarized below:

TABLE 2: 100 YEAR POST-DEVELOPMENT CRITERIA (WITHOUT DETENTION)

Node	C	Tc (Min.)	I (in/hr)	Area (acre)	Q100 (cfs)	V100 (fps)
117	0.79	6.68	8.322	0.704	4.151	5.29
203	0.84	6.13	9.75	0.265	1.800	1.570
303	0.90	7.45	9.75	0.460	3.122	3.37
402	0.85	5.00	9.75	0.228	1.900	2.10
TOTAL				1.657	10.973	

TABLE 2: 100 YEAR POST-DEVELOPMENT CRITERIA (WITH DETENTION)

Node	C	Tc (Min.)	I (in/hr)	Area (acre)	Q100 (cfs)	V100 (fps)
117	0.79	11.89	5.72	0.704	1.240	3.30
203	0.84	6.13	8.55	0.265	0.651	1.53
303	0.90	7.45	9.75	0.460	3.122	3.37
402	0.85	6.02	9.75	0.228	1.706	2.10
TOTAL				1.657	6.719	

The existing onsite peak flow was calculated to be 1.295 CFS and the proposed peak flow after

detention is 1.240 CFS. Therefore, the proposed site with bioretention design will decrease the peak flow of the project site. An overall decrease of 0.317 cfs will result from the existing to proposed condition, after detention. There is a total of 4.254 cfs detained throughout the project.

The existing conditions on Cole Grade Road drain to the easterly curb. The proposed conditions will modify Cole Grade Road and define a crown and split the flows. The proposed condition indicates a decrease in flow and velocity for the east side gutter of Cole Grade Road. However new flow and velocity will be introduced into the west side curb of Cole Grade Road.

The overall flow from Basin 3 (Node 303) will decrease from 3.871 cfs to 3.773 cfs ($3.122 + 0.651$ cfs), this is due to the detention within the proposed tree wells. The detention within the tree wells is calculated from the finished grade of the tree well to the flow line of the gutter at the location of the curb cut. This detention volume is 12". The structural, engineered soil beneath has been designed to satisfy both water quality and hydromodification requirements in the SWQMP. There will be a riser with a flow control orifice within the tree well that will connect to the 8" perforated underdrain. This orifice will reset at the finished grade of the tree well.

CONCLUSION

A hydrologic analysis has been conducted for the subject for a 100 year storm event. The site will utilize a biofiltration basin and tree wells to mitigate the increase in peak flows to lower than existing flow.

DECLARATION OF RESPONSIBLE CHARGE

I, hereby declare that I am the Engineer of Work for this project, that I have exercised responsible charge over the design of the project as defined in section 6703 of the business and professions code, and that the design is consistent with current standards.

I understand that the check of project drawings and specifications by the County of San Diego is confined to a review only and does not relieve me, as Engineer of Work of my responsibility for project design.

ENGINEER OF WORK:

Civil Landworks Corporation
110 Copperwood Way, Suite P
Oceanside CA, USA 92058



David V. Caron
R.C.E. 70066
Exp. 9-30-22



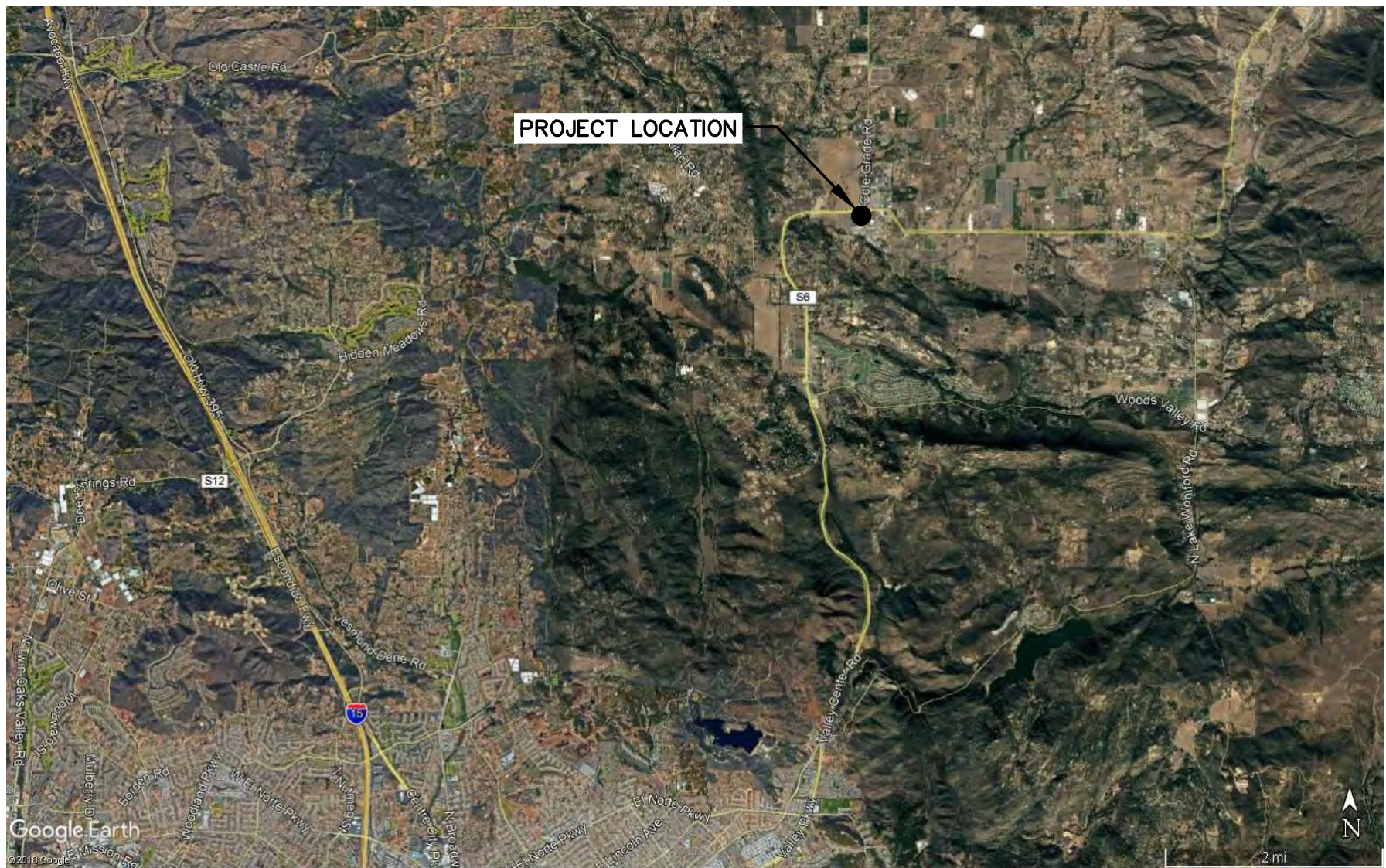
2-8-2021
Date

REFERENCES

1. San Diego County Hydrology Manual (June 2003).
2. San Diego County Drainage Design Manual (July 2005).
3. Web Soil Survey, San Diego Area, California. United States Natural Resource Conservation Service.
4. CIVILCADD/CIVILDESIGN Engineering Software, © 1991-2006 Version 7.6. San Diego County Control Division 2003 Manual Rational Hydrology Study.
5. AutoCAD Civil 3D Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2015 Version 10.4 by Autodesk, Inc.

ATTACHMENT 1

LOCATION MAP



SITE LOCATION MAP

DATE: 6/8/18

SCALE: AS SHOWN

ARCO - VALLEY CENTER RD

DRAWN BY:
A. GRISWOLD



SITE VICINITY MAP

DATE: 6/8/18

SCALE: AS SHOWN

ARCO - VALLEY CENTER RD

DRAWN BY:
A. GRISWOLD

ATTACHMENT 2

PRECIPITATION MAPS AND SOIL MAP

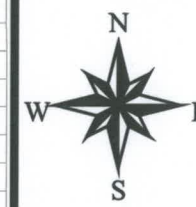
County of San Diego Hydrology Manual



Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

----- Isopluvial (inches)

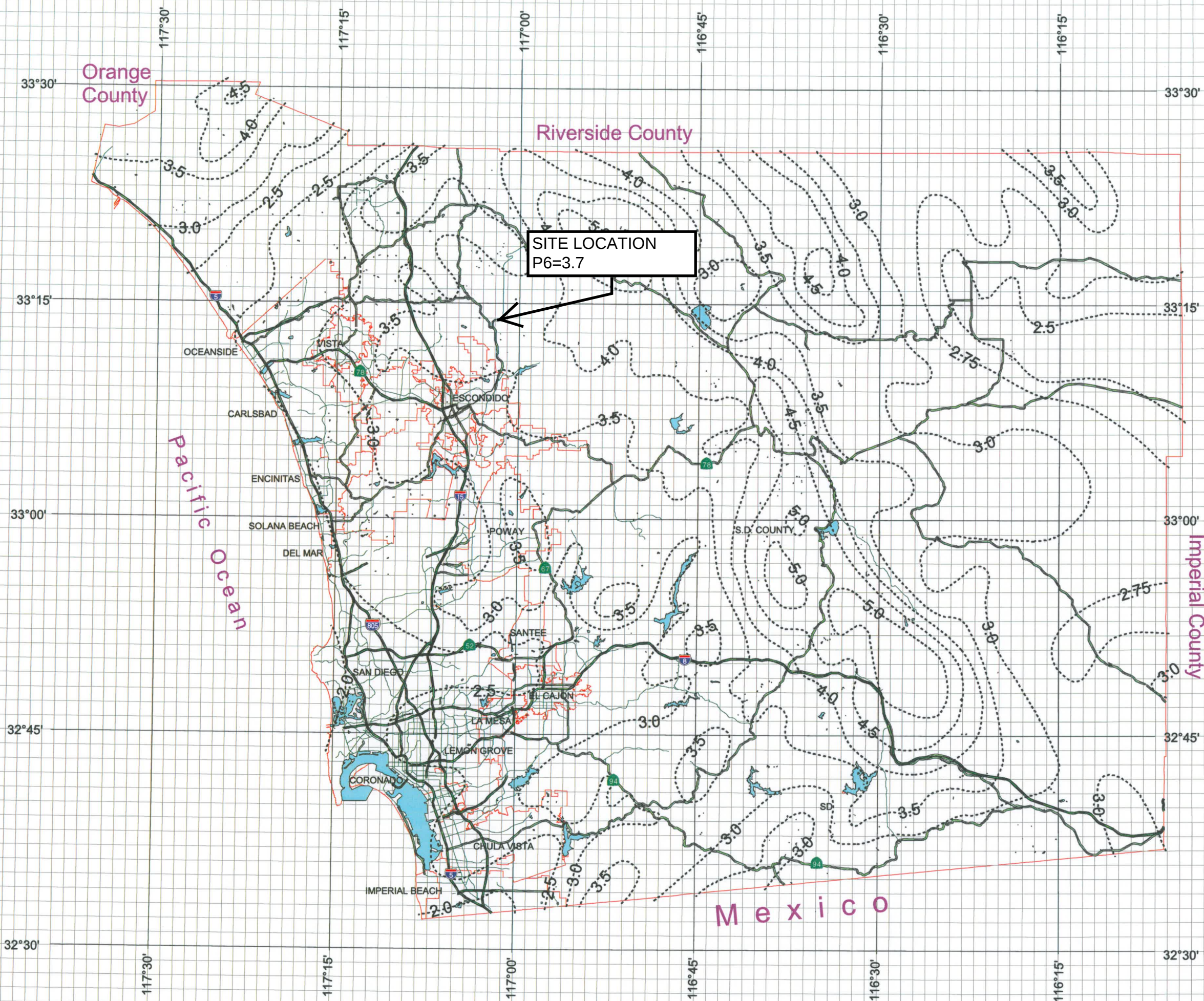


3 0 3 Miles

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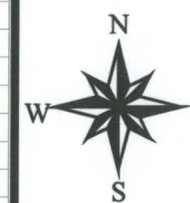
County of San Diego Hydrology Manual



Rainfall Isophuvials

100 Year Rainfall Event - 24 Hours

----- Isopluvial (inches)

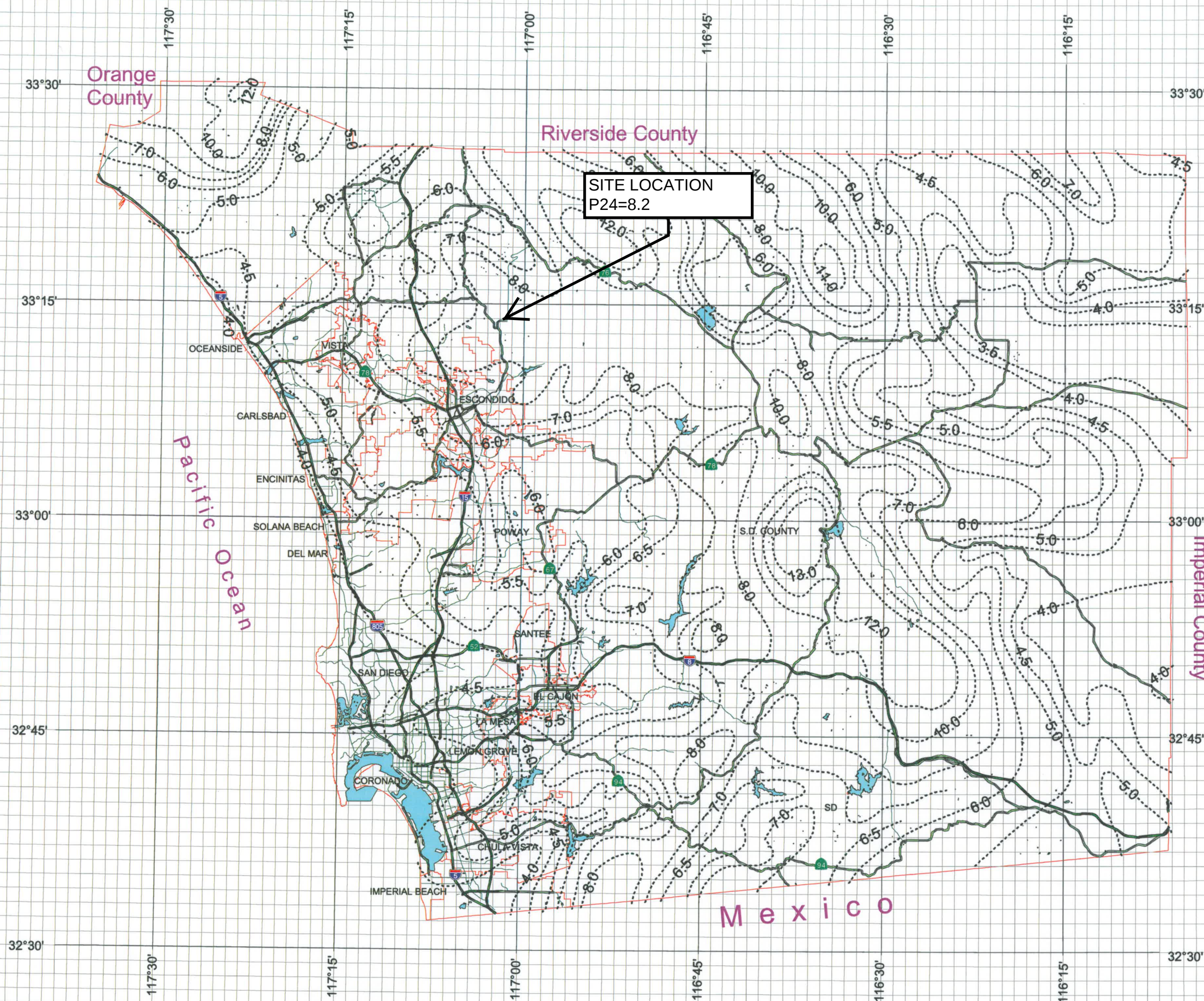


3 0 3 Miles

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Hydrologic Soil Group—San Diego County Area, California (ARCO - Valley Center Rd)



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 12, Sep 13, 2017

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

Date(s) aerial images were photographed: Dec 31, 2009—Feb 2, 2017

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
FaC2	Fallbrook sandy loam, 5 to 9 percent slopes, eroded	C	0.1	1.1%
PeC	Placentia sandy loam, 2 to 9 percent slopes, warm MAAT, MLRA 19	C	7.8	98.9%
VaA	Visalia sandy loam, 0 to 2 percent slopes	A	0.0	0.0%
Totals for Area of Interest			7.9	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

ATTACHMENT 3

EXISTING HYDROLOGY CALCULATIONS

AREA CALCULATIONS

EXISTING HYDROLOGIC BASINS

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
EX-1A	A	0.20	0	0.000	0	0	0	0	-	0.17	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.21	0%	0.00	-
	C	0.30	17,057	0.392	0	2,737	14,320	0	-	0.25	100%	0.25	-
	D	0.35	0	0.000	0	0	0	0	-	0.29	0%	0.00	-
Total		-	17,057	0.392	0	2,737	14,320	0	16.05%	-	100%	0.25	<u>0.396</u>

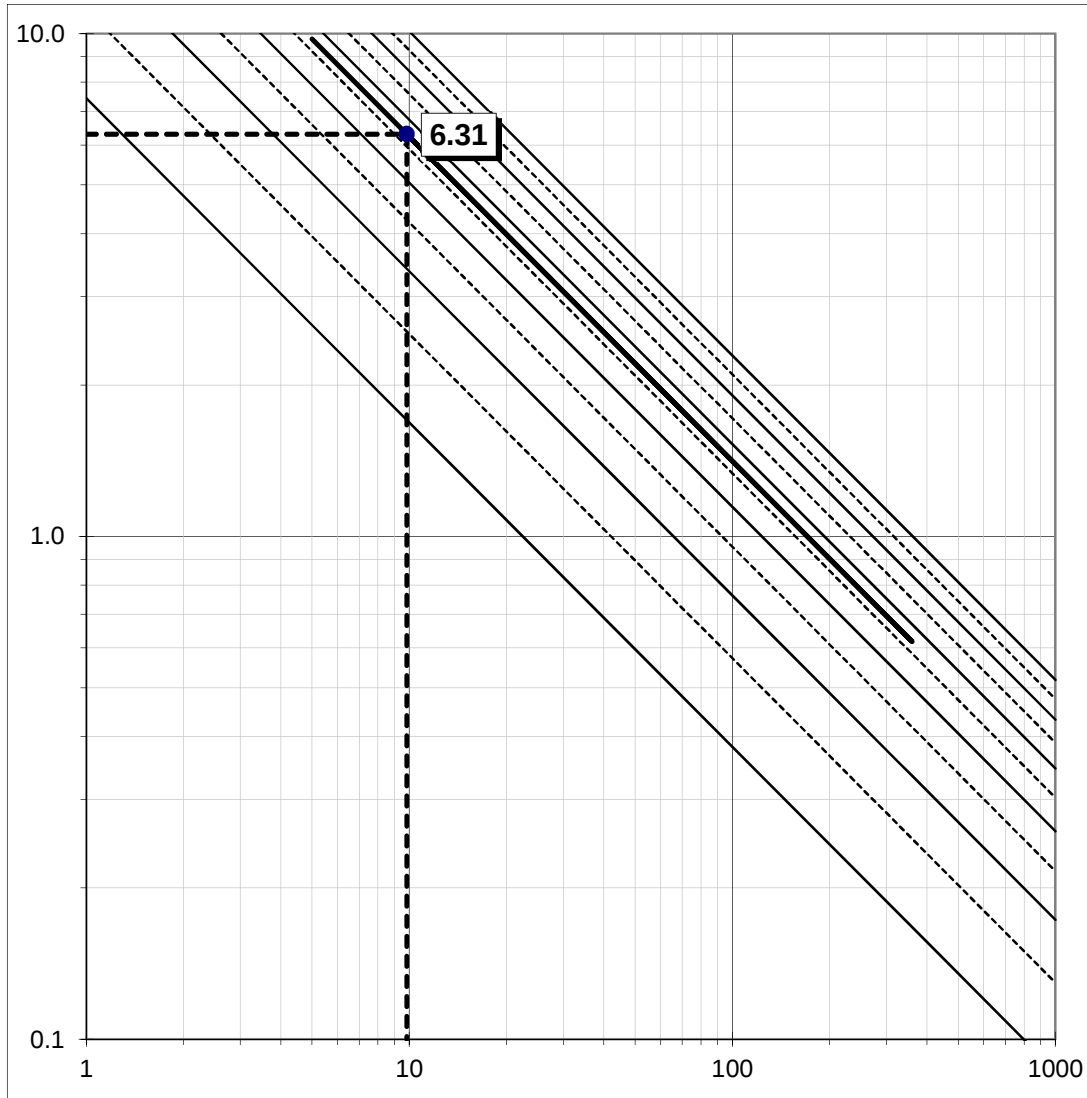
Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
EX-1B	A	0.20	0	0.000	0	0	0	0	-	0.17	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.21	0%	0.00	-
	C	0.30	13,907	0.319	0	2,427	11,481	0	-	0.25	100%	0.25	-
	D	0.35	0	0.000	0	0	0	0	-	0.29	0%	0.00	-
Total		-	13,907	0.319	0	2,427	11,481	0	17.45%	-	100%	0.25	<u>0.405</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
EX-2	A	0.20	0	0.000	0	0	0	0	-	0.19	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.24	0%	0.00	-
	C	0.30	6,056	0.139	0	235	5,821	0	-	0.29	100%	0.29	-
	D	0.35	0	0.000	0	0	0	0	-	0.34	0%	0.00	-
Total		-	6,056	0.139	0	235	5,821	0	3.88%	-	100%	0.29	<u>0.323</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
EX-3A	A	0.20	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	C	0.30	3,909	0.090	0	3,909	0	0	-	0.00	100%	0.00	-
	D	0.35	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
Total		-	3,909	0.090	0	3,909	0	0	100.00%	-	100%	0.00	<u>0.900</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
EX-3B	A	0.20	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	C	0.30	21,335	0.490	0	19,717	1,617	0	-	0.02	100%	0.02	-
	D	0.35	0	0.000	0	0	0	0	-	0.03	0%	0.00	-
Total		-	21,335	0.490	0	19,717	1,617	0	92.42%	-	100%	0.02	<u>0.855</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
EX-4	A	0.20	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.03	0%	0.00	-
	C	0.30	9,928	0.228	0	8,728	1,200	0	-	0.04	100%	0.04	-
	D	0.35	0	0.000	0	0	0	0	-	0.04	0%	0.00	-
Total		-	9,928	0.228	0	8,728	1,200	0	87.91%	-	100%	0.04	<u>0.827</u>



EX-1A

Existing Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.40

Dist. = 107.00 ft.

slope = 2.340 %

* T_c = 9.82 min.

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 373 ft

ΔE = 0 ft

** T_c = #DIV/0! min.

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

** Minimum T_c = 10 Minutes

Basin Intensity Calculations

Selected Frequency, 100 year

P_6 = 3.7 in.

P_{24} = 8.2 in.

P_6 / P_{24} = 45%

Adjusted P_6 = 3.70 in.

$T_c(D)$ = 9.82 min.

I = 6.31 in/hr

P_6 must be within
45% to 65% of P_{24} .
Adjust P_6 as needed.

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

Basin Flow Calculations

Q = 0.99 cfs

C = 0.40

I = 6.31 in/hr

A = 0.392 ac.

$$Q = C * I * A$$

ex1

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 10/24/18

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
6 hour, precipitation(inches) = 3.700
24 hour precipitation(inches) = 8.200
P6/P24 = 45.1%
San Diego hydrology manual 'C' values used

Process from Point/Station 101.000 to Point/Station 102.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.400 given for subarea
Rainfall intensity (I) = 6.308(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 9.82 min. Rain intensity = 6.31(In/Hr)
Total area = 0.392(Ac.) Total runoff = 0.990(CFS)

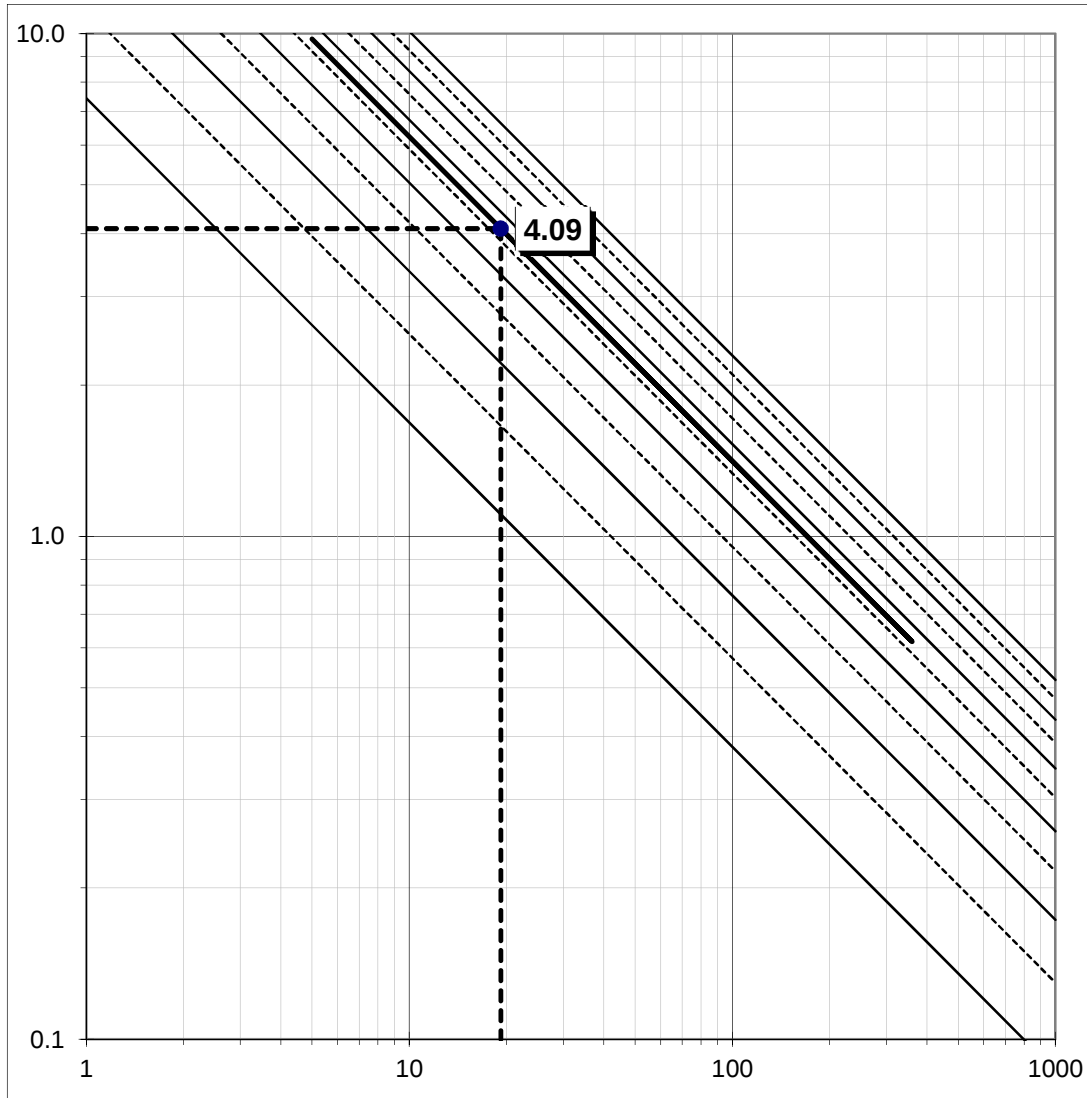
Process from Point/Station 102.000 to Point/Station 103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.175(CFS)
Depth of flow = 0.300(Ft.), Average velocity = 0.782(Ft/s)
***** Irregular Channel Data *****

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 1.50
2 50.00 0.00
3 1.50 50.00
Manning's 'N' friction factor = 0.035

Sub-Channel flow = 1.175(CFS)
flow top width = 10.009(Ft.)
velocity = 0.782(Ft/s)
area = 1.503(Sq.Ft)
Froude number = 0.356

Upstream point elevation = 1342.500(Ft.)
Downstream point elevation = 1342.000(Ft.)
Flow length = 113.000(Ft.)
Travel time = 2.41 min.
Time of concentration = 12.23 min.
Depth of flow = 0.300(Ft.)
Average velocity = 0.782(Ft/s)
Total irregular channel flow = 1.175(CFS)
Irregular channel normal depth above invert elev. = 0.300(Ft.)
Average velocity of channel(s) = 0.782(Ft/s)
Adding area flow to channel
Rainfall intensity (I) = 5.475(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.250 given for subarea
Rainfall intensity = 5.475(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.333 CA = 0.237
Subarea runoff = 0.305(CFS) for 0.319(Ac.)
Total runoff = 1.295(CFS) Total area = 0.711(Ac.)
Depth of flow = 0.311(Ft.), Average velocity = 0.801(Ft/s)
End of computations, total study area = 0.711 (Ac.)



EX-2

Existing Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.32

Dist. = 133.00 ft.

slope = 0.600 %

*T_c = 19.20 min.

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{S}}$$

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 0 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

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

** Minimum T_c = 10 Minutes

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 19.20 min.

I = 4.09 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

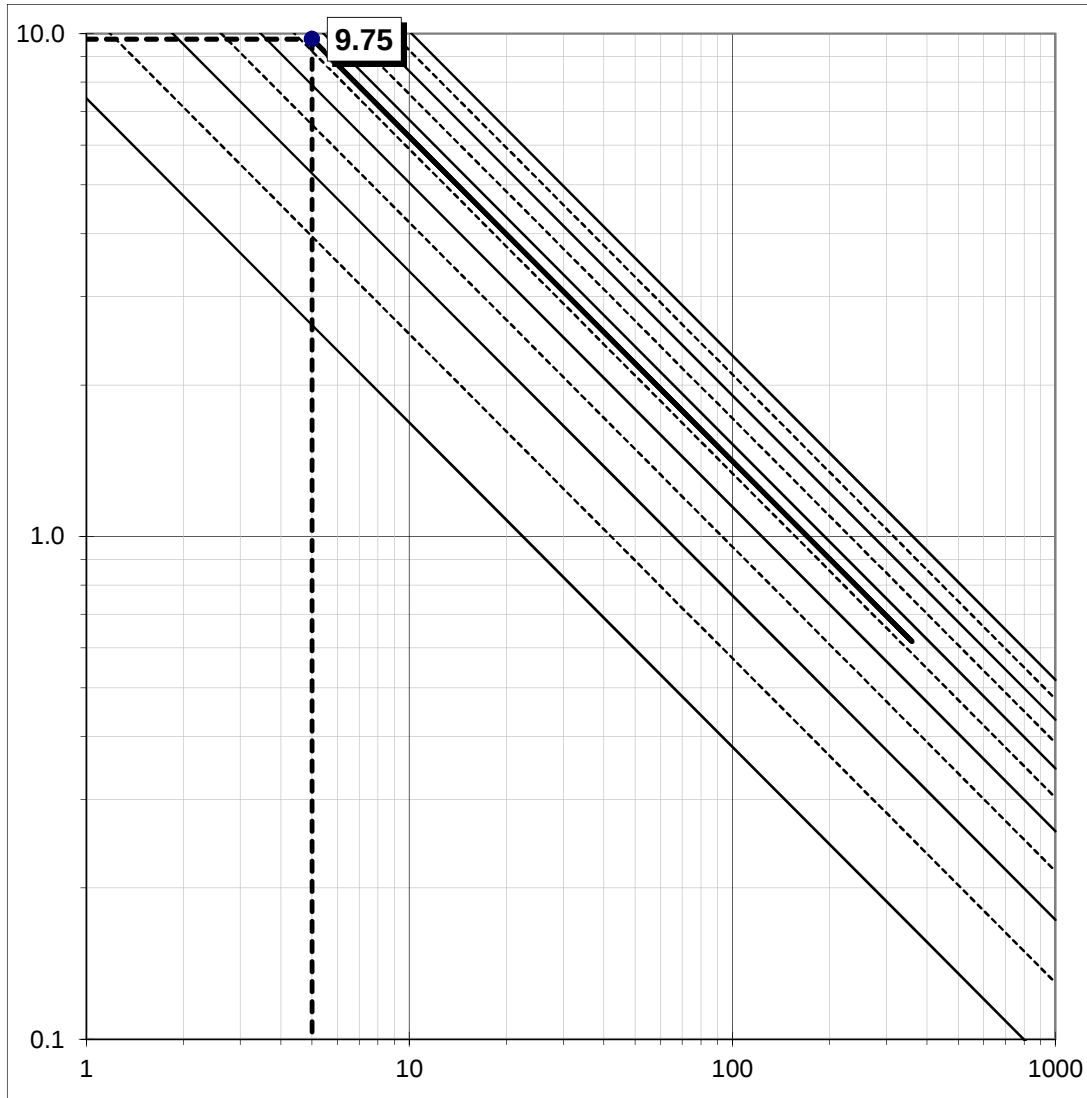
Q = 0.18 cfs

C = 0.32

I = 4.09 in/hr

A = 0.139 ac.

$$Q = C * I * A$$



EX-3A

Existing Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.90

Dist. = 87.00 ft.

slope = 1.150 %

*T_c = 5.00 min.

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 373 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

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

** Minimum T_c = 10 Minutes

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 5.00 min.

I = 9.75 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

Q = 0.79 cfs

C = 0.90

I = 9.75 in/hr

A = 0.090 ac.

$$Q = C * I * A$$

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
 San Diego County Flood Control Division 2003 hydrology manual
 Rational Hydrology Study Date: 02/26/19

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
 6 hour, precipitation(inches) = 3.700
 24 hour precipitation(inches) = 8.200
 P6/P24 = 45.1%
 San Diego hydrology manual 'C' values used

 Process from Point/Station 301.000 to Point/Station 302.000
 **** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.900 given for subarea
 Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
 User specified values are as follows:
 TC = 5.00 min. Rain intensity = 9.75(In/Hr)
 Total area = 0.090(Ac.) Total runoff = 0.790(CFS)

 Process from Point/Station 302.000 to Point/Station 303.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 2.341(CFS)
 Depth of flow = 0.175(Ft.), Average velocity = 3.137(Ft/s)
 ***** Irregular Channel Data *****

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	24.00	0.00
3	24.50	0.50
4	30.00	0.70

Manning's 'N' friction factor = 0.013

Sub-Channel flow = 2.341(CFS)
 flow top width = 8.552(Ft.)
 velocity = 3.137(Ft/s)
 area = 0.746(Sq.Ft)
 Froude number = 1.871

Upstream point elevation = 1353.000(Ft.)
 Downstream point elevation = 1344.300(Ft.)
 Flow length = 442.000(Ft.)
 Travel time = 2.35 min.
 Time of concentration = 7.35 min.
 Depth of flow = 0.175(Ft.)
 Average velocity = 3.137(Ft/s)
 Total irregular channel flow = 2.341(CFS)
 Irregular channel normal depth above invert elev. = 0.175(Ft.)
 Average velocity of channel(s) = 3.137(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.605(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.855 given for subarea
 Rainfall intensity = 7.605(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.862 CA = 0.500
 Subarea runoff = 3.012(CFS) for 0.490(Ac.)
 Total runoff = 3.802(CFS) Total area = 0.580(Ac.)
 Depth of flow = 0.209(Ft.), Average velocity = 3.541(Ft/s)

ex3

```
*****
Process from Point/Station      302.000 to Point/Station      303.000
**** CONFLUENCE OF MAIN STREAMS ****
```

The following data inside Main Stream is listed:

In Main Stream number: 1
Stream flow area = 0.580(Ac.)
Runoff from this stream = 3.802(CFS)
Time of concentration = 7.35 min.
Rainfall intensity = 7.605(In/Hr)
Program is now starting with Main Stream No. 2

```
*****
Process from Point/Station      201.000 to Point/Station      202.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
```

User specified 'C' value of 0.320 given for subarea
Rainfall intensity (I) = 4.093(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 19.20 min. Rain intensity = 4.09(In/Hr)
Total area = 0.139(Ac.) Total runoff = 0.180(CFS)

```
*****
Process from Point/Station      201.000 to Point/Station      202.000
**** CONFLUENCE OF MAIN STREAMS ****
```

The following data inside Main Stream is listed:

In Main Stream number: 2
Stream flow area = 0.139(Ac.)
Runoff from this stream = 0.180(CFS)
Time of concentration = 19.20 min.
Rainfall intensity = 4.093(In/Hr)
Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	3.802	7.35	7.605
2	0.180	19.20	4.093
Qmax(1) =			
	1.000 *	1.000 *	3.802) +
	1.000 *	0.383 *	0.180) + = 3.871
Qmax(2) =			
	0.538 *	1.000 *	3.802) +
	1.000 *	1.000 *	0.180) + = 2.226

Total of 2 main streams to confluence:

Flow rates before confluence point:

3.802 0.180

Maximum flow rates at confluence using above data:

3.871 2.226

Area of streams before confluence:

0.580 0.139

Results of confluence:

Total flow rate = 3.871(CFS)

Time of concentration = 7.348 min.

Effective stream area after confluence = 0.719(Ac.)

End of computations, total study area = 0.719 (Ac.)

Channel Report

EX3 - GUTTER

User-defined

Invert Elev (ft)

= 1346.60

Slope (%)

= 2.03

N-Value

= 0.013

Calculations

Compute by:

Known Q

Known Q (cfs)

= 3.87

Highlighted

Depth (ft)

= 0.21

Q (cfs)

= 3.870

Area (sqft)

= 1.11

Velocity (ft/s)

= 3.50

Wetted Perim (ft)

= 10.71

Crit Depth, Yc (ft)

= 0.28

Top Width (ft)

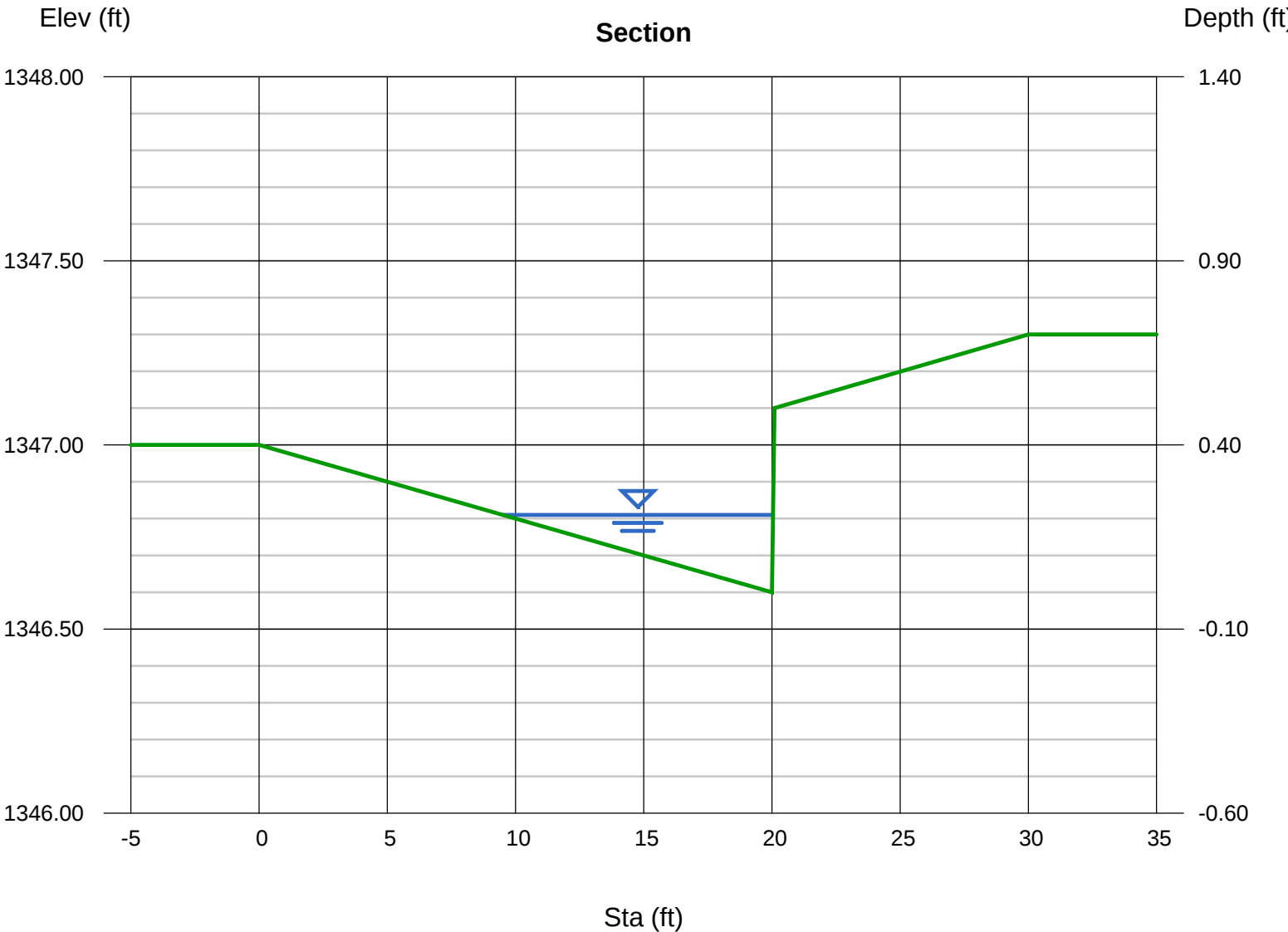
= 10.54

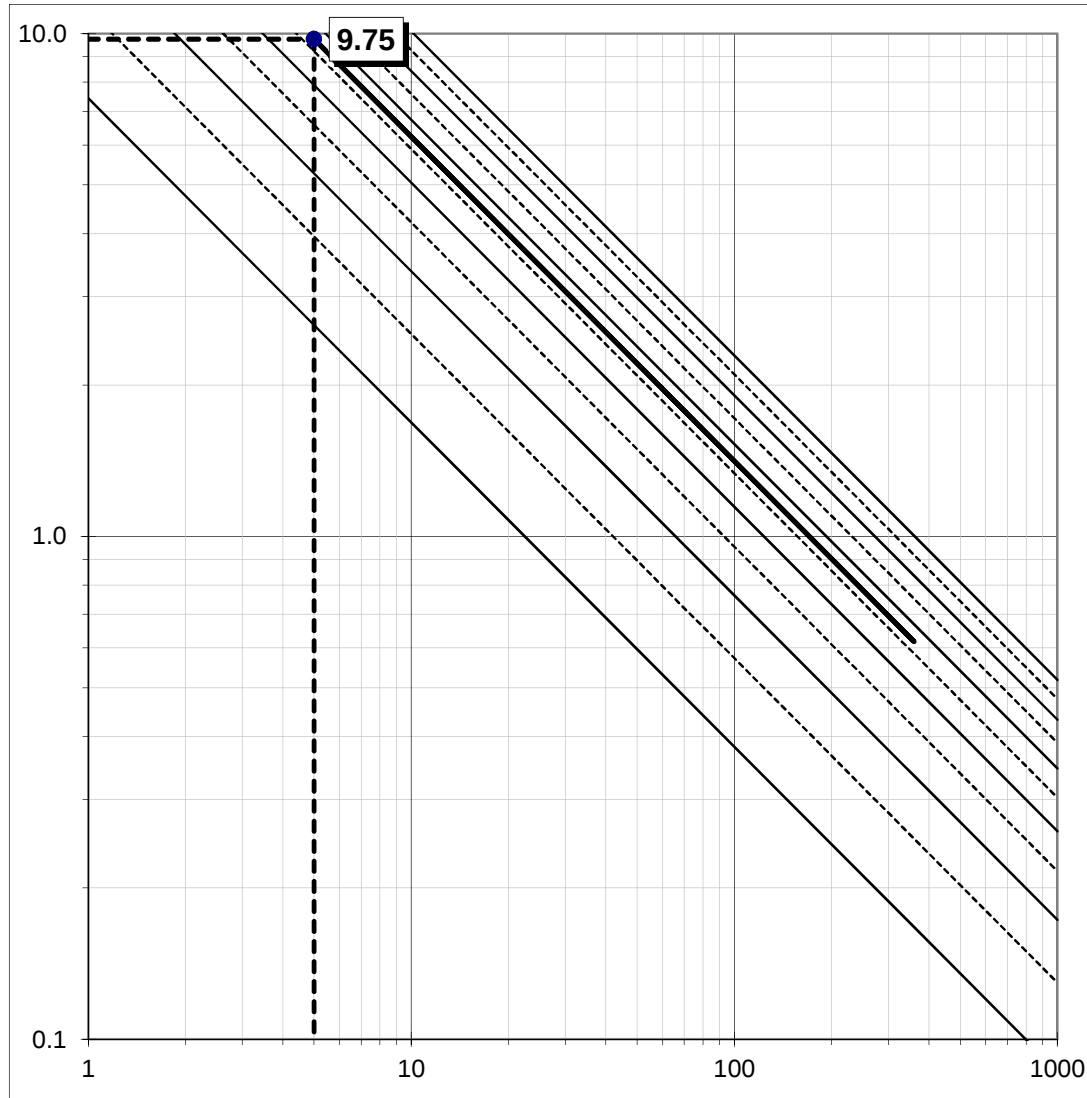
EGL (ft)

= 0.40

(Sta, El, n)-(Sta, El, n)...

(0.00, 1347.00)-(20.00, 1346.60, 0.013)-(20.10, 1347.10, 0.013)-(30.00, 1347.30, 0.013)





EX-4

Existing Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.84

Dist. = 126.00 ft.

slope = 1.350 %

*T_c = 5.00 min.

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 373 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

** Minimum T_c = 10 Minutes

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

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

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 5.00 min.

I = 9.75 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

Q = 1.87 cfs

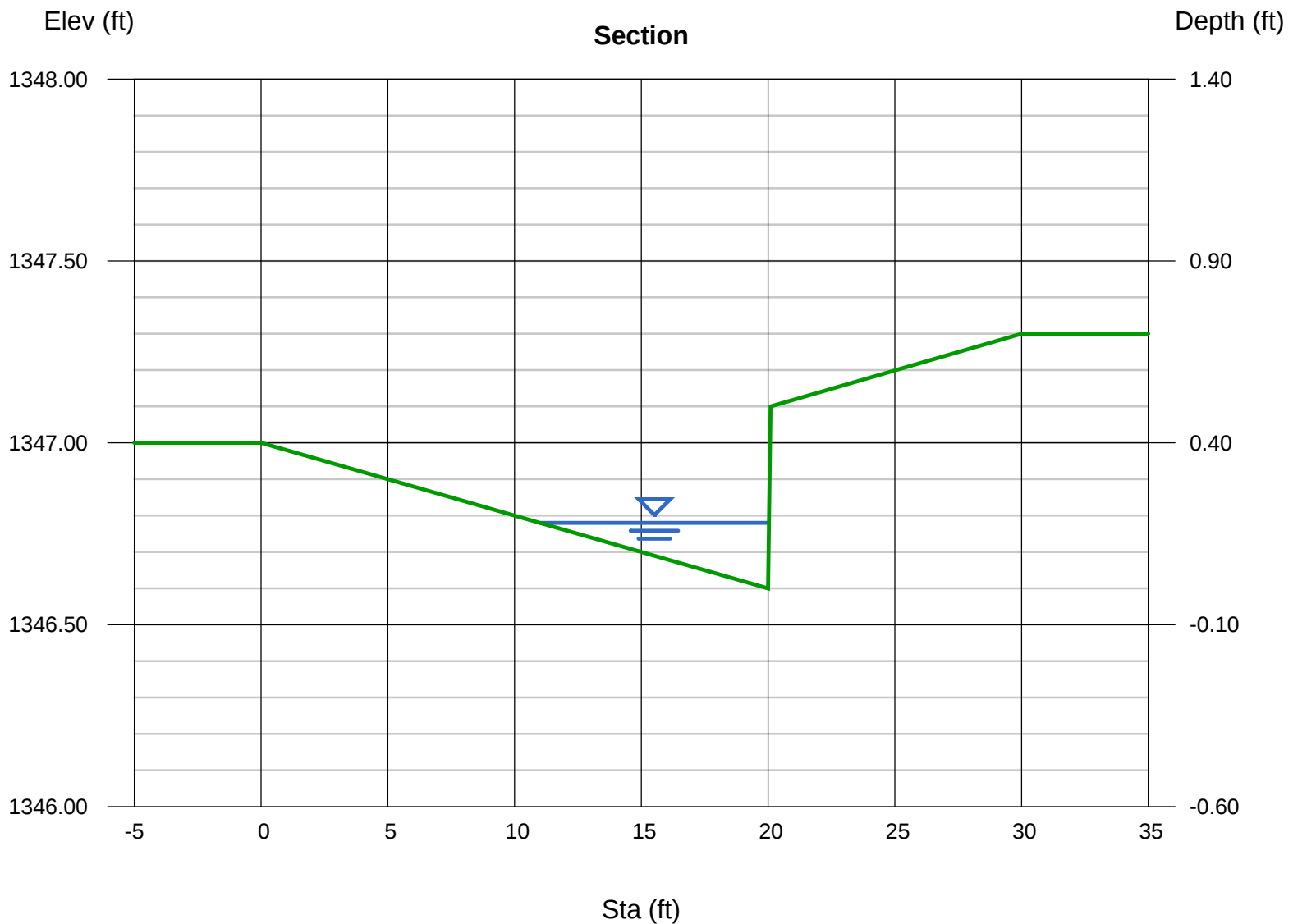
C = 0.84

I = 9.75 in/hr

A = 0.228 ac.

$$Q = C * I * A$$

Tuesday, Feb 26 2019



ATTACHMENT 4

PROPOSED HYDROLOGY CALCULATIONS

AREA CALCULATIONS

PROPOSED HYDROLOGIC BASINS

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-1A	A	0.20	0	0.000	0	0	0	0	-	0.06	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.07	0%	0.00	-
	C	0.30	6,186	0.142	0	4,404	1,782	0	-	0.09	100%	0.09	-
	D	0.35	0	0.000	0	0	0	0	-	0.10	0%	0.00	-
	Total	-	6,186	0.142	0	4,404	1,782	0	71.19%	-	100%	0.09	<u>0.727</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-1B	A	0.20	0	0.000	0	0	0	0	-	0.03	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.03	0%	0.00	-
	C	0.30	4,912	0.113	0	4,240	672	0	-	0.04	100%	0.04	-
	D	0.35	0	0.000	0	0	0	0	-	0.05	0%	0.00	-
	Total	-	4,912	0.113	0	4,240	672	0	86.32%	-	100%	0.04	<u>0.818</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-1C	A	0.20	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	C	0.30	4,838	0.111	0	4,838	0	0	-	0.00	100%	0.00	-
	D	0.35	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	Total	-	4,838	0.111	0	4,838	0	0	100.00%	-	100%	0.00	<u>0.900</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-1D	A	0.20	0	0.000	0	0	0	0	-	0.01	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	C	0.30	5,882	0.135	0	5,511	371	0	-	0.02	100%	0.02	-
	D	0.35	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	Total	-	5,882	0.135	0	5,511	371	0	93.69%	-	100%	0.02	<u>0.862</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-1E	A	0.20	0	0.000	0	0	0	0	-	0.01	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.01	0%	0.00	-
	C	0.30	4,838	0.111	0	4,565	273	0	-	0.02	100%	0.02	-
	D	0.35	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	Total	-	4,838	0.111	0	4,565	273	0	94.35%	-	100%	0.02	<u>0.866</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-1F	A	0.20	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	C	0.30	818	0.019	0	818	0	0	-	0.00	100%	0.00	-
	D	0.35	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	Total	-	818	0.019	0	818	0	0	100.00%	-	100%	0.00	<u>0.900</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-1G	A	0.20	0	0.000	0	0	0	0	-	0.20	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.25	0%	0.00	-
	C	0.30	2,492	0.057	0	0	2,492	0	-	0.30	100%	0.30	-
	D	0.35	0	0.000	0	0	0	0	-	0.35	0%	0.00	-
Total		-	2,492	0.057	0	0	2,492	0	0.00%	-	100%	0.30	<u>0.300</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-2A	A	0.20	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	C	0.30	5,431	0.125	0	4,900	531	0	-	0.03	100%	0.03	-
	D	0.35	0	0.000	0	0	0	0	-	0.03	0%	0.00	-
Total		-	5,431	0.125	0	4,900	531	0	90.22%	-	100%	0.03	<u>0.841</u>

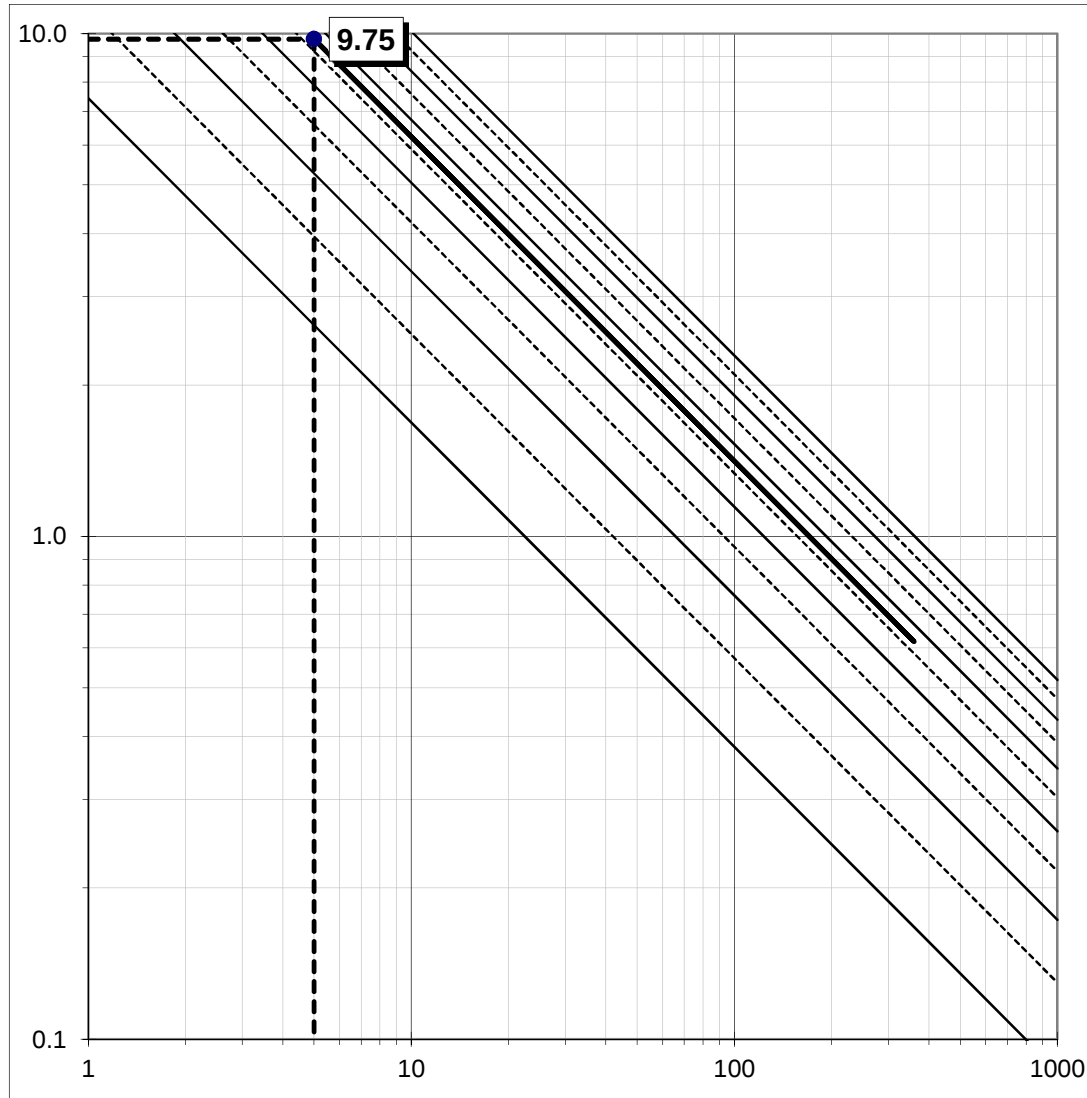
Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-2B	A	0.20	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	C	0.30	5,098	0.117	0	4,607	491	0	-	0.03	94%	0.03	-
	D	0.35	0	0.000	0	0	0	0	-	0.03	0%	0.00	-
Total		-	5,098	0.117	0	4,607	491	0	90.37%	-	94%	0.03	<u>0.841</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-2C	A	0.20	0	0.000	0	0	0	0	-	0.20	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.25	0%	0.00	-
	C	0.30	1,008	0.023	0	0	1,008	0	-	0.30	100%	0.30	-
	D	0.35	0	0.000	0	0	0	0	-	0.35	0%	0.00	-
Total		-	1,008	0.023	0	0	1,008	0	0.00%	-	100%	0.30	<u>0.300</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-3A	A	0.20	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	C	0.30	3,909	0.090	0	3,909	0	0	-	0.00	100%	0.00	-
	D	0.35	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
Total		-	3,909	0.090	0	3,909	0	0	100.00%	-	100%	0.00	<u>0.900</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-3B	A	0.20	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
	C	0.30	16,117	0.370	0	16,117	0	0	-	0.00	100%	0.00	-
	D	0.35	0	0.000	0	0	0	0	-	0.00	0%	0.00	-
Total		-	16,117	0.370	0	16,117	0	0	100.00%	-	100%	0.00	<u>0.900</u>

Basin	Soil Type	Pervious Runoff Coefficient	Total Area SF	Total Area Acres	Natural SF	Impervious SF	Landscape SF	Pervious Pavers SF	% Impervious	C Value Weighted	% Fraction of Site	C Value Fraction	C Value Final
PR-4	A	0.20	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	B	0.25	0	0.000	0	0	0	0	-	0.02	0%	0.00	-
	C	0.30	9,928	0.228	0	9,161	767	0	-	0.02	100%	0.02	-
	D	0.35	0	0.000	0	0	0	0	-	0.03	0%	0.00	-
Total		-	9,928	0.228	0	9,161	767	0	92.27%	-	100%	0.02	<u>0.854</u>



PR-1A

Proposed Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.73

Dist. = 23.00 ft.

slope = 3.900 %

*T_c = 5.00 min.

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 0 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

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

** Minimum T_c = 10 Minutes

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 5.00 min.

I = 9.75 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

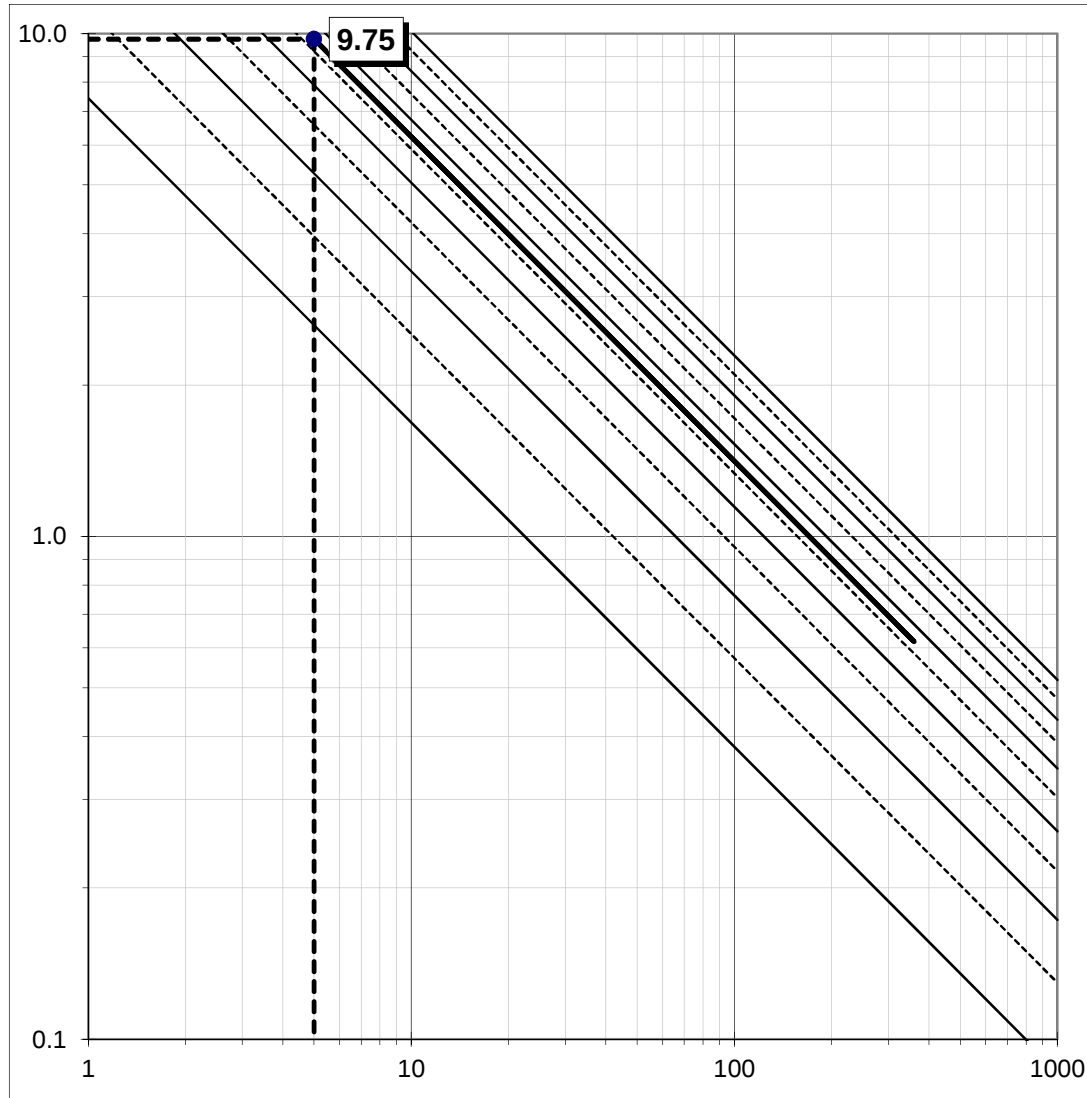
Q = 1.01 cfs

C = 0.73

I = 9.75 in/hr

A = 0.142 ac.

$$Q = C * I * A$$



PR-1B

Proposed Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.82

Dist. = 33.00 ft.

slope = 0.606 %

*T_c = 5.00 min.

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 0 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

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

** Minimum T_c = 10 Minutes

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 5.00 min.

I = 9.75 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

Q = 0.13 cfs

C = 0.82

I = 9.75 in/hr

A = 0.016 ac.

$$Q = C * I * A$$

PR1A

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 12/16/20

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
6 hour, precipitation(inches) = 3.700
24 hour precipitation(inches) = 8.200
P6/P24 = 45.1%
San Diego hydrology manual 'C' values used

Process from Point/Station 101.000 to Point/Station 102.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.730 given for subarea
Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 5.00 min. Rain intensity = 9.75(In/Hr)
Total area = 0.142(Ac.) Total runoff = 1.010(CFS)

Process from Point/Station 101.000 to Point/Station 102.000
**** 6 HOUR HYDROGRAPH ****

Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003

Time of Concentration = 5.00
Basin Area = 0.14 Acres
6 Hour Rainfall = 3.700 Inches
Runoff Coefficient = 0.730
Peak Discharge = 1.01 CFS

Time (Min)	Discharge (CFS)
0	0.000
5	0.023
10	0.023
15	0.023
20	0.024
25	0.024
30	0.024
35	0.025
40	0.025
45	0.026
50	0.026
55	0.027
60	0.027
65	0.028
70	0.028
75	0.029

PR1A

80	0.029
85	0.030
90	0.030
95	0.031
100	0.031
105	0.032
110	0.033
115	0.034
120	0.035
125	0.036
130	0.037
135	0.038
140	0.039
145	0.040
150	0.041
155	0.043
160	0.044
165	0.047
170	0.048
175	0.051
180	0.053
185	0.057
190	0.059
195	0.064
200	0.067
205	0.074
210	0.079
215	0.090
220	0.098
225	0.120
230	0.136
235	0.200
240	0.282
245	1.010
250	0.160
255	0.107
260	0.084
265	0.070
270	0.061
275	0.055
280	0.050
285	0.046
290	0.042
295	0.040
300	0.037
305	0.035
310	0.033
315	0.032
320	0.031
325	0.029
330	0.028
335	0.027
340	0.026
345	0.025
350	0.025
355	0.024
360	0.023
365	0.023

+++++

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	0.3	0.5	0.8	1.0
0+ 0	0.0000	0.00	Q				

				PR1A		
0+ 1	0.0000	0.00	Q			
0+ 2	0.0000	0.01	Q			
0+ 3	0.0000	0.01	Q			
0+ 4	0.0001	0.02	Q			
0+ 5	0.0001	0.02	Q			
0+ 6	0.0001	0.02	Q			
0+ 7	0.0002	0.02	Q			
0+ 8	0.0002	0.02	Q			
0+ 9	0.0002	0.02	Q			
0+10	0.0003	0.02	Q			
0+11	0.0003	0.02	Q			
0+12	0.0003	0.02	Q			
0+13	0.0003	0.02	Q			
0+14	0.0004	0.02	Q			
0+15	0.0004	0.02	Q			
0+16	0.0004	0.02	Q			
0+17	0.0005	0.02	Q			
0+18	0.0005	0.02	Q			
0+19	0.0005	0.02	Q			
0+20	0.0006	0.02	Q			
0+21	0.0006	0.02	Q			
0+22	0.0006	0.02	Q			
0+23	0.0007	0.02	Q			
0+24	0.0007	0.02	Q			
0+25	0.0007	0.02	Q			
0+26	0.0008	0.02	Q			
0+27	0.0008	0.02	QV			
0+28	0.0008	0.02	QV			
0+29	0.0009	0.02	QV			
0+30	0.0009	0.02	QV			
0+31	0.0009	0.02	QV			
0+32	0.0010	0.02	QV			
0+33	0.0010	0.02	QV			
0+34	0.0010	0.02	QV			
0+35	0.0011	0.02	QV			
0+36	0.0011	0.02	QV			
0+37	0.0011	0.03	QV			
0+38	0.0012	0.03	QV			
0+39	0.0012	0.03	QV			
0+40	0.0013	0.03	QV			
0+41	0.0013	0.03	Q			
0+42	0.0013	0.03	Q			
0+43	0.0014	0.03	Q			
0+44	0.0014	0.03	Q			
0+45	0.0014	0.03	Q			
0+46	0.0015	0.03	Q			
0+47	0.0015	0.03	Q			
0+48	0.0015	0.03	Q			
0+49	0.0016	0.03	Q			
0+50	0.0016	0.03	QV			
0+51	0.0016	0.03	QV			
0+52	0.0017	0.03	QV			
0+53	0.0017	0.03	QV			
0+54	0.0018	0.03	QV			
0+55	0.0018	0.03	QV			
0+56	0.0018	0.03	QV			
0+57	0.0019	0.03	QV			
0+58	0.0019	0.03	QV			
0+59	0.0019	0.03	QV			
1+ 0	0.0020	0.03	QV			
1+ 1	0.0020	0.03	QV			
1+ 2	0.0020	0.03	QV			
1+ 3	0.0021	0.03	QV			
1+ 4	0.0021	0.03	QV			
1+ 5	0.0022	0.03	QV			
1+ 6	0.0022	0.03	QV			
1+ 7	0.0022	0.03	QV			
1+ 8	0.0023	0.03	QV			

					PR1A		
1+ 9	0.0023	0.03	QV				
1+10	0.0024	0.03	QV				
1+11	0.0024	0.03	QV				
1+12	0.0024	0.03	Q V				
1+13	0.0025	0.03	Q V				
1+14	0.0025	0.03	Q V				
1+15	0.0025	0.03	Q V				
1+16	0.0026	0.03	Q V				
1+17	0.0026	0.03	Q V				
1+18	0.0027	0.03	Q V				
1+19	0.0027	0.03	Q V				
1+20	0.0027	0.03	Q V				
1+21	0.0028	0.03	Q V				
1+22	0.0028	0.03	Q V				
1+23	0.0029	0.03	Q V				
1+24	0.0029	0.03	Q V				
1+25	0.0029	0.03	Q V				
1+26	0.0030	0.03	Q V				
1+27	0.0030	0.03	Q V				
1+28	0.0031	0.03	Q V				
1+29	0.0031	0.03	Q V				
1+30	0.0032	0.03	Q V				
1+31	0.0032	0.03	Q V				
1+32	0.0032	0.03	Q V				
1+33	0.0033	0.03	Q V				
1+34	0.0033	0.03	Q V				
1+35	0.0034	0.03	Q V				
1+36	0.0034	0.03	Q V				
1+37	0.0034	0.03	Q V				
1+38	0.0035	0.03	Q V				
1+39	0.0035	0.03	Q V				
1+40	0.0036	0.03	Q V				
1+41	0.0036	0.03	Q V				
1+42	0.0037	0.03	Q V				
1+43	0.0037	0.03	Q V				
1+44	0.0038	0.03	Q V				
1+45	0.0038	0.03	Q V				
1+46	0.0038	0.03	Q V				
1+47	0.0039	0.03	Q V				
1+48	0.0039	0.03	Q V				
1+49	0.0040	0.03	Q V				
1+50	0.0040	0.03	Q V				
1+51	0.0041	0.03	Q V				
1+52	0.0041	0.03	Q V				
1+53	0.0042	0.03	Q V				
1+54	0.0042	0.03	Q V				
1+55	0.0043	0.03	Q V				
1+56	0.0043	0.03	Q V				
1+57	0.0044	0.03	Q V				
1+58	0.0044	0.03	Q V				
1+59	0.0044	0.03	Q V				
2+ 0	0.0045	0.03	Q V				
2+ 1	0.0045	0.03	Q V				
2+ 2	0.0046	0.04	Q V				
2+ 3	0.0046	0.04	Q V				
2+ 4	0.0047	0.04	Q V				
2+ 5	0.0047	0.04	Q V				
2+ 6	0.0048	0.04	Q V				
2+ 7	0.0048	0.04	Q V				
2+ 8	0.0049	0.04	Q V				
2+ 9	0.0049	0.04	Q V				
2+10	0.0050	0.04	Q V				
2+11	0.0050	0.04	Q V				
2+12	0.0051	0.04	Q V				
2+13	0.0051	0.04	Q V				
2+14	0.0052	0.04	Q V				
2+15	0.0052	0.04	Q V				
2+16	0.0053	0.04	Q V				

PR1A					
2+17	0.0054	0.04	Q	V	
2+18	0.0054	0.04	Q	V	
2+19	0.0055	0.04	Q	V	
2+20	0.0055	0.04	Q	V	
2+21	0.0056	0.04	Q	V	
2+22	0.0056	0.04	Q	V	
2+23	0.0057	0.04	Q	V	
2+24	0.0057	0.04	Q	V	
2+25	0.0058	0.04	Q	V	
2+26	0.0058	0.04	Q	V	
2+27	0.0059	0.04	Q	V	
2+28	0.0060	0.04	Q	V	
2+29	0.0060	0.04	Q	V	
2+30	0.0061	0.04	Q	V	
2+31	0.0061	0.04	Q	V	
2+32	0.0062	0.04	Q	V	
2+33	0.0062	0.04	Q	V	
2+34	0.0063	0.04	Q	V	
2+35	0.0064	0.04	Q	V	
2+36	0.0064	0.04	Q	V	
2+37	0.0065	0.04	Q	V	
2+38	0.0065	0.04	Q	V	
2+39	0.0066	0.04	Q	V	
2+40	0.0067	0.04	Q	V	
2+41	0.0067	0.04	Q	V	
2+42	0.0068	0.05	Q	V	
2+43	0.0068	0.05	Q	V	
2+44	0.0069	0.05	Q	V	
2+45	0.0070	0.05	Q	V	
2+46	0.0070	0.05	Q	V	
2+47	0.0071	0.05	Q	V	
2+48	0.0072	0.05	Q	V	
2+49	0.0072	0.05	Q	V	
2+50	0.0073	0.05	Q	V	
2+51	0.0074	0.05	Q	V	
2+52	0.0074	0.05	Q	V	
2+53	0.0075	0.05	Q	V	
2+54	0.0076	0.05	Q	V	
2+55	0.0077	0.05	Q	V	
2+56	0.0077	0.05	Q	V	
2+57	0.0078	0.05	Q	V	
2+58	0.0079	0.05	Q	V	
2+59	0.0079	0.05	Q	V	
3+ 0	0.0080	0.05	Q	V	
3+ 1	0.0081	0.05	Q	V	
3+ 2	0.0082	0.05	Q	V	
3+ 3	0.0082	0.06	Q	V	
3+ 4	0.0083	0.06	Q	V	
3+ 5	0.0084	0.06	Q	V	
3+ 6	0.0085	0.06	Q	V	
3+ 7	0.0085	0.06	Q	V	
3+ 8	0.0086	0.06	Q	V	
3+ 9	0.0087	0.06	Q	V	
3+10	0.0088	0.06	Q	V	
3+11	0.0089	0.06	Q	V	
3+12	0.0090	0.06	Q	V	
3+13	0.0090	0.06	Q	V	
3+14	0.0091	0.06	Q	V	
3+15	0.0092	0.06	Q	V	
3+16	0.0093	0.06	Q	V	
3+17	0.0094	0.07	Q	V	
3+18	0.0095	0.07	Q	V	
3+19	0.0096	0.07	Q	V	
3+20	0.0097	0.07	Q	V	
3+21	0.0098	0.07	Q	V	
3+22	0.0099	0.07	Q	V	
3+23	0.0100	0.07	Q	V	
3+24	0.0101	0.07	Q	V	

3+25	0.0102	0.07	Q	V	PR1A				
3+26	0.0103	0.08	Q	V					
3+27	0.0104	0.08	Q	V					
3+28	0.0105	0.08	Q	V					
3+29	0.0106	0.08	Q	V					
3+30	0.0107	0.08	Q	V					
3+31	0.0108	0.08	Q	V					
3+32	0.0109	0.08	Q	V					
3+33	0.0110	0.09	Q	V					
3+34	0.0112	0.09	Q	V					
3+35	0.0113	0.09	Q	V					
3+36	0.0114	0.09	Q	V					
3+37	0.0115	0.09	Q	V					
3+38	0.0117	0.09	Q	V					
3+39	0.0118	0.10	Q	V					
3+40	0.0119	0.10	Q	V					
3+41	0.0121	0.10	Q	V					
3+42	0.0122	0.11	Q	V					
3+43	0.0124	0.11	Q	V					
3+44	0.0125	0.12	Q	V					
3+45	0.0127	0.12	Q	V					
3+46	0.0129	0.12	Q	V					
3+47	0.0130	0.13	Q	V					
3+48	0.0132	0.13	Q	V					
3+49	0.0134	0.13	Q	V					
3+50	0.0136	0.14	Q	V					
3+51	0.0138	0.15	Q	V					
3+52	0.0140	0.16	Q	V					
3+53	0.0143	0.17	Q	V					
3+54	0.0145	0.19	Q	V					
3+55	0.0148	0.20	Q	V					
3+56	0.0151	0.22	Q	V					
3+57	0.0154	0.23	Q	V					
3+58	0.0158	0.25	Q	V					
3+59	0.0161	0.27	Q	V					
4+ 0	0.0165	0.28	Q	V					
4+ 1	0.0171	0.43		Q	V				
4+ 2	0.0179	0.57		Q	V				
4+ 3	0.0189	0.72			Q				
4+ 4	0.0201	0.86			V			Q	
4+ 5	0.0215	1.01			V				Q
4+ 6	0.0226	0.84			V			Q	
4+ 7	0.0235	0.67			Q			V	
4+ 8	0.0242	0.50			Q			V	
4+ 9	0.0247	0.33		Q				V	
4+10	0.0249	0.16	Q					V	
4+11	0.0251	0.15	Q					V	
4+12	0.0253	0.14	Q					V	
4+13	0.0255	0.13	Q					V	
4+14	0.0256	0.12	Q					V	
4+15	0.0258	0.11	Q					V	
4+16	0.0259	0.10	Q					V	
4+17	0.0261	0.10	Q					V	
4+18	0.0262	0.09	Q					V	
4+19	0.0263	0.09	Q					V	
4+20	0.0264	0.08	Q					V	
4+21	0.0265	0.08	Q					V	
4+22	0.0267	0.08	Q					V	
4+23	0.0268	0.08	Q					V	
4+24	0.0269	0.07	Q					V	
4+25	0.0270	0.07	Q					V	
4+26	0.0270	0.07	Q					V	
4+27	0.0271	0.07	Q					V	
4+28	0.0272	0.06	Q					V	
4+29	0.0273	0.06	Q					V	
4+30	0.0274	0.06	Q					V	
4+31	0.0275	0.06	Q					V	
4+32	0.0276	0.06	Q					V	

					PR1A	
4+33	0.0276	0.06	Q		V	
4+34	0.0277	0.06	Q		V	
4+35	0.0278	0.05	Q		V	
4+36	0.0279	0.05	Q		V	
4+37	0.0279	0.05	Q		V	
4+38	0.0280	0.05	Q		V	
4+39	0.0281	0.05	Q		V	
4+40	0.0282	0.05	Q		V	
4+41	0.0282	0.05	Q		V	
4+42	0.0283	0.05	Q		V	
4+43	0.0283	0.05	Q		V	
4+44	0.0284	0.05	Q		V	
4+45	0.0285	0.05	Q		V	
4+46	0.0285	0.04	Q		V	
4+47	0.0286	0.04	Q		V	
4+48	0.0287	0.04	Q		V	
4+49	0.0287	0.04	Q		V	
4+50	0.0288	0.04	Q		V	
4+51	0.0288	0.04	Q		V	
4+52	0.0289	0.04	Q		V	
4+53	0.0289	0.04	Q		V	
4+54	0.0290	0.04	Q		V	
4+55	0.0291	0.04	Q		V	
4+56	0.0291	0.04	Q		V	
4+57	0.0292	0.04	Q		V	
4+58	0.0292	0.04	Q		V	
4+59	0.0293	0.04	Q		V	
5+ 0	0.0293	0.04	Q		V	
5+ 1	0.0294	0.04	Q		V	
5+ 2	0.0294	0.04	Q		V	
5+ 3	0.0295	0.04	Q		V	
5+ 4	0.0295	0.04	Q		V	
5+ 5	0.0296	0.04	Q		V	
5+ 6	0.0296	0.03	Q		V	
5+ 7	0.0297	0.03	Q		V	
5+ 8	0.0297	0.03	Q		V	
5+ 9	0.0298	0.03	Q		V	
5+10	0.0298	0.03	Q		V	
5+11	0.0298	0.03	Q		V	
5+12	0.0299	0.03	Q		V	
5+13	0.0299	0.03	Q		V	
5+14	0.0300	0.03	Q		V	
5+15	0.0300	0.03	Q		V	
5+16	0.0301	0.03	Q		V	
5+17	0.0301	0.03	Q		V	
5+18	0.0302	0.03	Q		V	
5+19	0.0302	0.03	Q		V	
5+20	0.0302	0.03	Q		V	
5+21	0.0303	0.03	Q		V	
5+22	0.0303	0.03	Q		V	
5+23	0.0304	0.03	Q		V	
5+24	0.0304	0.03	Q		V	
5+25	0.0304	0.03	Q		V	
5+26	0.0305	0.03	Q		V	
5+27	0.0305	0.03	Q		V	
5+28	0.0306	0.03	Q		V	
5+29	0.0306	0.03	Q		V	
5+30	0.0306	0.03	Q		V	
5+31	0.0307	0.03	Q		V	
5+32	0.0307	0.03	Q		V	
5+33	0.0308	0.03	Q		V	
5+34	0.0308	0.03	Q		V	
5+35	0.0308	0.03	Q		V	
5+36	0.0309	0.03	Q		V	
5+37	0.0309	0.03	Q		V	
5+38	0.0309	0.03	Q		V	
5+39	0.0310	0.03	Q		V	
5+40	0.0310	0.03	Q		V	

					PR1A		
5+41	0.0311	0.03	Q				V
5+42	0.0311	0.03	Q				V
5+43	0.0311	0.03	Q				V
5+44	0.0312	0.03	Q				V
5+45	0.0312	0.03	Q				V
5+46	0.0312	0.03	Q				V
5+47	0.0313	0.03	Q				V
5+48	0.0313	0.02	Q				V
5+49	0.0313	0.02	Q				V
5+50	0.0314	0.02	Q				V
5+51	0.0314	0.02	Q				V
5+52	0.0314	0.02	Q				V
5+53	0.0315	0.02	Q				V
5+54	0.0315	0.02	Q				V
5+55	0.0315	0.02	Q				V
5+56	0.0316	0.02	Q				V
5+57	0.0316	0.02	Q				V
5+58	0.0316	0.02	Q				V
5+59	0.0317	0.02	Q				V
6+ 0	0.0317	0.02	Q				V
6+ 1	0.0317	0.02	Q				V
6+ 2	0.0318	0.02	Q				V
6+ 3	0.0318	0.02	Q				V
6+ 4	0.0318	0.02	Q				V
6+ 5	0.0319	0.02	Q				V

End of computations, total study area = 0.142 (Ac.)

Stage Storage Capacity Calculations

$Q_{out} = AV = A \text{ acres} * 43560 \text{ sf/Acre (infiltration rate in/hr)} * 1 \text{ ft/12in (1 hr/3600 sec)}$

Orifice Flow: $Q = C * A * \sqrt{2gh}$
 $g = 32.20 \text{ ft/sec}^2$
 $C = 0.60$

Orifice-1

No. of openings 1
 Elevation 0.00
 diameter 2.9 inches 0.24 ft
 $A = 0.05 \text{ sf}$ $A = (\pi * D^2) / 4$

<u>Water Depth (ft)</u>	<u>Volume (cf)</u>	<u>Stage Storage Area (Ac.ft)</u>	<u>Area of Infiltration (ft)</u>	<u>Q infiltration</u>	<u>Effective Head Orifice-1</u>	<u>Q cfs Orifice-1</u>
0.00	0	0.000	N/A	0.000	N/A	0.000
0.25	125	0.003	N/A	0.000	0.13	0.079
0.50	250	0.006	N/A	0.000	0.38	0.136
1.00	500	0.011	N/A	0.000	0.88	0.207

PR1ADET

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012
Study date: 12/16/20

Program License Serial Number 6313

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

From study/file name: PR1A.rte
*****HYDROGRAPH DATA*****
Number of intervals = 365
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 1.010 (CFS)
Total volume = 0.032 (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

Flow into basin

+++++
Process from Point/Station 102.000 to Point/Station 102.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 365
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 Storage Outflow (S-0*dt/2) (S+0*dt/2)
(Ft.) (Ac.Ft) (CFS) (Ac.Ft) (Ac.Ft)

0.000 0.000 0.000 0.000 0.000
0.250 0.003 0.079 0.003 0.003
0.500 0.006 0.136 0.006 0.006
1.000 0.011 0.207 0.011 0.011

Hydrograph Detention Basin Routing

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

Time Inflow Outflow Storage Depth
(Hours) (CFS) (CFS) (Ac.Ft) .0 0.3 0.51 0.76 1.01 (Ft.)
0.017 0.00 0.00 0.000 0 | | | | 0.00
0.033 0.01 0.00 0.000 0 | | | | 0.00
0.050 0.01 0.00 0.000 0 | | | | 0.00
0.067 0.02 0.00 0.000 0 | | | | 0.00
0.083 0.02 0.00 0.000 0 | | | | 0.01

					PRIADET	
0.100	0.02	0.00	0.000	0		0.01
0.117	0.02	0.00	0.000	0		0.01
0.133	0.02	0.00	0.000	0		0.01
0.150	0.02	0.00	0.000	0		0.02
0.167	0.02	0.01	0.000	0		0.02
0.183	0.02	0.01	0.000	0		0.02
0.200	0.02	0.01	0.000	0		0.02
0.217	0.02	0.01	0.000	0		0.02
0.233	0.02	0.01	0.000	0		0.02
0.250	0.02	0.01	0.000	0		0.03
0.267	0.02	0.01	0.000	0		0.03
0.283	0.02	0.01	0.000	0		0.03
0.300	0.02	0.01	0.000	0		0.03
0.317	0.02	0.01	0.000	0		0.03
0.333	0.02	0.01	0.000	0		0.03
0.350	0.02	0.01	0.000	0		0.04
0.367	0.02	0.01	0.000	0		0.04
0.383	0.02	0.01	0.000	0		0.04
0.400	0.02	0.01	0.000	0		0.04
0.417	0.02	0.01	0.000	0		0.04
0.433	0.02	0.01	0.001	0		0.04
0.450	0.02	0.01	0.001	0		0.04
0.467	0.02	0.01	0.001	0		0.05
0.483	0.02	0.01	0.001	0		0.05
0.500	0.02	0.01	0.001	0		0.05
0.517	0.02	0.02	0.001	0		0.05
0.533	0.02	0.02	0.001	0		0.05
0.550	0.02	0.02	0.001	0		0.05
0.567	0.02	0.02	0.001	0		0.05
0.583	0.02	0.02	0.001	0		0.05
0.600	0.02	0.02	0.001	0		0.05
0.617	0.03	0.02	0.001	0		0.05
0.633	0.03	0.02	0.001	0		0.06
0.650	0.03	0.02	0.001	0		0.06
0.667	0.03	0.02	0.001	0		0.06
0.683	0.03	0.02	0.001	0		0.06
0.700	0.03	0.02	0.001	0		0.06
0.717	0.03	0.02	0.001	0		0.06
0.733	0.03	0.02	0.001	0		0.06
0.750	0.03	0.02	0.001	0		0.06
0.767	0.03	0.02	0.001	0		0.06
0.783	0.03	0.02	0.001	0		0.06
0.800	0.03	0.02	0.001	0		0.06
0.817	0.03	0.02	0.001	0		0.06
0.833	0.03	0.02	0.001	0		0.06
0.850	0.03	0.02	0.001	0		0.06
0.867	0.03	0.02	0.001	0		0.07
0.883	0.03	0.02	0.001	0		0.07
0.900	0.03	0.02	0.001	0		0.07
0.917	0.03	0.02	0.001	0		0.07
0.933	0.03	0.02	0.001	0		0.07
0.950	0.03	0.02	0.001	0		0.07
0.967	0.03	0.02	0.001	0		0.07
0.983	0.03	0.02	0.001	0		0.07
1.000	0.03	0.02	0.001	0		0.07
1.017	0.03	0.02	0.001	0		0.07
1.033	0.03	0.02	0.001	0		0.07
1.050	0.03	0.02	0.001	0		0.07
1.067	0.03	0.02	0.001	0		0.07
1.083	0.03	0.02	0.001	0		0.07
1.100	0.03	0.02	0.001	0		0.07
1.117	0.03	0.02	0.001	0		0.07
1.133	0.03	0.02	0.001	0		0.07
1.150	0.03	0.02	0.001	0		0.07
1.167	0.03	0.02	0.001	0		0.08
1.183	0.03	0.02	0.001	0		0.08
1.200	0.03	0.02	0.001	0		0.08
1.217	0.03	0.02	0.001	0		0.08

						PRIADET			
1.233	0.03	0.02	0.001	0					0.08
1.250	0.03	0.02	0.001	0					0.08
1.267	0.03	0.02	0.001	0					0.08
1.283	0.03	0.02	0.001	0					0.08
1.300	0.03	0.02	0.001	0					0.08
1.317	0.03	0.03	0.001	0					0.08
1.333	0.03	0.03	0.001	0					0.08
1.350	0.03	0.03	0.001	0					0.08
1.367	0.03	0.03	0.001	0					0.08
1.383	0.03	0.03	0.001	0					0.08
1.400	0.03	0.03	0.001	0					0.08
1.417	0.03	0.03	0.001	0					0.08
1.433	0.03	0.03	0.001	0					0.08
1.450	0.03	0.03	0.001	0					0.08
1.467	0.03	0.03	0.001	0					0.08
1.483	0.03	0.03	0.001	0					0.08
1.500	0.03	0.03	0.001	0					0.08
1.517	0.03	0.03	0.001	0					0.08
1.533	0.03	0.03	0.001	0					0.08
1.550	0.03	0.03	0.001	0					0.09
1.567	0.03	0.03	0.001	0					0.09
1.583	0.03	0.03	0.001	0					0.09
1.600	0.03	0.03	0.001	0					0.09
1.617	0.03	0.03	0.001	0					0.09
1.633	0.03	0.03	0.001	0					0.09
1.650	0.03	0.03	0.001	0					0.09
1.667	0.03	0.03	0.001	0					0.09
1.683	0.03	0.03	0.001	OI					0.09
1.700	0.03	0.03	0.001	OI					0.09
1.717	0.03	0.03	0.001	OI					0.09
1.733	0.03	0.03	0.001	OI					0.09
1.750	0.03	0.03	0.001	OI					0.09
1.767	0.03	0.03	0.001	OI					0.09
1.783	0.03	0.03	0.001	OI					0.09
1.800	0.03	0.03	0.001	OI					0.09
1.817	0.03	0.03	0.001	OI					0.09
1.833	0.03	0.03	0.001	OI					0.09
1.850	0.03	0.03	0.001	OI					0.09
1.867	0.03	0.03	0.001	OI					0.09
1.883	0.03	0.03	0.001	OI					0.09
1.900	0.03	0.03	0.001	OI					0.09
1.917	0.03	0.03	0.001	OI					0.09
1.933	0.03	0.03	0.001	OI					0.10
1.950	0.03	0.03	0.001	OI					0.10
1.967	0.03	0.03	0.001	OI					0.10
1.983	0.03	0.03	0.001	OI					0.10
2.000	0.03	0.03	0.001	OI					0.10
2.017	0.03	0.03	0.001	OI					0.10
2.033	0.04	0.03	0.001	OI					0.10
2.050	0.04	0.03	0.001	OI					0.10
2.067	0.04	0.03	0.001	OI					0.10
2.083	0.04	0.03	0.001	OI					0.10
2.100	0.04	0.03	0.001	0					0.10
2.117	0.04	0.03	0.001	0					0.10
2.133	0.04	0.03	0.001	0					0.10
2.150	0.04	0.03	0.001	0					0.10
2.167	0.04	0.03	0.001	0					0.10
2.183	0.04	0.03	0.001	0					0.10
2.200	0.04	0.03	0.001	0					0.10
2.217	0.04	0.03	0.001	0					0.10
2.233	0.04	0.03	0.001	0					0.10
2.250	0.04	0.03	0.001	0					0.10
2.267	0.04	0.03	0.001	0					0.11
2.283	0.04	0.03	0.001	0					0.11
2.300	0.04	0.03	0.001	0					0.11
2.317	0.04	0.03	0.001	0					0.11
2.333	0.04	0.03	0.001	0					0.11
2.350	0.04	0.03	0.001	0					0.11

						PRIADET			
2.367	0.04	0.03	0.001	0					0.11
2.383	0.04	0.03	0.001	0					0.11
2.400	0.04	0.03	0.001	0					0.11
2.417	0.04	0.03	0.001	0					0.11
2.433	0.04	0.04	0.001	0					0.11
2.450	0.04	0.04	0.001	0					0.11
2.467	0.04	0.04	0.001	0					0.11
2.483	0.04	0.04	0.001	0					0.11
2.500	0.04	0.04	0.001	0					0.11
2.517	0.04	0.04	0.001	0					0.11
2.533	0.04	0.04	0.001	0					0.11
2.550	0.04	0.04	0.001	0					0.12
2.567	0.04	0.04	0.001	0					0.12
2.583	0.04	0.04	0.001	0					0.12
2.600	0.04	0.04	0.001	0					0.12
2.617	0.04	0.04	0.001	0					0.12
2.633	0.04	0.04	0.001	0					0.12
2.650	0.04	0.04	0.001	0					0.12
2.667	0.04	0.04	0.001	0					0.12
2.683	0.04	0.04	0.001	0					0.12
2.700	0.05	0.04	0.001	0					0.12
2.717	0.05	0.04	0.001	0					0.12
2.733	0.05	0.04	0.001	0					0.12
2.750	0.05	0.04	0.001	0					0.12
2.767	0.05	0.04	0.002	0					0.13
2.783	0.05	0.04	0.002	0					0.13
2.800	0.05	0.04	0.002	0					0.13
2.817	0.05	0.04	0.002	0					0.13
2.833	0.05	0.04	0.002	0					0.13
2.850	0.05	0.04	0.002	0					0.13
2.867	0.05	0.04	0.002	0					0.13
2.883	0.05	0.04	0.002	0					0.13
2.900	0.05	0.04	0.002	0					0.13
2.917	0.05	0.04	0.002	0					0.13
2.933	0.05	0.04	0.002	0					0.13
2.950	0.05	0.04	0.002	0					0.14
2.967	0.05	0.04	0.002	0					0.14
2.983	0.05	0.04	0.002	0					0.14
3.000	0.05	0.04	0.002	0					0.14
3.017	0.05	0.04	0.002	0					0.14
3.033	0.05	0.04	0.002	0					0.14
3.050	0.06	0.04	0.002	0					0.14
3.067	0.06	0.05	0.002	0					0.14
3.083	0.06	0.05	0.002	0					0.14
3.100	0.06	0.05	0.002	0					0.15
3.117	0.06	0.05	0.002	0					0.15
3.133	0.06	0.05	0.002	0					0.15
3.150	0.06	0.05	0.002	0					0.15
3.167	0.06	0.05	0.002	0					0.15
3.183	0.06	0.05	0.002	0					0.15
3.200	0.06	0.05	0.002	0					0.15
3.217	0.06	0.05	0.002	0					0.15
3.233	0.06	0.05	0.002	0					0.16
3.250	0.06	0.05	0.002	OI					0.16
3.267	0.06	0.05	0.002	OI					0.16
3.283	0.07	0.05	0.002	OI					0.16
3.300	0.07	0.05	0.002	OI					0.16
3.317	0.07	0.05	0.002	OI					0.16
3.333	0.07	0.05	0.002	OI					0.17
3.350	0.07	0.05	0.002	OI					0.17
3.367	0.07	0.05	0.002	OI					0.17
3.383	0.07	0.05	0.002	OI					0.17
3.400	0.07	0.05	0.002	OI					0.17
3.417	0.07	0.06	0.002	OI					0.18
3.433	0.08	0.06	0.002	OI					0.18
3.450	0.08	0.06	0.002	OI					0.18
3.467	0.08	0.06	0.002	OI					0.18
3.483	0.08	0.06	0.002	OI					0.18

						PR1ADET							
3.500	0.08	0.06	0.002	OI									0.19
3.517	0.08	0.06	0.002	OI									0.19
3.533	0.08	0.06	0.002	OI									0.19
3.550	0.09	0.06	0.002	OI									0.19
3.567	0.09	0.06	0.002	OI									0.20
3.583	0.09	0.06	0.002	O									0.20
3.600	0.09	0.06	0.002	O									0.20
3.617	0.09	0.07	0.002	O									0.21
3.633	0.09	0.07	0.003	OI									0.21
3.650	0.10	0.07	0.003	OI									0.21
3.667	0.10	0.07	0.003	OI									0.22
3.683	0.10	0.07	0.003	OI									0.22
3.700	0.11	0.07	0.003	OI									0.22
3.717	0.11	0.07	0.003	OI									0.23
3.733	0.12	0.07	0.003	OI									0.23
3.750	0.12	0.08	0.003	OI									0.24
3.767	0.12	0.08	0.003	OI									0.24
3.783	0.13	0.08	0.003	O I									0.25
3.800	0.13	0.08	0.003	O I									0.25
3.817	0.13	0.08	0.003	O I									0.26
3.833	0.14	0.08	0.003	O I									0.27
3.850	0.15	0.08	0.003	O I									0.27
3.867	0.16	0.09	0.003	O I									0.28
3.883	0.17	0.09	0.003	O I									0.29
3.900	0.19	0.09	0.004	O I									0.30
3.917	0.20	0.09	0.004	O I									0.31
3.933	0.22	0.10	0.004	O I									0.33
3.950	0.23	0.10	0.004	O I									0.34
3.967	0.25	0.10	0.004	O I									0.36
3.983	0.27	0.11	0.004	O I									0.37
4.000	0.28	0.11	0.005	O I									0.39
4.017	0.43	0.12	0.005	O		I							0.42
4.033	0.57	0.13	0.006	O			I						0.46
4.050	0.72	0.14	0.006	O				I					0.53
4.067	0.86	0.15	0.007	O					I				0.62
4.083	1.01	0.17	0.008	O						I			0.72
4.100	0.84	0.18	0.009	O						I			0.83
4.117	0.67	0.19	0.010	O				I					0.90
4.133	0.50	0.20	0.011	O		I							0.96
4.150	0.33	0.21	0.011	O			I						0.99
4.167	0.16	0.21	0.011	IO									0.99
4.183	0.15	0.20	0.011	I O I		I		I		I			0.99
4.200	0.14	0.20	0.011	I O									0.98
4.217	0.13	0.20	0.011	I O									0.97
4.233	0.12	0.20	0.011	I O									0.96
4.250	0.11	0.20	0.010	I O									0.94
4.267	0.10	0.20	0.010	I O									0.93
4.283	0.10	0.20	0.010	I O									0.92
4.300	0.09	0.19	0.010	I O									0.90
4.317	0.09	0.19	0.010	I O									0.89
4.333	0.08	0.19	0.010	I O									0.88
4.350	0.08	0.19	0.010	I O									0.86
4.367	0.08	0.19	0.009	I O									0.85
4.383	0.08	0.18	0.009	I O									0.83
4.400	0.07	0.18	0.009	I O									0.82
4.417	0.07	0.18	0.009	I O									0.80
4.433	0.07	0.18	0.009	I O									0.79
4.450	0.07	0.17	0.009	I O									0.77
4.467	0.06	0.17	0.009	I O									0.76
4.483	0.06	0.17	0.008	I O									0.74
4.500	0.06	0.17	0.008	I O									0.73
4.517	0.06	0.17	0.008	I O									0.71
4.533	0.06	0.16	0.008	I O									0.70
4.550	0.06	0.16	0.008	I O									0.68
4.567	0.06	0.16	0.008	I O									0.67
4.583	0.05	0.16	0.008	I O									0.66
4.600	0.05	0.16	0.007	I O									0.64
4.617	0.05	0.15	0.007	I O									0.63

Maximum Detention
Depth: 1.0'

						PRIADET						
4.633	0.05	0.15	0.007	I	0							0.61
4.650	0.05	0.15	0.007	I	0							0.60
4.667	0.05	0.15	0.007	I	0							0.59
4.683	0.05	0.15	0.007	I	0							0.57
4.700	0.05	0.14	0.007	I	0							0.56
4.717	0.05	0.14	0.006	I	0							0.55
4.733	0.05	0.14	0.006	I	0							0.53
4.750	0.05	0.14	0.006	I	0							0.52
4.767	0.04	0.14	0.006	I	0							0.51
4.783	0.04	0.14	0.006	I	0							0.50
4.800	0.04	0.13	0.006	I	0							0.49
4.817	0.04	0.13	0.006	I	0							0.48
4.833	0.04	0.13	0.006	I	0							0.47
4.850	0.04	0.13	0.005	I	0							0.46
4.867	0.04	0.12	0.005	I	0							0.45
4.883	0.04	0.12	0.005	I	0							0.44
4.900	0.04	0.12	0.005	I	0							0.43
4.917	0.04	0.12	0.005	I	0							0.42
4.933	0.04	0.12	0.005	I	0							0.41
4.950	0.04	0.11	0.005	I	0							0.40
4.967	0.04	0.11	0.005	I	0							0.39
4.983	0.04	0.11	0.005	I	0							0.38
5.000	0.04	0.11	0.005	I	0							0.38
5.017	0.04	0.11	0.004	I	0							0.37
5.033	0.04	0.10	0.004	I	0							0.36
5.050	0.04	0.10	0.004	I	0							0.35
5.067	0.04	0.10	0.004	I	0							0.34
5.083	0.04	0.10	0.004	I	0							0.34
5.100	0.03	0.10	0.004	I	0							0.33
5.117	0.03	0.10	0.004	I	0							0.32
5.133	0.03	0.09	0.004	IO								0.32
5.150	0.03	0.09	0.004	IO								0.31
5.167	0.03	0.09	0.004	IO								0.30
5.183	0.03	0.09	0.004	IO								0.30
5.200	0.03	0.09	0.003	IO								0.29
5.217	0.03	0.09	0.003	IO								0.28
5.233	0.03	0.09	0.003	IO								0.28
5.250	0.03	0.08	0.003	IO								0.27
5.267	0.03	0.08	0.003	IO								0.27
5.283	0.03	0.08	0.003	I	0							0.26
5.300	0.03	0.08	0.003	I	0							0.25
5.317	0.03	0.08	0.003	I	0							0.25
5.333	0.03	0.08	0.003	I	0							0.24
5.350	0.03	0.08	0.003	I	0							0.24
5.367	0.03	0.07	0.003	I	0							0.23
5.383	0.03	0.07	0.003	I	0							0.23
5.400	0.03	0.07	0.003	I	0							0.22
5.417	0.03	0.07	0.003	I	0							0.22
5.433	0.03	0.07	0.003	I	0							0.21
5.450	0.03	0.07	0.003	I	0							0.21
5.467	0.03	0.06	0.002	I	0							0.21
5.483	0.03	0.06	0.002	I	0							0.20
5.500	0.03	0.06	0.002	IO								0.20
5.517	0.03	0.06	0.002	IO								0.19
5.533	0.03	0.06	0.002	IO								0.19
5.550	0.03	0.06	0.002	IO								0.19
5.567	0.03	0.06	0.002	IO								0.18
5.583	0.03	0.06	0.002	IO								0.18
5.600	0.03	0.06	0.002	IO								0.18
5.617	0.03	0.05	0.002	IO								0.17
5.633	0.03	0.05	0.002	IO								0.17
5.650	0.03	0.05	0.002	IO								0.17
5.667	0.03	0.05	0.002	IO								0.16
5.683	0.03	0.05	0.002	IO								0.16
5.700	0.03	0.05	0.002	IO								0.16
5.717	0.03	0.05	0.002	IO								0.16
5.733	0.03	0.05	0.002	IO								0.15
5.750	0.03	0.05	0.002	IO								0.15

					PRIADET		
5.767	0.03	0.05	0.002	IO			0.15
5.783	0.03	0.05	0.002	IO			0.15
5.800	0.02	0.05	0.002	IO			0.14
5.817	0.02	0.04	0.002	IO			0.14
5.833	0.02	0.04	0.002	IO			0.14
5.850	0.02	0.04	0.002	IO			0.14
5.867	0.02	0.04	0.002	IO			0.13
5.883	0.02	0.04	0.002	IO			0.13
5.900	0.02	0.04	0.002	IO			0.13
5.917	0.02	0.04	0.002	IO			0.13
5.933	0.02	0.04	0.002	IO			0.13
5.950	0.02	0.04	0.001	IO			0.12
5.967	0.02	0.04	0.001	IO			0.12
5.983	0.02	0.04	0.001	IO			0.12
6.000	0.02	0.04	0.001	IO			0.12
6.017	0.02	0.04	0.001	IO			0.12
6.033	0.02	0.04	0.001	IO			0.12
6.050	0.02	0.04	0.001	IO			0.11
6.067	0.02	0.04	0.001	IO			0.11
6.083	0.02	0.04	0.001	IO			0.11
6.100	0.00	0.03	0.001	IO			0.11
6.117	0.00	0.03	0.001	IO			0.10
6.133	0.00	0.03	0.001	IO			0.10
6.150	0.00	0.03	0.001	O			0.10
6.167	0.00	0.03	0.001	O			0.09
6.183	0.00	0.03	0.001	O			0.09
6.200	0.00	0.03	0.001	O			0.09
6.217	0.00	0.03	0.001	O			0.08
6.233	0.00	0.03	0.001	O			0.08
6.250	0.00	0.02	0.001	O			0.08
6.267	0.00	0.02	0.001	O			0.08
6.283	0.00	0.02	0.001	O			0.07
6.300	0.00	0.02	0.001	O			0.07
6.317	0.00	0.02	0.001	O			0.07
6.333	0.00	0.02	0.001	O			0.07
6.350	0.00	0.02	0.001	O			0.06
6.367	0.00	0.02	0.001	O			0.06
6.383	0.00	0.02	0.001	O			0.06
6.400	0.00	0.02	0.001	O			0.06
6.417	0.00	0.02	0.001	O			0.05
6.433	0.00	0.02	0.001	O			0.05
6.450	0.00	0.02	0.001	O			0.05
6.467	0.00	0.02	0.001	O			0.05
6.483	0.00	0.01	0.001	O			0.05
6.500	0.00	0.01	0.001	O			0.05
6.517	0.00	0.01	0.001	O			0.04
6.533	0.00	0.01	0.001	O			0.04
6.550	0.00	0.01	0.000	O			0.04
6.567	0.00	0.01	0.000	O			0.04
6.583	0.00	0.01	0.000	O			0.04
6.600	0.00	0.01	0.000	O			0.04
6.617	0.00	0.01	0.000	O			0.04
6.633	0.00	0.01	0.000	O			0.03
6.650	0.00	0.01	0.000	O			0.03
6.667	0.00	0.01	0.000	O			0.03
6.683	0.00	0.01	0.000	O			0.03
6.700	0.00	0.01	0.000	O			0.03
6.717	0.00	0.01	0.000	O			0.03
6.733	0.00	0.01	0.000	O			0.03
6.750	0.00	0.01	0.000	O			0.03
6.767	0.00	0.01	0.000	O			0.03
6.783	0.00	0.01	0.000	O			0.02
6.800	0.00	0.01	0.000	O			0.02
6.817	0.00	0.01	0.000	O			0.02
6.833	0.00	0.01	0.000	O			0.02
6.850	0.00	0.01	0.000	O			0.02
6.867	0.00	0.01	0.000	O			0.02
6.883	0.00	0.01	0.000	O			0.02

				PR1ADET			
6.900	0.00	0.01	0.000	0			0.02
6.917	0.00	0.01	0.000	0			0.02
6.933	0.00	0.01	0.000	0			0.02
6.950	0.00	0.01	0.000	0			0.02
6.967	0.00	0.01	0.000	0			0.02
6.983	0.00	0.01	0.000	0			0.02
7.000	0.00	0.00	0.000	0			0.02
7.017	0.00	0.00	0.000	0			0.01
7.033	0.00	0.00	0.000	0			0.01
7.050	0.00	0.00	0.000	0			0.01
7.067	0.00	0.00	0.000	0			0.01
7.083	0.00	0.00	0.000	0			0.01
7.100	0.00	0.00	0.000	0			0.01
7.117	0.00	0.00	0.000	0			0.01
7.133	0.00	0.00	0.000	0			0.01
7.150	0.00	0.00	0.000	0			0.01
7.167	0.00	0.00	0.000	0			0.01
7.183	0.00	0.00	0.000	0			0.01
7.200	0.00	0.00	0.000	0			0.01
7.217	0.00	0.00	0.000	0			0.01
7.233	0.00	0.00	0.000	0			0.01
7.250	0.00	0.00	0.000	0			0.01
7.267	0.00	0.00	0.000	0			0.01
7.283	0.00	0.00	0.000	0			0.01
7.300	0.00	0.00	0.000	0			0.01
7.317	0.00	0.00	0.000	0			0.01
7.333	0.00	0.00	0.000	0			0.01
7.350	0.00	0.00	0.000	0			0.01
7.367	0.00	0.00	0.000	0			0.01
7.383	0.00	0.00	0.000	0			0.01
7.400	0.00	0.00	0.000	0			0.01
7.417	0.00	0.00	0.000	0			0.01
7.433	0.00	0.00	0.000	0			0.01
7.450	0.00	0.00	0.000	0			0.01
7.467	0.00	0.00	0.000	0			0.01
7.483	0.00	0.00	0.000	0			0.01
7.500	0.00	0.00	0.000	0			0.01
7.517	0.00	0.00	0.000	0			0.00
7.533	0.00	0.00	0.000	0			0.00
7.550	0.00	0.00	0.000	0			0.00
7.567	0.00	0.00	0.000	0			0.00
7.583	0.00	0.00	0.000	0			0.00
7.600	0.00	0.00	0.000	0			0.00
7.617	0.00	0.00	0.000	0			0.00
7.633	0.00	0.00	0.000	0			0.00
7.650	0.00	0.00	0.000	0			0.00
7.667	0.00	0.00	0.000	0			0.00
7.683	0.00	0.00	0.000	0			0.00
7.700	0.00	0.00	0.000	0			0.00
7.717	0.00	0.00	0.000	0			0.00
7.733	0.00	0.00	0.000	0			0.00

```

*****HYDROGRAPH DATA*****
Number of intervals = 464
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 0.206 (CFS)
Total volume = 0.032 (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
*****

```

Detained Outflow

PR1

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 12/16/20

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
6 hour, precipitation(inches) = 3.700
24 hour precipitation(inches) = 8.200
P6/P24 = 45.1%
San Diego hydrology manual 'C' values used

Process from Point/Station 101.000 to Point/Station 102.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.300
Rainfall intensity (I) = 6.242(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 9.98 min. Rain intensity = 6.24(In/Hr)
Total area = 0.142(Ac.) Total runoff = 0.206(CFS)

Process from Point/Station 102.000 to Point/Station 103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1345.800(Ft.)
Downstream point/station elevation = 1345.400(Ft.)
Pipe length = 70.00(Ft.) Slope = 0.0057 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.206(CFS)
Nearest computed pipe diameter = 6.00(In.)
Calculated individual pipe flow = 0.206(CFS)
Normal flow depth in pipe = 2.95(In.)
Flow top width inside pipe = 6.00(In.)
Critical Depth = 2.73(In.)
Pipe flow velocity = 2.14(Ft/s)
Travel time through pipe = 0.54 min.
Time of concentration (TC) = 10.52 min.

Process from Point/Station 102.000 to Point/Station 103.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

PR1

In Main Stream number: 1
Stream flow area = 0.142(Ac.)
Runoff from this stream = 0.206(CFS)
Time of concentration = 10.52 min.
Rainfall intensity = 6.032(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 104.000 to Point/Station 105.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[INDUSTRIAL area type]
(Limited Industrial)
Impervious value, Ai = 0.900
Sub-Area C Value = 0.840
Initial subarea total flow distance = 33.000(Ft.)
Highest elevation = 1347.300(Ft.)
Lowest elevation = 1347.100(Ft.)
Elevation difference = 0.200(Ft.) Slope = 0.606 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of 0.61 %, in a development type of
Limited Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration = 3.91 minutes
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$
TC = $[1.8 * (1.1 - 0.8400) * (50.000^{.5})] / (0.606^{(1/3)}) = 3.91$
Calculated TC of 3.911 minutes is less than 5 minutes,
resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.840
Subarea runoff = 1.056(CFS)
Total initial stream area = 0.129(Ac.)

Process from Point/Station 105.000 to Point/Station 103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.183(Ft.), Average velocity = 1.980(Ft/s)
!!Warning: Water is above left or right bank elevations
***** Irregular Channel Data *****

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 0.10
2 2.00 0.00
3 4.00 0.10
Manning's 'N' friction factor = 0.013

Sub-Channel flow = 1.056(CFS)
' ' flow top width = 4.000(Ft.)
' ' velocity = 1.980(Ft/s)
' ' area = 0.533(Sq.Ft)
' ' Froude number = 0.956

Upstream point elevation = 1347.100(Ft.)
Downstream point elevation = 1346.800(Ft.)
Flow length = 68.000(Ft.)
Travel time = 0.57 min.
Time of concentration = 4.48 min.
Depth of flow = 0.183(Ft.)
Average velocity = 1.980(Ft/s)

PR1

Total irregular channel flow = 1.056(CFS)
Irregular channel normal depth above invert elev. = 0.183(Ft.)
Average velocity of channel(s) = 1.980(Ft/s)
!!Warning: Water is above left or right bank elevations

++++
Process from Point/Station 105.000 to Point/Station 103.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
Stream flow area = 0.129(Ac.)
Runoff from this stream = 1.056(CFS)
Time of concentration = 4.48 min.
Rainfall intensity = 9.749(In/Hr)
Summary of stream data:

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

1	0.206	10.52	6.032
2	1.056	4.48	9.749

Qmax(1) =
1.000 * 1.000 * 0.206) +
0.619 * 1.000 * 1.056) + = 0.860
Qmax(2) =
1.000 * 0.426 * 0.206) +
1.000 * 1.000 * 1.056) + = 1.144

Total of 2 main streams to confluence:
Flow rates before confluence point:
0.206 1.056
Maximum flow rates at confluence using above data:
0.860 1.144
Area of streams before confluence:
0.142 0.129

Results of confluence:
Total flow rate = 1.144(CFS)
Time of concentration = 4.483 min.
Effective stream area after confluence = 0.271(Ac.)

++++
Process from Point/Station 103.000 to Point/Station 106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1345.400(Ft.)
Downstream point/station elevation = 1344.600(Ft.)
Pipe length = 157.00(Ft.) Slope = 0.0051 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.144(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.144(CFS)
Normal flow depth in pipe = 7.14(In.)
Flow top width inside pipe = 7.29(In.)
Critical Depth = 5.90(In.)
Pipe flow velocity = 3.05(Ft/s)
Travel time through pipe = 0.86 min.
Time of concentration (TC) = 5.34 min.

++++
Process from Point/Station 103.000 to Point/Station 106.000
**** CONFLUENCE OF MAIN STREAMS ****

PR1

The following data inside Main Stream is listed:

In Main Stream number: 1

Stream flow area = 0.271(Ac.)

Runoff from this stream = 1.144(CFS)

Time of concentration = 5.34 min.

Rainfall intensity = 9.341(In/Hr)

Program is now starting with Main Stream No. 2

Process from Point/Station 107.000 to Point/Station 108.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 1.000

Decimal fraction soil group D = 0.000

[INDUSTRIAL area type]

(General Industrial)

Impervious value, Ai = 0.950

Sub-Area C Value = 0.870

Initial subarea total flow distance = 87.000(Ft.)

Highest elevation = 1360.000(Ft.)

Lowest elevation = 1359.100(Ft.)

Elevation difference = 0.900(Ft.) Slope = 1.034 %

INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:

The maximum overland flow distance is 60.00 (Ft)

for the top area slope value of 1.03 %, in a development type of
General Industrial

In Accordance With Figure 3-3

Initial Area Time of Concentration = 3.17 minutes

$TC = [1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$

$TC = [1.8 * (1.1 - 0.8700) * (60.000^{.5})] / (1.034^{(1/3)}) = 3.17$

The initial area total distance of 87.00 (Ft.) entered leaves a
remaining distance of 27.00 (Ft.)

Using Figure 3-4, the travel time for this distance is 0.57 minutes

for a distance of 27.00 (Ft.) and a slope of 1.03 %

with an elevation difference of 0.28(Ft.) from the end of the top area

$Tt = [11.9 * \text{length}(\text{Mi})^3] / (\text{elevation change}(\text{Ft.}))^{.385} * 60(\text{min/hr})$
= 0.574 Minutes

$Tt = [(11.9 * 0.0051^3) / (0.28)]^{.385} = 0.57$

Total initial area Ti = 3.17 minutes from Figure 3-3 formula plus

0.57 minutes from the Figure 3-4 formula = 3.75 minutes

Calculated TC of 3.746 minutes is less than 5 minutes,

resetting TC to 5.0 minutes for rainfall intensity calculations

Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.870

Subarea runoff = 0.941(CFS)

Total initial stream area = 0.111(Ac.)

Process from Point/Station 108.000 to Point/Station 106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1344.700(Ft.)

Downstream point/station elevation = 1344.600(Ft.)

Pipe length = 4.00(Ft.) Slope = 0.0250 Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 0.941(CFS)

Nearest computed pipe diameter = 9.00(In.)

Calculated individual pipe flow = 0.941(CFS)

Normal flow depth in pipe = 3.73(In.)

Flow top width inside pipe = 8.87(In.)

Critical Depth = 5.34(In.)

Pipe flow velocity = 5.44(Ft/s)

Travel time through pipe = 0.01 min.

Time of concentration (TC) = 3.76 min.

+++++
 Process from Point/Station 108.000 to Point/Station 106.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 0.111(Ac.)
 Runoff from this stream = 0.941(CFS)
 Time of concentration = 3.76 min.
 Rainfall intensity = 9.749(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	1.144	5.34	9.341
2	0.941	3.76	9.749
Qmax(1) =			
	1.000 *	1.000 *	1.144) +
	0.958 *	1.000 *	0.941) + = 2.046
Qmax(2) =			
	1.000 *	0.703 *	1.144) +
	1.000 *	1.000 *	0.941) + = 1.746

Total of 2 main streams to confluence:

Flow rates before confluence point:

1.144 0.941

Maximum flow rates at confluence using above data:

2.046 1.746

Area of streams before confluence:

0.271 0.111

Results of confluence:

Total flow rate = 2.046(CFS)

Time of concentration = 5.342 min.

Effective stream area after confluence = 0.382(Ac.)

+++++
 Process from Point/Station 106.000 to Point/Station 109.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1344.600(Ft.)
 Downstream point/station elevation = 1344.500(Ft.)
 Pipe length = 34.00(Ft.) Slope = 0.0029 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.046(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 2.046(CFS)
 Normal flow depth in pipe = 8.24(In.)
 Flow top width inside pipe = 14.93(In.)
 Critical Depth = 6.83(In.)
 Pipe flow velocity = 2.97(Ft/s)
 Travel time through pipe = 0.19 min.
 Time of concentration (TC) = 5.53 min.

+++++
 Process from Point/Station 106.000 to Point/Station 109.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
 Stream flow area = 0.382(Ac.)
 Runoff from this stream = 2.046(CFS)
 Time of concentration = 5.53 min.

PR1

Rainfall intensity = 9.132(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 110.000 to Point/Station 111.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[INDUSTRIAL area type]
(General Industrial)
Impervious value, Ai = 0.950
Sub-Area C Value = 0.870
Initial subarea total flow distance = 17.000(Ft.)
Highest elevation = 1347.300(Ft.)
Lowest elevation = 1347.200(Ft.)
Elevation difference = 0.100(Ft.) Slope = 0.588 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of 0.59 %, in a development type of
General Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration = 3.49 minutes
TC = $[1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5}] / (\% \text{ slope}^{(1/3)})]$
TC = $[1.8 * (1.1 - 0.8700) * (50.000^{.5})] / (0.588^{(1/3)}) = 3.49$
Calculated TC of 3.494 minutes is less than 5 minutes,
resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff = 1.145(CFS)
Total initial stream area = 0.135(Ac.)

Process from Point/Station 111.000 to Point/Station 109.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow = 0.181(Ft.), Average velocity = 2.183(Ft/s)
!!Warning: Water is above left or right bank elevations
***** Irregular Channel Data *****

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 0.10
2 2.00 0.00
3 4.00 0.10

Manning's 'N' friction factor = 0.013

Sub-Channel flow = 1.145(CFS)
' ' flow top width = 4.000(Ft.)
' ' velocity = 2.183(Ft/s)
' ' area = 0.524(Sq.Ft)
' ' Froude number = 1.063

Upstream point elevation = 1347.200(Ft.)
Downstream point elevation = 1346.300(Ft.)
Flow length = 164.000(Ft.)
Travel time = 1.25 min.
Time of concentration = 4.75 min.
Depth of flow = 0.181(Ft.)
Average velocity = 2.183(Ft/s)
Total irregular channel flow = 1.145(CFS)
Irregular channel normal depth above invert elev. = 0.181(Ft.)
Average velocity of channel(s) = 2.183(Ft/s)
!!Warning: Water is above left or right bank elevations

 Process from Point/Station 111.000 to Point/Station 109.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 0.135(Ac.)
 Runoff from this stream = 1.145(CFS)
 Time of concentration = 4.75 min.
 Rainfall intensity = 9.749(In/Hr)
 Summary of stream data:

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

1	2.046	5.53	9.132
2	1.145	4.75	9.749

Q_{max}(1) =
 1.000 * 1.000 * 2.046) +
 0.937 * 1.000 * 1.145) + = 3.119

Q_{max}(2) =
 1.000 * 0.858 * 2.046) +
 1.000 * 1.000 * 1.145) + = 2.900

Total of 2 main streams to confluence:

Flow rates before confluence point:

2.046 1.145

Maximum flow rates at confluence using above data:

3.119 2.900

Area of streams before confluence:

0.382 0.135

Results of confluence:

Total flow rate = 3.119(CFS)

Time of concentration = 5.533 min.

Effective stream area after confluence = 0.517(Ac.)

 Process from Point/Station 109.000 to Point/Station 112.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1344.500(Ft.)
 Downstream point/station elevation = 1344.400(Ft.)
 Pipe length = 2.00(Ft.) Slope = 0.0500 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 3.119(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 3.119(CFS)
 Normal flow depth in pipe = 6.33(In.)
 Flow top width inside pipe = 8.22(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 9.39(Ft/s)
 Travel time through pipe = 0.00 min.
 Time of concentration (TC) = 5.54 min.

 Process from Point/Station 109.000 to Point/Station 112.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1
 Stream flow area = 0.517(Ac.)
 Runoff from this stream = 3.119(CFS)

PR1

Time of concentration = 5.54 min.
Rainfall intensity = 9.128(In/Hr)
Program is now starting with Main Stream No. 2

+++++
Process from Point/Station 113.000 to Point/Station 114.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 1.000
Decimal fraction soil group D = 0.000
[INDUSTRIAL area type]
(General Industrial)
Impervious value, Ai = 0.950
Sub-Area C Value = 0.870
Initial subarea total flow distance = 74.000(Ft.)
Highest elevation = 1347.300(Ft.)
Lowest elevation = 1345.300(Ft.)
Elevation difference = 2.000(Ft.) Slope = 2.703 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 80.00 (Ft)
for the top area slope value of 2.70 %, in a development type of
General Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration = 2.66 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5}] / (\% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.8700) * (80.000^{.5})] / (2.703^{(1/3)}) = 2.66$
Calculated TC of 2.658 minutes is less than 5 minutes,
resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff = 0.941(CFS)
Total initial stream area = 0.111(Ac.)

+++++
Process from Point/Station 114.000 to Point/Station 112.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1344.800(Ft.)
Downstream point/station elevation = 1344.400(Ft.)
Pipe length = 78.00(Ft.) Slope = 0.0051 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.941(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 0.941(CFS)
Normal flow depth in pipe = 6.06(In.)
Flow top width inside pipe = 8.44(In.)
Critical Depth = 5.34(In.)
Pipe flow velocity = 2.98(Ft/s)
Travel time through pipe = 0.44 min.
Time of concentration (TC) = 3.10 min.

+++++
Process from Point/Station 114.000 to Point/Station 112.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 0.111(Ac.)
Runoff from this stream = 0.941(CFS)
Time of concentration = 3.10 min.
Rainfall intensity = 9.749(In/Hr)
Program is now starting with Main Stream No. 3

PR1

 Process from Point/Station 115.000 to Point/Station 116.000
 **** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 1.000
 Decimal fraction soil group D = 0.000
 [INDUSTRIAL area type]
 (General Industrial)
 Impervious value, Ai = 0.950
 Sub-Area C Value = 0.870
 Initial subarea total flow distance = 27.000(Ft.)
 Highest elevation = 1347.100(Ft.)
 Lowest elevation = 1346.800(Ft.)
 Elevation difference = 0.300(Ft.) Slope = 1.111 %
 Top of Initial Area Slope adjusted by User to 4.815 %
 INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
 The maximum overland flow distance is 90.00 (Ft)
 for the top area slope value of 4.82 %, in a development type of
 General Industrial
 In Accordance With Figure 3-3
 Initial Area Time of Concentration = 2.33 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5}] / (\% slope^{(1/3)})$
 $TC = [1.8 * (1.1 - 0.8700) * (90.000^{.5})] / (4.815^{(1/3)}) = 2.33$
 Calculated TC of 2.326 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
 Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
 Subarea runoff = 0.161(CFS)
 Total initial stream area = 0.019(Ac.)

 Process from Point/Station 116.000 to Point/Station 112.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 1345.800(Ft.)
 Downstream point/station elevation = 1344.000(Ft.)
 Pipe length = 60.00(Ft.) Slope = 0.0300 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 0.161(CFS)
 Nearest computed pipe diameter = 6.00(In.)
 Calculated individual pipe flow = 0.161(CFS)
 Normal flow depth in pipe = 1.66(In.)
 Flow top width inside pipe = 5.37(In.)
 Critical Depth = 2.40(In.)
 Pipe flow velocity = 3.67(Ft/s)
 Travel time through pipe = 0.27 min.
 Time of concentration (TC) = 2.60 min.

 Process from Point/Station 116.000 to Point/Station 112.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 3
 Stream flow area = 0.019(Ac.)
 Runoff from this stream = 0.161(CFS)
 Time of concentration = 2.60 min.
 Rainfall intensity = 9.749(In/Hr)
 Summary of stream data:

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

1	3.119	5.54	9.128
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PR1

2	0.941	3.10	9.749
3	0.161	2.60	9.749

Qmax(1) =

1.000 *	1.000 *	3.119) +	
0.936 *	1.000 *	0.941) +	
0.936 *	1.000 *	0.161) + =	4.151

Qmax(2) =

1.000 *	0.559 *	3.119) +	
1.000 *	1.000 *	0.941) +	
1.000 *	1.000 *	0.161) + =	2.846

Qmax(3) =

1.000 *	0.469 *	3.119) +	
1.000 *	0.840 *	0.941) +	
1.000 *	1.000 *	0.161) + =	2.415

Total of 3 main streams to confluence:
Flow rates before confluence point:
3.119 0.941 0.161
Maximum flow rates at confluence using above data:
4.151 2.846 2.415
Area of streams before confluence:
0.517 0.111 0.019

Results of confluence:
Total flow rate = 4.151(CFS)
Time of concentration = 5.537 min.
Effective stream area after confluence = 0.647(Ac.)

+++++
Process from Point/Station 109.000 to Point/Station 112.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 4.197(CFS)
Depth of flow = 0.509(Ft.), Average velocity = 1.650(Ft/s)
***** Irregular Channel Data *****

Information entered for subchannel number 1 :
Point number 'X' coordinate 'Y' coordinate
1 0.00 2.00
2 0.00 0.00
3 5.00 0.00
4 5.00 2.00
Manning's 'N' friction factor = 0.035

Sub-Channel flow = 4.197(CFS)
' ' flow top width = 5.000(Ft.)
' ' velocity= 1.650(Ft/s)
' ' area = 2.543(Sq.Ft)
' ' Froude number = 0.408

Upstream point elevation = 1344.400(Ft.)
Downstream point elevation = 1344.000(Ft.)
Flow length = 84.000(Ft.)
Travel time = 0.85 min.
Time of concentration = 6.39 min.
Depth of flow = 0.509(Ft.)
Average velocity = 1.650(Ft/s)
Total irregular channel flow = 4.197(CFS)
Irregular channel normal depth above invert elev. = 0.509(Ft.)
Average velocity of channel(s) = 1.650(Ft/s)
Adding area flow to channel
Rainfall intensity (I) = 8.326(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 = 1.000
Decimal fraction soil group D = 0.000

PR1

[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, $A_i = 0.000$
Sub-Area C Value = 0.300
The area added to the existing stream causes a
a lower flow rate of $Q = 4.123(\text{CFS})$
therefore the upstream flow rate of $Q = 4.151(\text{CFS})$ is being used
Rainfall intensity = 8.326(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
($Q=KCIA$) is $C = 0.703$ $CA = 0.495$
Subarea runoff = 0.000(CFS) for 0.057(Ac.)
Total runoff = 4.151(CFS) Total area = 0.704(Ac.)
Depth of flow = 0.505(Ft.), Average velocity = 1.644(Ft/s)

+++++
Process from Point/Station 112.000 to Point/Station 112.000
**** 6 HOUR HYDROGRAPH ****

+++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003

Time of Concentration = 6.39
Basin Area = 0.70 Acres
6 Hour Rainfall = 3.700 Inches
Runoff Coefficient = 0.703
Peak Discharge = 4.15 CFS

Time (Min)	Discharge (CFS)
0	0.000
6	0.109
12	0.110
18	0.113
24	0.114
30	0.117
36	0.118
42	0.121
48	0.123
54	0.126
60	0.128
66	0.132
72	0.134
78	0.138
84	0.140
90	0.145
96	0.147
102	0.152
108	0.155
114	0.161
120	0.165
126	0.172
132	0.176
138	0.184
144	0.189
150	0.199
156	0.205
162	0.217
168	0.224
174	0.241
180	0.250
186	0.272
192	0.284
198	0.315
204	0.334
210	0.383
216	0.416
222	0.508
228	0.579

PR1

234	0.850
240	1.197
246	4.151
252	0.682
258	0.456
264	0.357
270	0.299
276	0.260
282	0.232
288	0.211
294	0.194
300	0.180
306	0.168
312	0.158
318	0.150
324	0.142
330	0.136
336	0.130
342	0.125
348	0.120
354	0.116
360	0.112
366	0.108

+++++

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	1.0	2.1	3.1	4.2

0+ 0	0.0000	0.00	Q					
0+ 1	0.0000	0.02	Q					
0+ 2	0.0001	0.04	Q					
0+ 3	0.0002	0.05	Q					
0+ 4	0.0003	0.07	Q					
0+ 5	0.0004	0.09	Q					
0+ 6	0.0005	0.11	VQ					
0+ 7	0.0007	0.11	VQ					
0+ 8	0.0008	0.11	VQ					
0+ 9	0.0010	0.11	VQ					
0+10	0.0011	0.11	VQ					
0+11	0.0013	0.11	VQ					
0+12	0.0014	0.11	VQ					
0+13	0.0016	0.11	VQ					
0+14	0.0017	0.11	VQ					
0+15	0.0019	0.11	VQ					
0+16	0.0020	0.11	VQ					
0+17	0.0022	0.11	VQ					
0+18	0.0024	0.11	VQ					
0+19	0.0025	0.11	VQ					
0+20	0.0027	0.11	VQ					
0+21	0.0028	0.11	VQ					
0+22	0.0030	0.11	VQ					
0+23	0.0031	0.11	VQ					
0+24	0.0033	0.11	VQ					
0+25	0.0035	0.11	VQ					
0+26	0.0036	0.12	VQ					
0+27	0.0038	0.12	VQ					
0+28	0.0039	0.12	Q					
0+29	0.0041	0.12	Q					
0+30	0.0043	0.12	Q					
0+31	0.0044	0.12	Q					
0+32	0.0046	0.12	Q					
0+33	0.0047	0.12	Q					
0+34	0.0049	0.12	Q					
0+35	0.0051	0.12	Q					

PR1

0+36	0.0052	0.12	Q				
0+37	0.0054	0.12	Q				
0+38	0.0056	0.12	Q				
0+39	0.0057	0.12	Q				
0+40	0.0059	0.12	Q				
0+41	0.0061	0.12	Q				
0+42	0.0062	0.12	Q				
0+43	0.0064	0.12	Q				
0+44	0.0066	0.12	Q				
0+45	0.0067	0.12	Q				
0+46	0.0069	0.12	Q				
0+47	0.0071	0.12	Q				
0+48	0.0072	0.12	Q				
0+49	0.0074	0.12	Q				
0+50	0.0076	0.12	QV				
0+51	0.0077	0.12	QV				
0+52	0.0079	0.13	QV				
0+53	0.0081	0.13	QV				
0+54	0.0083	0.13	QV				
0+55	0.0084	0.13	QV				
0+56	0.0086	0.13	QV				
0+57	0.0088	0.13	QV				
0+58	0.0090	0.13	QV				
0+59	0.0091	0.13	QV				
1+ 0	0.0093	0.13	QV				
1+ 1	0.0095	0.13	QV				
1+ 2	0.0097	0.13	QV				
1+ 3	0.0099	0.13	QV				
1+ 4	0.0100	0.13	QV				
1+ 5	0.0102	0.13	QV				
1+ 6	0.0104	0.13	QV				
1+ 7	0.0106	0.13	QV				
1+ 8	0.0108	0.13	QV				
1+ 9	0.0109	0.13	QV				
1+10	0.0111	0.13	QV				
1+11	0.0113	0.13	QV				
1+12	0.0115	0.13	Q V				
1+13	0.0117	0.13	Q V				
1+14	0.0119	0.14	Q V				
1+15	0.0121	0.14	Q V				
1+16	0.0122	0.14	Q V				
1+17	0.0124	0.14	Q V				
1+18	0.0126	0.14	Q V				
1+19	0.0128	0.14	Q V				
1+20	0.0130	0.14	Q V				
1+21	0.0132	0.14	Q V				
1+22	0.0134	0.14	Q V				
1+23	0.0136	0.14	Q V				
1+24	0.0138	0.14	Q V				
1+25	0.0140	0.14	Q V				
1+26	0.0142	0.14	Q V				
1+27	0.0144	0.14	Q V				
1+28	0.0145	0.14	Q V				
1+29	0.0147	0.14	Q V				
1+30	0.0149	0.14	Q V				
1+31	0.0151	0.15	Q V				
1+32	0.0153	0.15	Q V				
1+33	0.0155	0.15	Q V				
1+34	0.0157	0.15	Q V				
1+35	0.0160	0.15	Q V				
1+36	0.0162	0.15	Q V				
1+37	0.0164	0.15	Q V				
1+38	0.0166	0.15	Q V				
1+39	0.0168	0.15	Q V				
1+40	0.0170	0.15	Q V				
1+41	0.0172	0.15	Q V				
1+42	0.0174	0.15	Q V				
1+43	0.0176	0.15	Q V				

					PR1		
1+44	0.0178	0.15	Q	V			
1+45	0.0180	0.15	Q	V			
1+46	0.0182	0.15	Q	V			
1+47	0.0185	0.15	Q	V			
1+48	0.0187	0.16	Q	V			
1+49	0.0189	0.16	Q	V			
1+50	0.0191	0.16	Q	V			
1+51	0.0193	0.16	Q	V			
1+52	0.0195	0.16	Q	V			
1+53	0.0198	0.16	Q	V			
1+54	0.0200	0.16	Q	V			
1+55	0.0202	0.16	Q	V			
1+56	0.0204	0.16	Q	V			
1+57	0.0207	0.16	Q	V			
1+58	0.0209	0.16	Q	V			
1+59	0.0211	0.16	Q	V			
2+ 0	0.0213	0.16	Q	V			
2+ 1	0.0216	0.17	Q	V			
2+ 2	0.0218	0.17	Q	V			
2+ 3	0.0220	0.17	Q	V			
2+ 4	0.0223	0.17	Q	V			
2+ 5	0.0225	0.17	Q	V			
2+ 6	0.0227	0.17	Q	V			
2+ 7	0.0230	0.17	Q	V			
2+ 8	0.0232	0.17	Q	V			
2+ 9	0.0234	0.17	Q	V			
2+10	0.0237	0.17	Q	V			
2+11	0.0239	0.17	Q	V			
2+12	0.0242	0.18	Q	V			
2+13	0.0244	0.18	Q	V			
2+14	0.0247	0.18	Q	V			
2+15	0.0249	0.18	Q	V			
2+16	0.0251	0.18	Q	V			
2+17	0.0254	0.18	Q	V			
2+18	0.0257	0.18	Q	V			
2+19	0.0259	0.18	Q	V			
2+20	0.0262	0.19	Q	V			
2+21	0.0264	0.19	Q	V			
2+22	0.0267	0.19	Q	V			
2+23	0.0269	0.19	Q	V			
2+24	0.0272	0.19	Q	V			
2+25	0.0275	0.19	Q	V			
2+26	0.0277	0.19	Q	V			
2+27	0.0280	0.19	Q	V			
2+28	0.0283	0.20	Q	V			
2+29	0.0285	0.20	Q	V			
2+30	0.0288	0.20	Q	V			
2+31	0.0291	0.20	Q	V			
2+32	0.0294	0.20	Q	V			
2+33	0.0296	0.20	Q	V			
2+34	0.0299	0.20	Q	V			
2+35	0.0302	0.20	Q	V			
2+36	0.0305	0.20	Q	V			
2+37	0.0308	0.21	Q	V			
2+38	0.0310	0.21	Q	V			
2+39	0.0313	0.21	Q	V			
2+40	0.0316	0.21	Q	V			
2+41	0.0319	0.22	Q	V			
2+42	0.0322	0.22	Q	V			
2+43	0.0325	0.22	Q	V			
2+44	0.0328	0.22	Q	V			
2+45	0.0331	0.22	Q	V			
2+46	0.0334	0.22	Q	V			
2+47	0.0337	0.22	Q	V			
2+48	0.0341	0.22	Q	V			
2+49	0.0344	0.23	Q	V			
2+50	0.0347	0.23	Q	V			
2+51	0.0350	0.23	Q	V			

PR1

2+52	0.0353	0.24	Q	V		
2+53	0.0357	0.24	Q	V		
2+54	0.0360	0.24	Q	V		
2+55	0.0363	0.24	Q	V		
2+56	0.0367	0.24	Q	V		
2+57	0.0370	0.25	Q	V		
2+58	0.0373	0.25	Q	V		
2+59	0.0377	0.25	Q	V		
3+ 0	0.0380	0.25	Q	V		
3+ 1	0.0384	0.25	Q	V		
3+ 2	0.0387	0.26	Q	V		
3+ 3	0.0391	0.26	Q	V		
3+ 4	0.0394	0.26	Q	V		
3+ 5	0.0398	0.27	Q	V		
3+ 6	0.0402	0.27	Q	V		
3+ 7	0.0406	0.27	Q	V		
3+ 8	0.0409	0.28	Q	V		
3+ 9	0.0413	0.28	Q	V		
3+10	0.0417	0.28	Q	V		
3+11	0.0421	0.28	Q	V		
3+12	0.0425	0.28	Q	V		
3+13	0.0429	0.29	Q	V		
3+14	0.0433	0.29	Q	V		
3+15	0.0437	0.30	Q	V		
3+16	0.0441	0.31	Q	V		
3+17	0.0446	0.31	Q	V		
3+18	0.0450	0.32	Q	V		
3+19	0.0454	0.32	Q	V		
3+20	0.0459	0.32	Q	V		
3+21	0.0463	0.32	Q	V		
3+22	0.0468	0.33	Q	V		
3+23	0.0472	0.33	Q	V		
3+24	0.0477	0.33	Q	V		
3+25	0.0482	0.34	Q	V		
3+26	0.0486	0.35	Q	V		
3+27	0.0491	0.36	Q	V		
3+28	0.0496	0.37	Q	V		
3+29	0.0502	0.38	Q	V		
3+30	0.0507	0.38	Q	V		
3+31	0.0512	0.39	Q	V		
3+32	0.0518	0.39	Q	V		
3+33	0.0523	0.40	Q	V		
3+34	0.0529	0.40	Q	V		
3+35	0.0534	0.41	Q	V		
3+36	0.0540	0.42	Q	V		
3+37	0.0546	0.43	Q	V		
3+38	0.0552	0.45	Q	V		
3+39	0.0559	0.46	Q	V		
3+40	0.0565	0.48	Q	V		
3+41	0.0572	0.49	Q	V		
3+42	0.0579	0.51	Q	V		
3+43	0.0586	0.52	Q	V		
3+44	0.0593	0.53	Q	V		
3+45	0.0601	0.54	Q	V		
3+46	0.0609	0.56	Q	V		
3+47	0.0616	0.57	Q	V		
3+48	0.0624	0.58	Q	V		
3+49	0.0633	0.62	Q	V		
3+50	0.0642	0.67	Q	V		
3+51	0.0652	0.71	Q	V		
3+52	0.0663	0.76	Q	V		
3+53	0.0674	0.80	Q	V		
3+54	0.0685	0.85	Q	V		
3+55	0.0698	0.91	Q	V		
3+56	0.0711	0.97	Q	V		
3+57	0.0725	1.02	Q	V		
3+58	0.0740	1.08	Q	V		
3+59	0.0756	1.14	Q	V		

			PR1									
4+ 0	0.0772	1.20		Q		V						
4+ 1	0.0796	1.69			Q	V						
4+ 2	0.0826	2.18				Q						
4+ 3	0.0862	2.67				V	Q					
4+ 4	0.0906	3.17				V		Q				
4+ 5	0.0956	3.66					V		Q			
4+ 6	0.1014	4.15					V			Q		
4+ 7	0.1063	3.57						V		Q		
4+ 8	0.1104	2.99						QV				
4+ 9	0.1137	2.42					Q	V				
4+10	0.1163	1.84			Q			V				
4+11	0.1180	1.26		Q				V				
4+12	0.1189	0.68			Q			V				
4+13	0.1198	0.64			Q			V				
4+14	0.1207	0.61			Q			V				
4+15	0.1214	0.57			Q			V				
4+16	0.1222	0.53			Q			V				
4+17	0.1229	0.49		Q				V				
4+18	0.1235	0.46		Q				V				
4+19	0.1241	0.44		Q				V				
4+20	0.1247	0.42		Q				V				
4+21	0.1252	0.41		Q				V				
4+22	0.1258	0.39		Q				V				
4+23	0.1263	0.37		Q				V				
4+24	0.1268	0.36		Q				V				
4+25	0.1273	0.35		Q				V				
4+26	0.1277	0.34		Q				V				
4+27	0.1282	0.33		Q				V				
4+28	0.1286	0.32		Q				V				
4+29	0.1290	0.31		Q				V				
4+30	0.1294	0.30		Q				V				
4+31	0.1299	0.29		Q				V				
4+32	0.1302	0.29		Q				V				
4+33	0.1306	0.28		Q				V				
4+34	0.1310	0.27		Q				V				
4+35	0.1314	0.27		Q				V				
4+36	0.1317	0.26		Q				V				
4+37	0.1321	0.26		Q				V				
4+38	0.1324	0.25		Q				V				
4+39	0.1328	0.25		Q				V				
4+40	0.1331	0.24		Q				V				
4+41	0.1334	0.24		Q				V				
4+42	0.1337	0.23		Q				V				
4+43	0.1341	0.23		Q				V				
4+44	0.1344	0.22		Q				V				
4+45	0.1347	0.22		Q				V				
4+46	0.1350	0.22		Q				V				
4+47	0.1353	0.21		Q				V				
4+48	0.1356	0.21		Q				V				
4+49	0.1358	0.21		Q				V				
4+50	0.1361	0.20		Q				V				
4+51	0.1364	0.20		Q				V				
4+52	0.1367	0.20		Q				V				
4+53	0.1370	0.20		Q				V				
4+54	0.1372	0.19		Q				V				
4+55	0.1375	0.19		Q				V				
4+56	0.1377	0.19		Q				V				
4+57	0.1380	0.19		Q				V				
4+58	0.1383	0.18		Q				V				
4+59	0.1385	0.18		Q				V				
5+ 0	0.1388	0.18		Q				V				
5+ 1	0.1390	0.18		Q				V				
5+ 2	0.1392	0.18		Q				V				
5+ 3	0.1395	0.17		Q				V				
5+ 4	0.1397	0.17		Q				V				
5+ 5	0.1400	0.17		Q				V				
5+ 6	0.1402	0.17		Q				V				
5+ 7	0.1404	0.17		Q				V				

					PR1		
5+ 8	0.1406	0.16	Q			V	
5+ 9	0.1409	0.16	Q			V	
5+10	0.1411	0.16	Q			V	
5+11	0.1413	0.16	Q			V	
5+12	0.1415	0.16	Q			V	
5+13	0.1417	0.16	Q			V	
5+14	0.1420	0.16	Q			V	
5+15	0.1422	0.15	Q			V	
5+16	0.1424	0.15	Q			V	
5+17	0.1426	0.15	Q			V	
5+18	0.1428	0.15	Q			V	
5+19	0.1430	0.15	Q			V	
5+20	0.1432	0.15	Q			V	
5+21	0.1434	0.15	Q			V	
5+22	0.1436	0.14	Q			V	
5+23	0.1438	0.14	Q			V	
5+24	0.1440	0.14	Q			V	
5+25	0.1442	0.14	Q			V	
5+26	0.1444	0.14	Q			V	
5+27	0.1446	0.14	Q			V	
5+28	0.1448	0.14	Q			V	
5+29	0.1449	0.14	Q			V	
5+30	0.1451	0.14	Q			V	
5+31	0.1453	0.13	Q			V	
5+32	0.1455	0.13	Q			V	
5+33	0.1457	0.13	Q			V	
5+34	0.1459	0.13	Q			V	
5+35	0.1460	0.13	Q			V	
5+36	0.1462	0.13	Q			V	
5+37	0.1464	0.13	Q			V	
5+38	0.1466	0.13	Q			V	
5+39	0.1468	0.13	Q			V	
5+40	0.1469	0.13	Q			V	
5+41	0.1471	0.13	Q			V	
5+42	0.1473	0.12	Q			V	
5+43	0.1474	0.12	Q			V	
5+44	0.1476	0.12	Q			V	
5+45	0.1478	0.12	Q			V	
5+46	0.1480	0.12	Q			V	
5+47	0.1481	0.12	Q			V	
5+48	0.1483	0.12	Q			V	
5+49	0.1484	0.12	Q			V	
5+50	0.1486	0.12	Q			V	
5+51	0.1488	0.12	Q			V	
5+52	0.1489	0.12	Q			V	
5+53	0.1491	0.12	Q			V	
5+54	0.1493	0.12	Q			V	
5+55	0.1494	0.11	Q			V	
5+56	0.1496	0.11	Q			V	
5+57	0.1497	0.11	Q			V	
5+58	0.1499	0.11	Q			V	
5+59	0.1500	0.11	Q			V	
6+ 0	0.1502	0.11	Q			V	
6+ 1	0.1503	0.11	Q			V	
6+ 2	0.1505	0.11	Q			V	
6+ 3	0.1506	0.11	Q			V	
6+ 4	0.1508	0.11	Q			V	
6+ 5	0.1509	0.11	Q			V	
6+ 6	0.1511	0.11	Q			V	

End of computations, total study area = 0.704 (Ac.)

PR1WODET

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 01/20/21

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
6 hour, precipitation(inches) = 3.700
24 hour precipitation(inches) = 8.200
P6/P24 = 45.1%
San Diego hydrology manual 'C' values used

Process from Point/Station 112.000 to Point/Station 117.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.800 given for subarea
Rainfall intensity (I) = 8.322(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 6.39 min. Rain intensity = 8.32(In/Hr)
Total area = 0.704(Ac.) Total runoff = 4.151(CFS)

Process from Point/Station 112.000 to Point/Station 117.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 1341.500(Ft.)
Downstream point/station elevation = 1341.000(Ft.)
Pipe length = 92.00(Ft.) Slope = 0.0054 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.151(CFS)
Given pipe size = 12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
1.399(Ft.) at the headworks or inlet of the pipe(s)
Pipe friction loss = 1.248(Ft.)
Minor friction loss = 0.651(Ft.) K-factor = 1.50
Pipe flow velocity = 5.29(Ft/s)
Travel time through pipe = 0.29 min.
Time of concentration (TC) = 6.68 min.
End of computations, total study area = 0.704 (Ac.)

Stage Storage Capacity Caculations

$Q_{out} = AV = A \text{ acres} * 43560 \text{ sf/Acre (infiltration rate in/hr)} * 1 \text{ ft/12in (1 hr/3600 sec)}$

Orifice Flow: $Q = C * A * \sqrt{2gh}$
 $g = 32.20 \text{ ft/sec}^2$
 $C = 0.60$

Orifice-1

No. of openings 1
 Elevation 0.00
 diameter 0 inches 0.00 ft
 $A = 0.00 \text{ sf}$ $A = (\pi * D^2) / 4$

Weir Opening-1

Elevation 0.50
 Cd 0.60
 Width 0.8 ft
 $g = 32.20 \text{ sf/sec}$

<u>Water Depth (ft)</u>	<u>Volume (cf)</u>	<u>Stage Storage Area (Ac.ft)</u>	<u>Area of Infiltration (ft)</u>	<u>Q infiltration</u>	<u>Effective Head Orifice-1</u>	<u>Q cfs Orifice-1</u>	<u>Effective Head Weir</u>	<u>Q cfs Weir</u>	<u>Q total</u>
0.00	0	0.000	N/A	0.000	N/A	0.00	N/A	0.00	0.000
0.50	1,000	0.023	N/A	0.000	0.50	0.00	N/A	0.00	0.000
0.85	1,700	0.039	N/A	0.000	0.85	0.00	0.35	0.75	0.752
1.00	2,000	0.046	N/A	0.000	1.00	0.00	0.50	1.28	1.284

PR1DET

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012
Study date: 12/16/20

Program License Serial Number 6313

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

From study/file name: PR1.rte
*****HYDROGRAPH DATA*****
Number of intervals = 366
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 4.151 (CFS)
Total volume = 0.151 (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

Flow into basin

+++++
Process from Point/Station 112.000 to Point/Station 112.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 366
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 Storage Outflow (S-0*dt/2) (S+0*dt/2)
(Ft.) (Ac.Ft) (CFS) (Ac.Ft) (Ac.Ft)

0.000 0.000 0.000 0.000 0.000
0.500 0.023 0.640 0.023 0.023
1.000 0.046 1.220 0.045 0.047
1.500 0.069 1.610 0.068 0.070

Hydrograph Detention Basin Routing

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

Time Inflow Outflow Storage Depth
(Hours) (CFS) (CFS) (Ac.Ft) .0 1.0 2.08 3.11 4.15 (Ft.)
0.017 0.02 0.00 0.000 0 | | | | 0.00
0.033 0.04 0.00 0.000 0 | | | | 0.00
0.050 0.05 0.00 0.000 0 | | | | 0.00
0.067 0.07 0.01 0.000 0 | | | | 0.00
0.083 0.09 0.01 0.000 0 | | | | 0.01

						PR1DET		
0.100	0.11	0.01	0.000	O				0.01
0.117	0.11	0.02	0.001	O				0.01
0.133	0.11	0.02	0.001	O				0.01
0.150	0.11	0.02	0.001	O				0.02
0.167	0.11	0.03	0.001	O				0.02
0.183	0.11	0.03	0.001	O				0.02
0.200	0.11	0.03	0.001	O				0.02
0.217	0.11	0.03	0.001	O				0.03
0.233	0.11	0.04	0.001	O				0.03
0.250	0.11	0.04	0.001	O				0.03
0.267	0.11	0.04	0.002	O				0.03
0.283	0.11	0.05	0.002	O				0.04
0.300	0.11	0.05	0.002	O				0.04
0.317	0.11	0.05	0.002	O				0.04
0.333	0.11	0.05	0.002	O				0.04
0.350	0.11	0.06	0.002	O				0.04
0.367	0.11	0.06	0.002	O				0.04
0.383	0.11	0.06	0.002	O				0.05
0.400	0.11	0.06	0.002	O				0.05
0.417	0.11	0.06	0.002	O				0.05
0.433	0.12	0.07	0.002	O				0.05
0.450	0.12	0.07	0.002	O				0.05
0.467	0.12	0.07	0.002	O				0.05
0.483	0.12	0.07	0.003	O				0.06
0.500	0.12	0.07	0.003	O				0.06
0.517	0.12	0.07	0.003	O				0.06
0.533	0.12	0.08	0.003	O				0.06
0.550	0.12	0.08	0.003	O				0.06
0.567	0.12	0.08	0.003	O				0.06
0.583	0.12	0.08	0.003	O				0.06
0.600	0.12	0.08	0.003	O				0.06
0.617	0.12	0.08	0.003	O				0.07
0.633	0.12	0.08	0.003	O				0.07
0.650	0.12	0.09	0.003	O				0.07
0.667	0.12	0.09	0.003	O				0.07
0.683	0.12	0.09	0.003	O				0.07
0.700	0.12	0.09	0.003	O				0.07
0.717	0.12	0.09	0.003	O				0.07
0.733	0.12	0.09	0.003	O				0.07
0.750	0.12	0.09	0.003	O				0.07
0.767	0.12	0.09	0.003	O				0.07
0.783	0.12	0.10	0.003	O				0.07
0.800	0.12	0.10	0.003	O				0.08
0.817	0.12	0.10	0.004	O				0.08
0.833	0.12	0.10	0.004	O				0.08
0.850	0.12	0.10	0.004	O				0.08
0.867	0.13	0.10	0.004	O				0.08
0.883	0.13	0.10	0.004	O				0.08
0.900	0.13	0.10	0.004	O				0.08
0.917	0.13	0.10	0.004	O				0.08
0.933	0.13	0.10	0.004	O				0.08
0.950	0.13	0.10	0.004	O				0.08
0.967	0.13	0.11	0.004	O				0.08
0.983	0.13	0.11	0.004	O				0.08
1.000	0.13	0.11	0.004	O				0.08
1.017	0.13	0.11	0.004	O				0.08
1.033	0.13	0.11	0.004	O				0.09
1.050	0.13	0.11	0.004	OI				0.09
1.067	0.13	0.11	0.004	OI				0.09
1.083	0.13	0.11	0.004	OI				0.09
1.100	0.13	0.11	0.004	OI				0.09
1.117	0.13	0.11	0.004	OI				0.09
1.133	0.13	0.11	0.004	OI				0.09
1.150	0.13	0.11	0.004	OI				0.09
1.167	0.13	0.11	0.004	OI				0.09
1.183	0.13	0.12	0.004	OI				0.09
1.200	0.13	0.12	0.004	OI				0.09
1.217	0.13	0.12	0.004	OI				0.09

					PR1DET					
1.233	0.14	0.12	0.004	OI						0.09
1.250	0.14	0.12	0.004	OI						0.09
1.267	0.14	0.12	0.004	OI						0.09
1.283	0.14	0.12	0.004	OI						0.09
1.300	0.14	0.12	0.004	OI						0.09
1.317	0.14	0.12	0.004	OI						0.09
1.333	0.14	0.12	0.004	OI						0.10
1.350	0.14	0.12	0.004	OI						0.10
1.367	0.14	0.12	0.004	OI						0.10
1.383	0.14	0.12	0.004	OI						0.10
1.400	0.14	0.12	0.004	OI						0.10
1.417	0.14	0.12	0.004	OI						0.10
1.433	0.14	0.13	0.005	OI						0.10
1.450	0.14	0.13	0.005	OI						0.10
1.467	0.14	0.13	0.005	OI						0.10
1.483	0.14	0.13	0.005	OI						0.10
1.500	0.14	0.13	0.005	OI						0.10
1.517	0.15	0.13	0.005	OI						0.10
1.533	0.15	0.13	0.005	OI						0.10
1.550	0.15	0.13	0.005	0						0.10
1.567	0.15	0.13	0.005	0						0.10
1.583	0.15	0.13	0.005	0						0.10
1.600	0.15	0.13	0.005	0						0.10
1.617	0.15	0.13	0.005	0						0.10
1.633	0.15	0.13	0.005	0						0.10
1.650	0.15	0.13	0.005	0						0.10
1.667	0.15	0.13	0.005	0						0.10
1.683	0.15	0.13	0.005	0						0.11
1.700	0.15	0.14	0.005	0						0.11
1.717	0.15	0.14	0.005	0						0.11
1.733	0.15	0.14	0.005	0						0.11
1.750	0.15	0.14	0.005	0						0.11
1.767	0.15	0.14	0.005	0						0.11
1.783	0.15	0.14	0.005	0						0.11
1.800	0.16	0.14	0.005	0						0.11
1.817	0.16	0.14	0.005	0						0.11
1.833	0.16	0.14	0.005	0						0.11
1.850	0.16	0.14	0.005	0						0.11
1.867	0.16	0.14	0.005	0						0.11
1.883	0.16	0.14	0.005	0						0.11
1.900	0.16	0.14	0.005	0						0.11
1.917	0.16	0.14	0.005	0						0.11
1.933	0.16	0.14	0.005	0						0.11
1.950	0.16	0.15	0.005	0						0.11
1.967	0.16	0.15	0.005	0						0.11
1.983	0.16	0.15	0.005	0						0.11
2.000	0.16	0.15	0.005	0						0.11
2.017	0.17	0.15	0.005	0						0.12
2.033	0.17	0.15	0.005	0						0.12
2.050	0.17	0.15	0.005	0						0.12
2.067	0.17	0.15	0.005	0						0.12
2.083	0.17	0.15	0.005	0						0.12
2.100	0.17	0.15	0.005	0						0.12
2.117	0.17	0.15	0.005	0						0.12
2.133	0.17	0.15	0.006	0						0.12
2.150	0.17	0.15	0.006	0						0.12
2.167	0.17	0.15	0.006	0						0.12
2.183	0.17	0.16	0.006	0						0.12
2.200	0.18	0.16	0.006	0						0.12
2.217	0.18	0.16	0.006	0						0.12
2.233	0.18	0.16	0.006	0						0.12
2.250	0.18	0.16	0.006	0						0.12
2.267	0.18	0.16	0.006	0						0.12
2.283	0.18	0.16	0.006	0						0.13
2.300	0.18	0.16	0.006	0						0.13
2.317	0.18	0.16	0.006	0						0.13
2.333	0.19	0.16	0.006	0						0.13
2.350	0.19	0.16	0.006	0						0.13

						PR1DET		
2.367	0.19	0.16	0.006	0				0.13
2.383	0.19	0.17	0.006	0				0.13
2.400	0.19	0.17	0.006	0				0.13
2.417	0.19	0.17	0.006	0				0.13
2.433	0.19	0.17	0.006	0				0.13
2.450	0.19	0.17	0.006	0				0.13
2.467	0.20	0.17	0.006	0				0.13
2.483	0.20	0.17	0.006	0				0.13
2.500	0.20	0.17	0.006	0				0.13
2.517	0.20	0.17	0.006	0				0.14
2.533	0.20	0.17	0.006	0				0.14
2.550	0.20	0.18	0.006	0				0.14
2.567	0.20	0.18	0.006	0				0.14
2.583	0.20	0.18	0.006	0				0.14
2.600	0.20	0.18	0.006	0				0.14
2.617	0.21	0.18	0.006	0				0.14
2.633	0.21	0.18	0.006	0				0.14
2.650	0.21	0.18	0.007	0				0.14
2.667	0.21	0.18	0.007	0				0.14
2.683	0.22	0.18	0.007	0				0.14
2.700	0.22	0.18	0.007	0				0.14
2.717	0.22	0.19	0.007	0				0.15
2.733	0.22	0.19	0.007	0				0.15
2.750	0.22	0.19	0.007	0				0.15
2.767	0.22	0.19	0.007	0				0.15
2.783	0.22	0.19	0.007	0				0.15
2.800	0.22	0.19	0.007	0				0.15
2.817	0.23	0.19	0.007	0				0.15
2.833	0.23	0.19	0.007	0				0.15
2.850	0.23	0.20	0.007	0				0.15
2.867	0.24	0.20	0.007	0				0.15
2.883	0.24	0.20	0.007	0				0.16
2.900	0.24	0.20	0.007	0				0.16
2.917	0.24	0.20	0.007	0				0.16
2.933	0.24	0.20	0.007	0				0.16
2.950	0.25	0.21	0.007	0				0.16
2.967	0.25	0.21	0.007	0				0.16
2.983	0.25	0.21	0.007	0				0.16
3.000	0.25	0.21	0.008	0				0.16
3.017	0.25	0.21	0.008	0				0.17
3.033	0.26	0.21	0.008	0				0.17
3.050	0.26	0.21	0.008	OI				0.17
3.067	0.26	0.22	0.008	OI				0.17
3.083	0.27	0.22	0.008	OI				0.17
3.100	0.27	0.22	0.008	OI				0.17
3.117	0.27	0.22	0.008	OI				0.17
3.133	0.28	0.22	0.008	OI				0.18
3.150	0.28	0.23	0.008	OI				0.18
3.167	0.28	0.23	0.008	OI				0.18
3.183	0.28	0.23	0.008	OI				0.18
3.200	0.28	0.23	0.008	OI				0.18
3.217	0.29	0.23	0.008	OI				0.18
3.233	0.29	0.24	0.008	OI				0.18
3.250	0.30	0.24	0.009	OI				0.19
3.267	0.31	0.24	0.009	OI				0.19
3.283	0.31	0.24	0.009	OI				0.19
3.300	0.32	0.25	0.009	OI				0.19
3.317	0.32	0.25	0.009	OI				0.19
3.333	0.32	0.25	0.009	OI				0.20
3.350	0.32	0.25	0.009	OI				0.20
3.367	0.33	0.26	0.009	OI				0.20
3.383	0.33	0.26	0.009	0				0.20
3.400	0.33	0.26	0.009	0				0.21
3.417	0.34	0.27	0.010	0				0.21
3.433	0.35	0.27	0.010	0				0.21
3.450	0.36	0.27	0.010	0				0.21
3.467	0.37	0.28	0.010	0				0.21
3.483	0.38	0.28	0.010	0				0.22

						PR1DET						
3.500	0.38	0.28	0.010	0								0.22
3.517	0.39	0.29	0.010	0								0.22
3.533	0.39	0.29	0.010	OI								0.23
3.550	0.40	0.29	0.011	OI								0.23
3.567	0.40	0.30	0.011	OI								0.23
3.583	0.41	0.30	0.011	OI								0.24
3.600	0.42	0.31	0.011	OI								0.24
3.617	0.43	0.31	0.011	OI								0.24
3.633	0.45	0.32	0.011	OI								0.25
3.650	0.46	0.32	0.012	OI								0.25
3.667	0.48	0.33	0.012	OI								0.26
3.683	0.49	0.33	0.012	OI								0.26
3.700	0.51	0.34	0.012	OI								0.26
3.717	0.52	0.35	0.012	O I								0.27
3.733	0.53	0.35	0.013	O I								0.28
3.750	0.54	0.36	0.013	O I								0.28
3.767	0.56	0.37	0.013	O I								0.29
3.783	0.57	0.37	0.013	O I								0.29
3.800	0.58	0.38	0.014	O I								0.30
3.817	0.62	0.39	0.014	OI								0.30
3.833	0.67	0.40	0.014	O I								0.31
3.850	0.71	0.41	0.015	O I								0.32
3.867	0.76	0.42	0.015	O I								0.33
3.883	0.80	0.44	0.016	O I								0.34
3.900	0.85	0.45	0.016	O I								0.35
3.917	0.91	0.47	0.017	O I								0.36
3.933	0.97	0.48	0.017	O I								0.38
3.950	1.02	0.50	0.018	O I								0.39
3.967	1.08	0.52	0.019	O I								0.41
3.983	1.14	0.55	0.020	O I								0.43
4.000	1.20	0.57	0.020	O I								0.45
4.017	1.69	0.60	0.022	O		I						0.47
4.033	2.18	0.65	0.023	O		I						0.51
4.050	2.67	0.71	0.026	O			I					0.56
4.067	3.17	0.79	0.029	O				I				0.63
4.083	3.66	0.88	0.032	O					I			0.70
4.100	4.15	0.98	0.037	O						I		0.79
4.117	3.57	1.08	0.040		O					I		0.88
4.133	2.99	1.15	0.043		O			I				0.94
4.150	2.42	1.21	0.045		O		I					0.99
4.167	1.84	1.23	0.047		O		I					1.02
4.183	1.26	1.24	0.047	I		O		I				1.03
4.200	0.68	1.23	0.047		I		O					1.02
4.217	0.64	1.22	0.046		I		O					1.00
4.233	0.61	1.20	0.045		I		O					0.98
4.250	0.57	1.18	0.044		I		O					0.97
4.267	0.53	1.16	0.044		I		O					0.95
4.283	0.49	1.14	0.043		I		O					0.93
4.300	0.46	1.11	0.042		I		O					0.91
4.317	0.44	1.09	0.041		I		O					0.89
4.333	0.42	1.07	0.040		I		O					0.87
4.350	0.41	1.05	0.039		I		O					0.85
4.367	0.39	1.02	0.038		I		O					0.83
4.383	0.37	1.00	0.037		I		O					0.81
4.400	0.36	0.98	0.036		I		O					0.79
4.417	0.35	0.96	0.036		I		O					0.77
4.433	0.34	0.94	0.035		I		O					0.76
4.450	0.33	0.92	0.034		I		O					0.74
4.467	0.32	0.90	0.033		I		O					0.72
4.483	0.31	0.88	0.032		I		O					0.70
4.500	0.30	0.86	0.032		I		O					0.69
4.517	0.29	0.84	0.031		I		O					0.67
4.533	0.29	0.82	0.030		I		O					0.65
4.550	0.28	0.80	0.029		I		O					0.64
4.567	0.27	0.78	0.029		I		O					0.62
4.583	0.27	0.77	0.028		I		O					0.61
4.600	0.26	0.75	0.027		I		O					0.59
4.617	0.26	0.73	0.027	I		O						0.58

Maximum Detention
Depth: 1.0'

					PR1DET	
5.767	0.12	0.19	0.007	IO		0.15
5.783	0.12	0.19	0.007	IO		0.14
5.800	0.12	0.18	0.007	IO		0.14
5.817	0.12	0.18	0.006	IO		0.14
5.833	0.12	0.18	0.006	IO		0.14
5.850	0.12	0.18	0.006	IO		0.14
5.867	0.12	0.17	0.006	IO		0.14
5.883	0.12	0.17	0.006	IO		0.13
5.900	0.12	0.17	0.006	IO		0.13
5.917	0.11	0.17	0.006	IO		0.13
5.933	0.11	0.17	0.006	IO		0.13
5.950	0.11	0.16	0.006	IO		0.13
5.967	0.11	0.16	0.006	IO		0.13
5.983	0.11	0.16	0.006	IO		0.12
6.000	0.11	0.16	0.006	IO		0.12
6.017	0.11	0.16	0.006	IO		0.12
6.033	0.11	0.15	0.006	IO		0.12
6.050	0.11	0.15	0.005	IO		0.12
6.067	0.11	0.15	0.005	IO		0.12
6.083	0.11	0.15	0.005	IO		0.12
6.100	0.11	0.15	0.005	IO		0.12
6.117	0.00	0.14	0.005	IO		0.11
6.133	0.00	0.14	0.005	IO		0.11
6.150	0.00	0.13	0.005	IO		0.10
6.167	0.00	0.13	0.005	O		0.10
6.183	0.00	0.12	0.004	O		0.10
6.200	0.00	0.12	0.004	O		0.09
6.217	0.00	0.11	0.004	O		0.09
6.233	0.00	0.11	0.004	O		0.09
6.250	0.00	0.11	0.004	O		0.08
6.267	0.00	0.10	0.004	O		0.08
6.283	0.00	0.10	0.004	O		0.08
6.300	0.00	0.09	0.003	O		0.07
6.317	0.00	0.09	0.003	O		0.07
6.333	0.00	0.09	0.003	O		0.07
6.350	0.00	0.08	0.003	O		0.07
6.367	0.00	0.08	0.003	O		0.06
6.383	0.00	0.08	0.003	O		0.06
6.400	0.00	0.08	0.003	O		0.06
6.417	0.00	0.07	0.003	O		0.06
6.433	0.00	0.07	0.003	O		0.05
6.450	0.00	0.07	0.002	O		0.05
6.467	0.00	0.06	0.002	O		0.05
6.483	0.00	0.06	0.002	O		0.05
6.500	0.00	0.06	0.002	O		0.05
6.517	0.00	0.06	0.002	O		0.05
6.533	0.00	0.06	0.002	O		0.04
6.550	0.00	0.05	0.002	O		0.04
6.567	0.00	0.05	0.002	O		0.04
6.583	0.00	0.05	0.002	O		0.04
6.600	0.00	0.05	0.002	O		0.04
6.617	0.00	0.05	0.002	O		0.04
6.633	0.00	0.04	0.002	O		0.03
6.650	0.00	0.04	0.002	O		0.03
6.667	0.00	0.04	0.001	O		0.03
6.683	0.00	0.04	0.001	O		0.03
6.700	0.00	0.04	0.001	O		0.03
6.717	0.00	0.04	0.001	O		0.03
6.733	0.00	0.04	0.001	O		0.03
6.750	0.00	0.03	0.001	O		0.03
6.767	0.00	0.03	0.001	O		0.03
6.783	0.00	0.03	0.001	O		0.02
6.800	0.00	0.03	0.001	O		0.02
6.817	0.00	0.03	0.001	O		0.02
6.833	0.00	0.03	0.001	O		0.02
6.850	0.00	0.03	0.001	O		0.02
6.867	0.00	0.03	0.001	O		0.02
6.883	0.00	0.02	0.001	O		0.02

						PR1DET		
6.900	0.00	0.02	0.001	0				0.02
6.917	0.00	0.02	0.001	0				0.02
6.933	0.00	0.02	0.001	0				0.02
6.950	0.00	0.02	0.001	0				0.02
6.967	0.00	0.02	0.001	0				0.02
6.983	0.00	0.02	0.001	0				0.02
7.000	0.00	0.02	0.001	0				0.01
7.017	0.00	0.02	0.001	0				0.01
7.033	0.00	0.02	0.001	0				0.01
7.050	0.00	0.02	0.001	0				0.01
7.067	0.00	0.02	0.001	0				0.01
7.083	0.00	0.02	0.001	0				0.01
7.100	0.00	0.02	0.001	0				0.01
7.117	0.00	0.01	0.001	0				0.01
7.133	0.00	0.01	0.001	0				0.01
7.150	0.00	0.01	0.000	0				0.01
7.167	0.00	0.01	0.000	0				0.01
7.183	0.00	0.01	0.000	0				0.01
7.200	0.00	0.01	0.000	0				0.01
7.217	0.00	0.01	0.000	0				0.01
7.233	0.00	0.01	0.000	0				0.01
7.250	0.00	0.01	0.000	0				0.01
7.267	0.00	0.01	0.000	0				0.01
7.283	0.00	0.01	0.000	0				0.01
7.300	0.00	0.01	0.000	0				0.01
7.317	0.00	0.01	0.000	0				0.01
7.333	0.00	0.01	0.000	0				0.01
7.350	0.00	0.01	0.000	0				0.01
7.367	0.00	0.01	0.000	0				0.01
7.383	0.00	0.01	0.000	0				0.01
7.400	0.00	0.01	0.000	0				0.01
7.417	0.00	0.01	0.000	0				0.01
7.433	0.00	0.01	0.000	0				0.01
7.450	0.00	0.01	0.000	0				0.01
7.467	0.00	0.01	0.000	0				0.01
7.483	0.00	0.01	0.000	0				0.00
7.500	0.00	0.01	0.000	0				0.00
7.517	0.00	0.01	0.000	0				0.00
7.533	0.00	0.01	0.000	0				0.00
7.550	0.00	0.01	0.000	0				0.00
7.567	0.00	0.01	0.000	0				0.00
7.583	0.00	0.00	0.000	0				0.00
7.600	0.00	0.00	0.000	0				0.00
7.617	0.00	0.00	0.000	0				0.00
7.633	0.00	0.00	0.000	0				0.00
7.650	0.00	0.00	0.000	0				0.00
7.667	0.00	0.00	0.000	0				0.00
7.683	0.00	0.00	0.000	0				0.00
7.700	0.00	0.00	0.000	0				0.00
7.717	0.00	0.00	0.000	0				0.00
7.733	0.00	0.00	0.000	0				0.00
7.750	0.00	0.00	0.000	0				0.00
7.767	0.00	0.00	0.000	0				0.00
7.783	0.00	0.00	0.000	0				0.00
7.800	0.00	0.00	0.000	0				0.00
7.817	0.00	0.00	0.000	0				0.00
7.833	0.00	0.00	0.000	0				0.00
7.850	0.00	0.00	0.000	0				0.00
7.867	0.00	0.00	0.000	0				0.00
7.883	0.00	0.00	0.000	0				0.00
7.900	0.00	0.00	0.000	0				0.00
7.917	0.00	0.00	0.000	0				0.00
7.933	0.00	0.00	0.000	0				0.00
7.950	0.00	0.00	0.000	0				0.00
7.967	0.00	0.00	0.000	0				0.00
7.983	0.00	0.00	0.000	0				0.00
8.000	0.00	0.00	0.000	0				0.00
8.017	0.00	0.00	0.000	0				0.00

	PR1DET
8.033	0.00
8.050	0.00
8.067	0.00
8.083	0.00
8.100	0.00
8.117	0.00
8.133	0.00
8.150	0.00
8.167	0.00
8.183	0.00

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

Number of intervals = 491

Time interval = 1.0 (Min.)

Maximum/Peak flow rate = 1.240 (CFS)

Total volume = 0.151 (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

Detained Outflow

PR1WDET

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 12/16/20

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
6 hour, precipitation(inches) = 3.700
24 hour precipitation(inches) = 8.200
P6/P24 = 45.1%
San Diego hydrology manual 'C' values used

Process from Point/Station 112.000 to Point/Station 117.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.800 given for subarea
Rainfall intensity (I) = 5.722(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 11.42 min. Rain intensity = 5.72(In/Hr)
Total area = 0.704(Ac.) Total runoff = 1.240(CFS)

Process from Point/Station 112.000 to Point/Station 117.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation = 1341.500(Ft.)
Downstream point/station elevation = 1341.000(Ft.)
Pipe length = 92.00(Ft.) Slope = 0.0054 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.240(CFS)
Given pipe size = 12.00(In.)
Calculated individual pipe flow = 1.240(CFS)
Normal flow depth in pipe = 5.80(In.)
Flow top width inside pipe = 11.99(In.)
Critical Depth = 5.63(In.)
Pipe flow velocity = 3.30(Ft/s)
Travel time through pipe = 0.47 min.
Time of concentration (TC) = 11.89 min.
End of computations, total study area = 0.704 (Ac.)

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Wednesday, Jan 20 2021

8 foot bottom

Trapezoidal

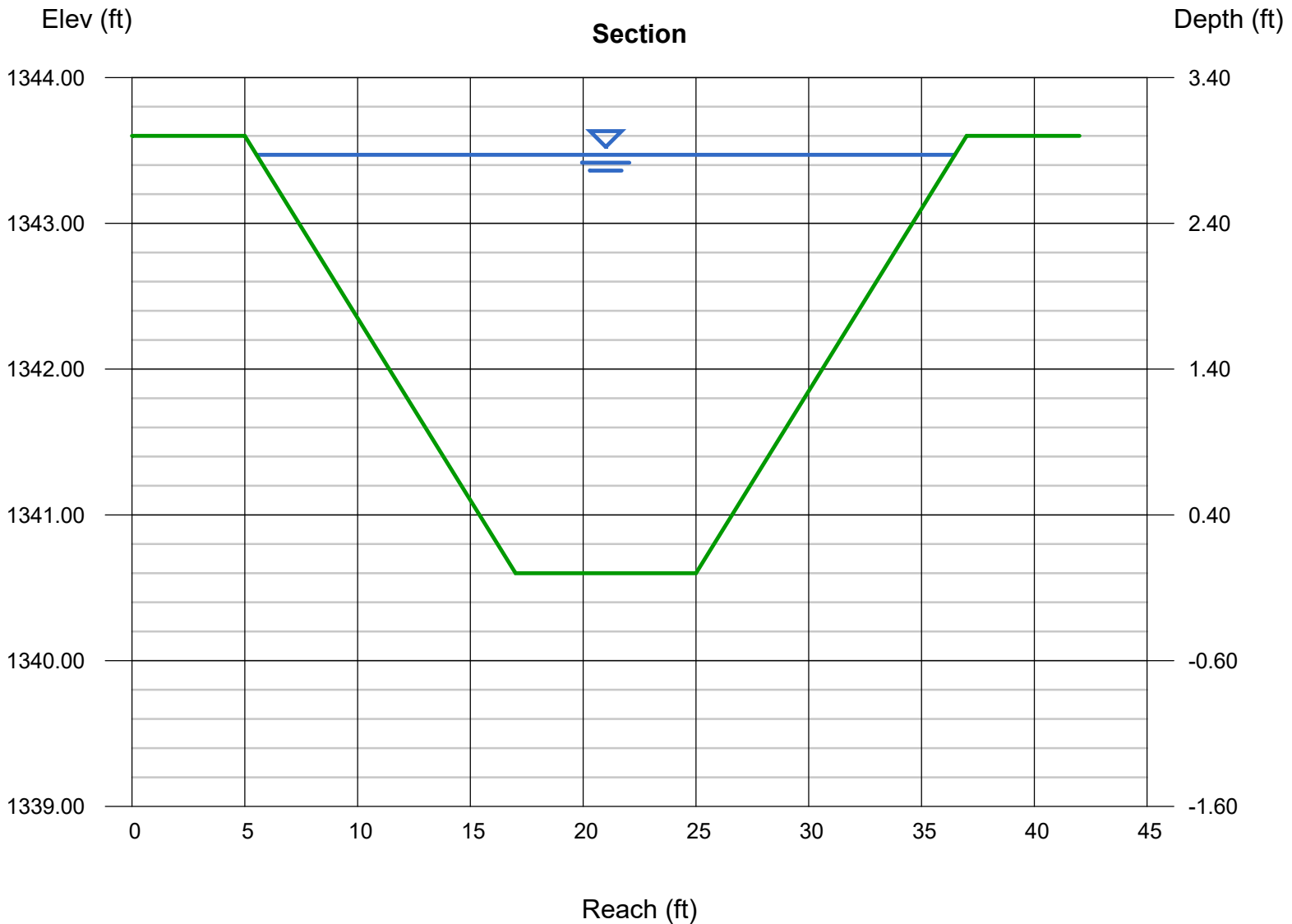
Bottom Width (ft) = 8.00
Side Slopes (z:1) = 4.00, 4.00
Total Depth (ft) = 3.00
Invert Elev (ft) = 1340.60
Slope (%) = 0.50
N-Value = 0.035

Calculations

Compute by: Known Q
Known Q (cfs) = 244.60

Highlighted

Depth (ft) = 2.87
Q (cfs) = 244.60
Area (sqft) = 55.91
Velocity (ft/s) = 4.38
Wetted Perim (ft) = 31.67
Crit Depth, Yc (ft) = 2.17
Top Width (ft) = 30.96
EGL (ft) = 3.17



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Wednesday, Jan 20 2021

23 foot bottom

Trapezoidal

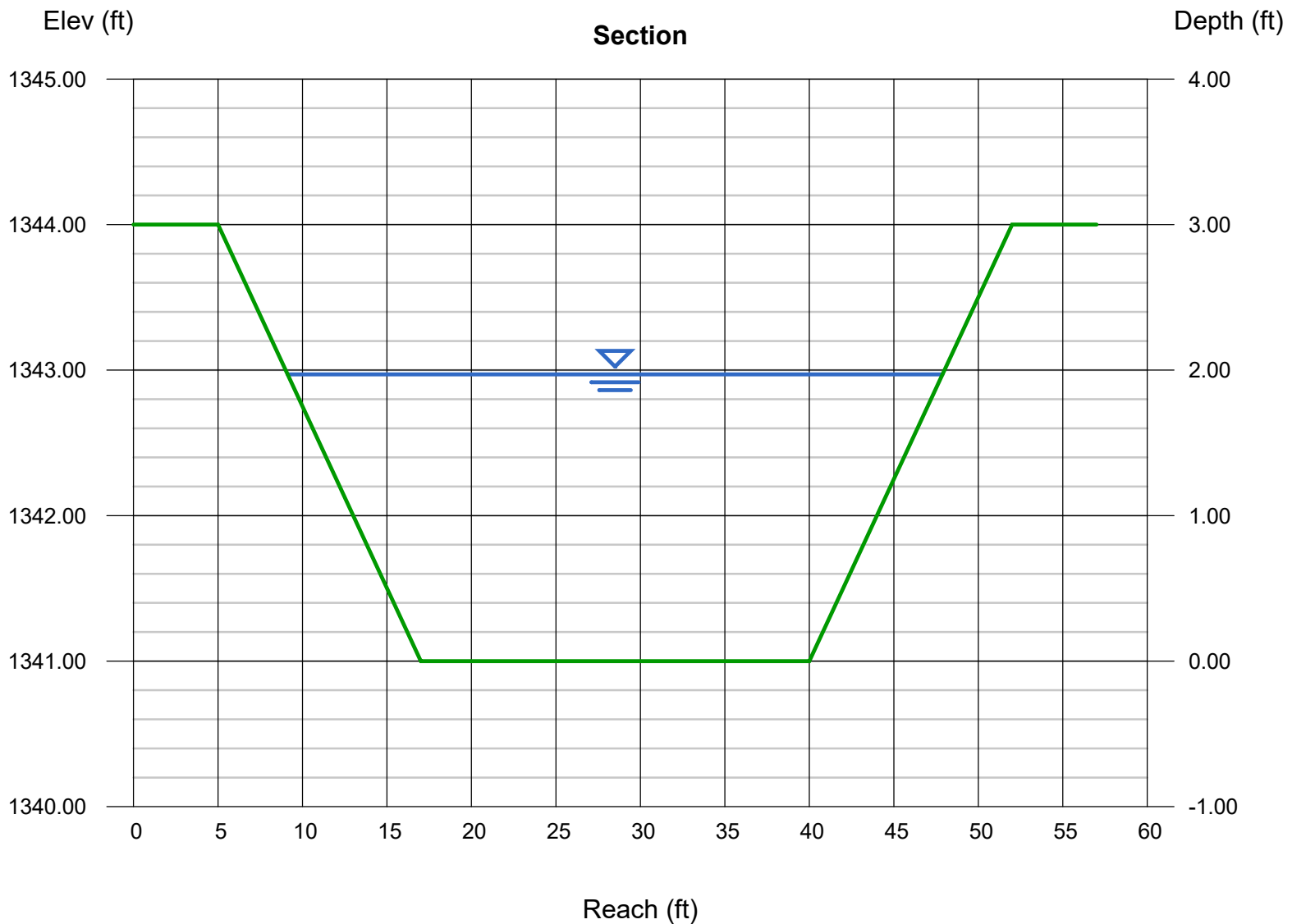
Bottom Width (ft) = 23.00
Side Slopes (z:1) = 4.00, 4.00
Total Depth (ft) = 3.00
Invert Elev (ft) = 1341.00
Slope (%) = 0.50
N-Value = 0.035

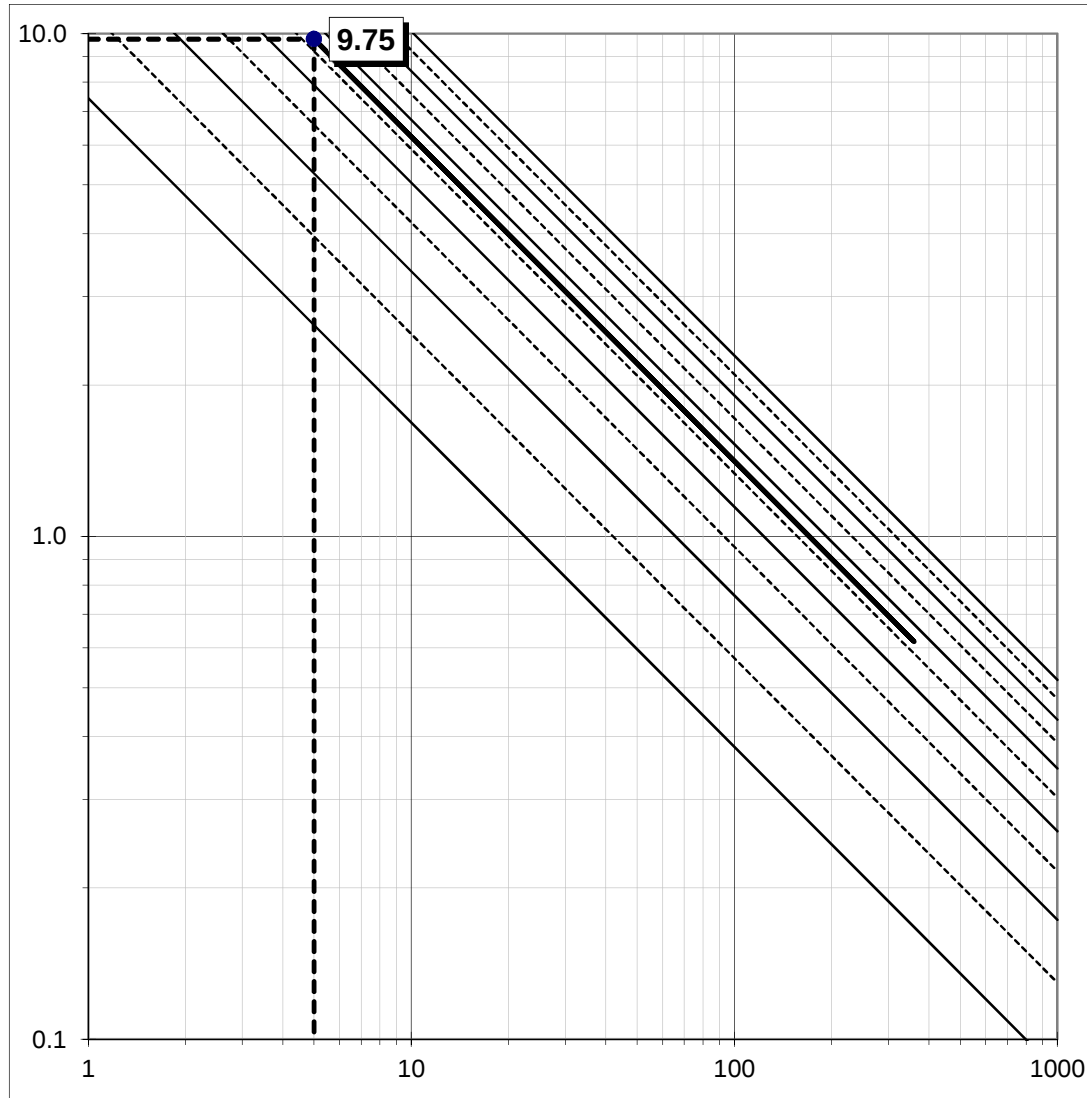
Calculations

Compute by: Known Q
Known Q (cfs) = 244.60

Highlighted

Depth (ft) = 1.97
Q (cfs) = 244.60
Area (sqft) = 60.83
Velocity (ft/s) = 4.02
Wetted Perim (ft) = 39.25
Crit Depth, Yc (ft) = 1.40
Top Width (ft) = 38.76
EGL (ft) = 2.22





PR-2A

Proposed Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.84

Dist. = 205.00 ft.

slope = 4.400 %

*T_c = 5.00 min.

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 0 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

** Minimum T_c = 10 Minutes

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

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

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 5.00 min.

I = 9.75 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

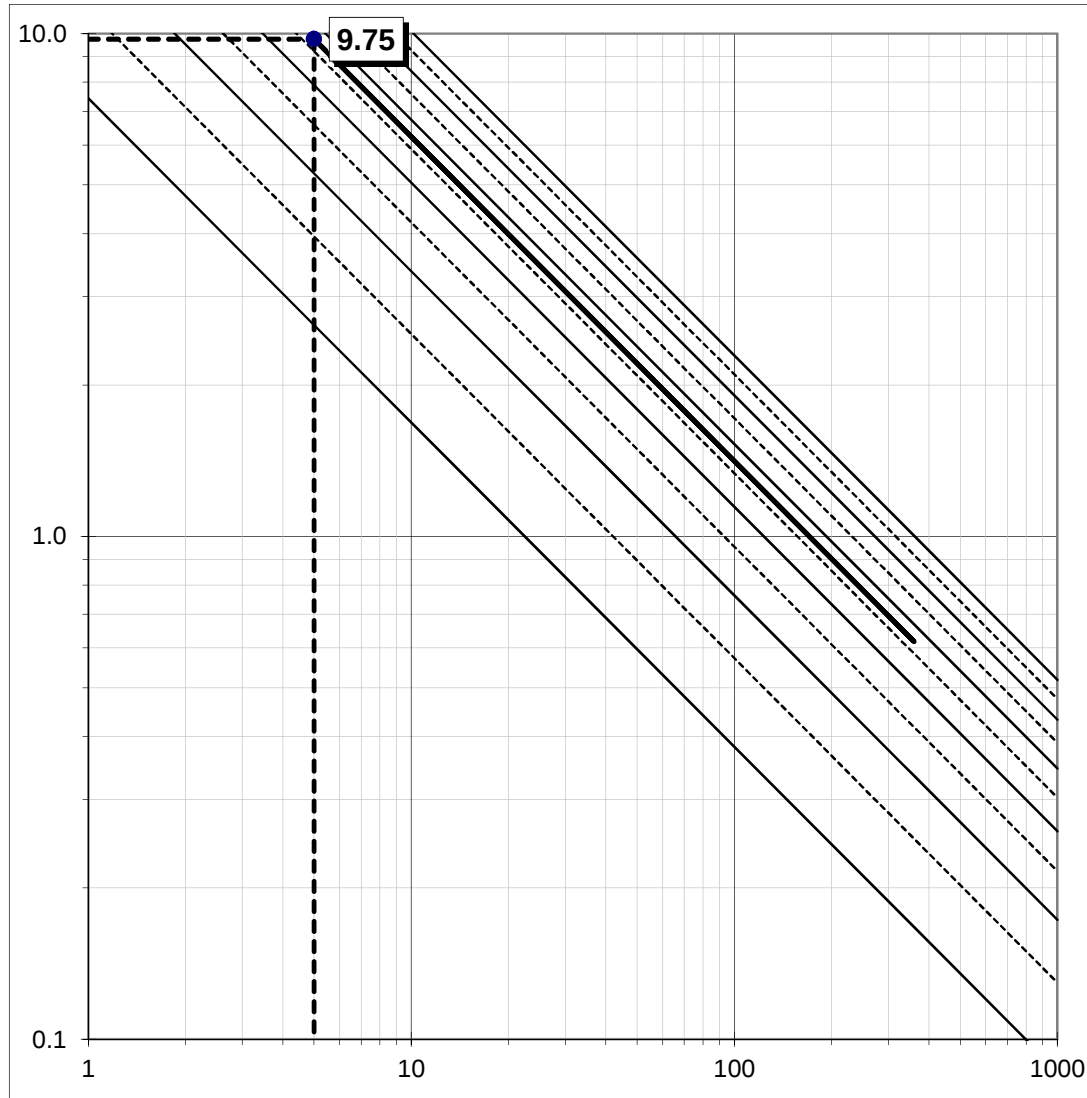
Q = 1.03 cfs

C = 0.84

I = 9.75 in/hr

A = 0.125 ac.

$$Q = C * I * A$$



PR-2C

Existing Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.30

Dist. = 24.00 ft.

slope = 10.000 %

*T_c = 5.00 min.

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 373 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

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

** Minimum T_c = 10 Minutes

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 5.00 min.

I = 9.75 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

Q = 0.07 cfs

C = 0.30

I = 9.75 in/hr

A = 0.023 ac.

$$Q = C * I * A$$

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
 San Diego County Flood Control Division 2003 hydrology manual
 Rational Hydrology Study Date: 01/20/21

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
 6 hour, precipitation(inches) = 3.700
 24 hour precipitation(inches) = 8.200
 P6/P24 = 45.1%
 San Diego hydrology manual 'C' values used

 Process from Point/Station 201.000 to Point/Station 202.000
 **** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.840 given for subarea
 Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
 User specified values are as follows:
 TC = 5.00 min. Rain intensity = 9.75(In/Hr)
 Total area = 0.125(Ac.) Total runoff = 1.030(CFS)

 Process from Point/Station 202.000 to Point/Station 203.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.417(CFS)
 Depth of flow = 0.169(Ft.), Average velocity = 2.037(Ft/s)
 ***** Irregular Channel Data *****

Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	24.00	0.00
3	24.50	0.50
4	34.00	0.70

 Manning's 'N' friction factor = 0.013

Sub-Channel flow = 1.417(CFS)
 ' ' flow top width = 8.257(Ft.)
 ' ' velocity = 2.037(Ft/s)
 ' ' area = 0.696(Sq.Ft)
 ' ' Froude number = 1.237

Upstream point elevation = 1345.200(Ft.)
 Downstream point elevation = 1344.000(Ft.)
 Flow length = 138.000(Ft.)
 Travel time = 1.13 min.
 Time of concentration = 6.13 min.
 Depth of flow = 0.169(Ft.)
 Average velocity = 2.037(Ft/s)
 Total irregular channel flow = 1.417(CFS)

PR2A

Irregular channel normal depth above invert elev. = 0.169(Ft.)
 Average velocity of channel(s) = 2.037(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 8.549(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.841 given for subarea
 Rainfall intensity = 8.549(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.840 CA = 0.203
 Subarea runoff = 0.709(CFS) for 0.117(Ac.)
 Total runoff = 1.739(CFS) Total area = 0.242(Ac.)
 Depth of flow = 0.182(Ft.), Average velocity = 2.144(Ft/s)

++++++
 Process from Point/Station 202.000 to Point/Station 203.000
 **** 6 HOUR HYDROGRAPH ****

++++++
 Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003

Time of Concentration = 6.13
 Basin Area = 0.24 Acres
 6 Hour Rainfall = 3.700 Inches
 Runoff Coefficient = 0.840
 Peak Discharge = 1.74 CFS

Time (Min)	Discharge (CFS)
0	0.000
6	0.045
12	0.045
18	0.046
24	0.047
30	0.048
36	0.049
42	0.050
48	0.051
54	0.052
60	0.053
66	0.054
72	0.055
78	0.057
84	0.057
90	0.059
96	0.060
102	0.063
108	0.064
114	0.066
120	0.068
126	0.071
132	0.072
138	0.076
144	0.077
150	0.082
156	0.084
162	0.089
168	0.092
174	0.099
180	0.103
186	0.112
192	0.117
198	0.130
204	0.137
210	0.157
216	0.171
222	0.209
228	0.238
234	0.349
240	0.492

PR2A

246	1.739
252	0.280
258	0.187
264	0.147
270	0.123
276	0.107
282	0.095
288	0.087
294	0.080
300	0.074
306	0.069
312	0.065
318	0.061
324	0.058
330	0.056
336	0.053
342	0.051
348	0.049
354	0.047
360	0.046
366	0.044

+++++

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	0.4	0.9	1.3	1.7

0+ 0	0.0000		0.00	Q				
0+ 1	0.0000		0.01	Q				
0+ 2	0.0000		0.01	Q				
0+ 3	0.0001		0.02	Q				
0+ 4	0.0001		0.03	Q				
0+ 5	0.0002		0.04	Q				
0+ 6	0.0002		0.04	VQ				
0+ 7	0.0003		0.04	VQ				
0+ 8	0.0003		0.05	VQ				
0+ 9	0.0004		0.05	VQ				
0+10	0.0005		0.05	VQ				
0+11	0.0005		0.05	VQ				
0+12	0.0006		0.05	VQ				
0+13	0.0007		0.05	VQ				
0+14	0.0007		0.05	VQ				
0+15	0.0008		0.05	VQ				
0+16	0.0008		0.05	VQ				
0+17	0.0009		0.05	VQ				
0+18	0.0010		0.05	VQ				
0+19	0.0010		0.05	VQ				
0+20	0.0011		0.05	VQ				
0+21	0.0012		0.05	VQ				
0+22	0.0012		0.05	VQ				
0+23	0.0013		0.05	VQ				
0+24	0.0014		0.05	VQ				
0+25	0.0014		0.05	VQ				
0+26	0.0015		0.05	VQ				
0+27	0.0016		0.05	VQ				
0+28	0.0016		0.05	Q				
0+29	0.0017		0.05	Q				
0+30	0.0017		0.05	Q				
0+31	0.0018		0.05	Q				
0+32	0.0019		0.05	Q				
0+33	0.0019		0.05	Q				
0+34	0.0020		0.05	Q				
0+35	0.0021		0.05	Q				
0+36	0.0021		0.05	Q				
0+37	0.0022		0.05	Q				

					PR2A		
0+38	0.0023	0.05	Q				
0+39	0.0024	0.05	Q				
0+40	0.0024	0.05	Q				
0+41	0.0025	0.05	Q				
0+42	0.0026	0.05	Q				
0+43	0.0026	0.05	Q				
0+44	0.0027	0.05	Q				
0+45	0.0028	0.05	Q				
0+46	0.0028	0.05	Q				
0+47	0.0029	0.05	Q				
0+48	0.0030	0.05	Q				
0+49	0.0030	0.05	Q				
0+50	0.0031	0.05	Q				
0+51	0.0032	0.05	QV				
0+52	0.0033	0.05	QV				
0+53	0.0033	0.05	QV				
0+54	0.0034	0.05	QV				
0+55	0.0035	0.05	QV				
0+56	0.0035	0.05	QV				
0+57	0.0036	0.05	QV				
0+58	0.0037	0.05	QV				
0+59	0.0038	0.05	QV				
1+ 0	0.0038	0.05	QV				
1+ 1	0.0039	0.05	QV				
1+ 2	0.0040	0.05	QV				
1+ 3	0.0040	0.05	QV				
1+ 4	0.0041	0.05	QV				
1+ 5	0.0042	0.05	QV				
1+ 6	0.0043	0.05	QV				
1+ 7	0.0043	0.05	QV				
1+ 8	0.0044	0.05	QV				
1+ 9	0.0045	0.05	QV				
1+10	0.0046	0.05	QV				
1+11	0.0046	0.05	QV				
1+12	0.0047	0.05	Q V				
1+13	0.0048	0.06	Q V				
1+14	0.0049	0.06	Q V				
1+15	0.0049	0.06	Q V				
1+16	0.0050	0.06	Q V				
1+17	0.0051	0.06	Q V				
1+18	0.0052	0.06	Q V				
1+19	0.0053	0.06	Q V				
1+20	0.0053	0.06	Q V				
1+21	0.0054	0.06	Q V				
1+22	0.0055	0.06	Q V				
1+23	0.0056	0.06	Q V				
1+24	0.0057	0.06	Q V				
1+25	0.0057	0.06	Q V				
1+26	0.0058	0.06	Q V				
1+27	0.0059	0.06	Q V				
1+28	0.0060	0.06	Q V				
1+29	0.0061	0.06	Q V				
1+30	0.0061	0.06	Q V				
1+31	0.0062	0.06	Q V				
1+32	0.0063	0.06	Q V				
1+33	0.0064	0.06	Q V				
1+34	0.0065	0.06	Q V				
1+35	0.0066	0.06	Q V				
1+36	0.0066	0.06	Q V				
1+37	0.0067	0.06	Q V				
1+38	0.0068	0.06	Q V				
1+39	0.0069	0.06	Q V				
1+40	0.0070	0.06	Q V				
1+41	0.0071	0.06	Q V				
1+42	0.0071	0.06	Q V				
1+43	0.0072	0.06	Q V				
1+44	0.0073	0.06	Q V				
1+45	0.0074	0.06	Q V				

					PR2A		
1+46	0.0075	0.06	Q	V			
1+47	0.0076	0.06	Q	V			
1+48	0.0077	0.06	Q	V			
1+49	0.0078	0.06	Q	V			
1+50	0.0078	0.06	Q	V			
1+51	0.0079	0.07	Q	V			
1+52	0.0080	0.07	Q	V			
1+53	0.0081	0.07	Q	V			
1+54	0.0082	0.07	Q	V			
1+55	0.0083	0.07	Q	V			
1+56	0.0084	0.07	Q	V			
1+57	0.0085	0.07	Q	V			
1+58	0.0086	0.07	Q	V			
1+59	0.0087	0.07	Q	V			
2+ 0	0.0088	0.07	Q	V			
2+ 1	0.0089	0.07	Q	V			
2+ 2	0.0089	0.07	Q	V			
2+ 3	0.0090	0.07	Q	V			
2+ 4	0.0091	0.07	Q	V			
2+ 5	0.0092	0.07	Q	V			
2+ 6	0.0093	0.07	Q	V			
2+ 7	0.0094	0.07	Q	V			
2+ 8	0.0095	0.07	Q	V			
2+ 9	0.0096	0.07	Q	V			
2+10	0.0097	0.07	Q	V			
2+11	0.0098	0.07	Q	V			
2+12	0.0099	0.07	Q	V			
2+13	0.0100	0.07	Q	V			
2+14	0.0101	0.07	Q	V			
2+15	0.0102	0.07	Q	V			
2+16	0.0103	0.07	Q	V			
2+17	0.0104	0.08	Q	V			
2+18	0.0105	0.08	Q	V			
2+19	0.0106	0.08	Q	V			
2+20	0.0107	0.08	Q	V			
2+21	0.0109	0.08	Q	V			
2+22	0.0110	0.08	Q	V			
2+23	0.0111	0.08	Q	V			
2+24	0.0112	0.08	Q	V			
2+25	0.0113	0.08	Q	V			
2+26	0.0114	0.08	Q	V			
2+27	0.0115	0.08	Q	V			
2+28	0.0116	0.08	Q	V			
2+29	0.0117	0.08	Q	V			
2+30	0.0118	0.08	Q	V			
2+31	0.0119	0.08	Q	V			
2+32	0.0121	0.08	Q	V			
2+33	0.0122	0.08	Q	V			
2+34	0.0123	0.08	Q	V			
2+35	0.0124	0.08	Q	V			
2+36	0.0125	0.08	Q	V			
2+37	0.0126	0.08	Q	V			
2+38	0.0128	0.09	Q	V			
2+39	0.0129	0.09	Q	V			
2+40	0.0130	0.09	Q	V			
2+41	0.0131	0.09	Q	V			
2+42	0.0132	0.09	Q	V			
2+43	0.0134	0.09	Q	V			
2+44	0.0135	0.09	Q	V			
2+45	0.0136	0.09	Q	V			
2+46	0.0137	0.09	Q	V			
2+47	0.0139	0.09	Q	V			
2+48	0.0140	0.09	Q	V			
2+49	0.0141	0.09	Q	V			
2+50	0.0142	0.09	Q	V			
2+51	0.0144	0.10	Q	V			
2+52	0.0145	0.10	Q	V			
2+53	0.0146	0.10	Q	V			

			PR2A		
4+ 2	0.0339	0.91			QV
4+ 3	0.0355	1.12			V Q
4+ 4	0.0373	1.32			V Q
4+ 5	0.0394	1.53			V Q
4+ 6	0.0418	1.74			V V
4+ 7	0.0439	1.50			V V
4+ 8	0.0456	1.25			V V
4+ 9	0.0470	1.01			V V
4+10	0.0480	0.77			V V
4+11	0.0487	0.52			V V
4+12	0.0491	0.28		Q	V V
4+13	0.0495	0.26		Q	V V
4+14	0.0498	0.25		Q	V V
4+15	0.0502	0.23		Q	V V
4+16	0.0505	0.22		Q	V V
4+17	0.0507	0.20		Q	V V
4+18	0.0510	0.19		Q	V V
4+19	0.0513	0.18		Q	V V
4+20	0.0515	0.17		Q	V V
4+21	0.0517	0.17		Q	V V
4+22	0.0519	0.16		Q	V V
4+23	0.0522	0.15		Q	V V
4+24	0.0524	0.15		Q	V V
4+25	0.0526	0.14		Q	V V
4+26	0.0527	0.14		Q	V V
4+27	0.0529	0.13		Q	V V
4+28	0.0531	0.13		Q	V V
4+29	0.0533	0.13		Q	V V
4+30	0.0535	0.12		Q	V V
4+31	0.0536	0.12		Q	V V
4+32	0.0538	0.12		Q	V V
4+33	0.0539	0.11		Q	V V
4+34	0.0541	0.11		Q	V V
4+35	0.0542	0.11		Q	V V
4+36	0.0544	0.11		Q	V V
4+37	0.0545	0.10		Q	V V
4+38	0.0547	0.10		Q	V V
4+39	0.0548	0.10		Q	V V
4+40	0.0550	0.10		Q	V V
4+41	0.0551	0.10		Q	V V
4+42	0.0552	0.10		Q	V V
4+43	0.0553	0.09		Q	V V
4+44	0.0555	0.09		Q	V V
4+45	0.0556	0.09		Q	V V
4+46	0.0557	0.09		Q	V V
4+47	0.0558	0.09		Q	V V
4+48	0.0560	0.09		Q	V V
4+49	0.0561	0.09		Q	V V
4+50	0.0562	0.08		Q	V V
4+51	0.0563	0.08		Q	V V
4+52	0.0564	0.08		Q	V V
4+53	0.0565	0.08		Q	V V
4+54	0.0566	0.08		Q	V V
4+55	0.0568	0.08		Q	V V
4+56	0.0569	0.08		Q	V V
4+57	0.0570	0.08		Q	V V
4+58	0.0571	0.08		Q	V V
4+59	0.0572	0.07		Q	V V
5+ 0	0.0573	0.07		Q	V V
5+ 1	0.0574	0.07		Q	V V
5+ 2	0.0575	0.07		Q	V V
5+ 3	0.0576	0.07		Q	V V
5+ 4	0.0577	0.07		Q	V V
5+ 5	0.0578	0.07		Q	V V
5+ 6	0.0579	0.07		Q	V V
5+ 7	0.0580	0.07		Q	V V
5+ 8	0.0580	0.07		Q	V V
5+ 9	0.0581	0.07		Q	V V

					PR2A	
5+10	0.0582	0.07	Q			V
5+11	0.0583	0.07	Q			V
5+12	0.0584	0.06	Q			V
5+13	0.0585	0.06	Q			V
5+14	0.0586	0.06	Q			V
5+15	0.0587	0.06	Q			V
5+16	0.0588	0.06	Q			V
5+17	0.0588	0.06	Q			V
5+18	0.0589	0.06	Q			V
5+19	0.0590	0.06	Q			V
5+20	0.0591	0.06	Q			V
5+21	0.0592	0.06	Q			V
5+22	0.0593	0.06	Q			V
5+23	0.0593	0.06	Q			V
5+24	0.0594	0.06	Q			V
5+25	0.0595	0.06	Q			V
5+26	0.0596	0.06	Q			V
5+27	0.0597	0.06	Q			V
5+28	0.0597	0.06	Q			V
5+29	0.0598	0.06	Q			V
5+30	0.0599	0.06	Q			V
5+31	0.0600	0.06	Q			V
5+32	0.0600	0.05	Q			V
5+33	0.0601	0.05	Q			V
5+34	0.0602	0.05	Q			V
5+35	0.0603	0.05	Q			V
5+36	0.0603	0.05	Q			V
5+37	0.0604	0.05	Q			V
5+38	0.0605	0.05	Q			V
5+39	0.0606	0.05	Q			V
5+40	0.0606	0.05	Q			V
5+41	0.0607	0.05	Q			V
5+42	0.0608	0.05	Q			V
5+43	0.0608	0.05	Q			V
5+44	0.0609	0.05	Q			V
5+45	0.0610	0.05	Q			V
5+46	0.0611	0.05	Q			V
5+47	0.0611	0.05	Q			V
5+48	0.0612	0.05	Q			V
5+49	0.0613	0.05	Q			V
5+50	0.0613	0.05	Q			V
5+51	0.0614	0.05	Q			V
5+52	0.0615	0.05	Q			V
5+53	0.0615	0.05	Q			V
5+54	0.0616	0.05	Q			V
5+55	0.0616	0.05	Q			V
5+56	0.0617	0.05	Q			V
5+57	0.0618	0.05	Q			V
5+58	0.0618	0.05	Q			V
5+59	0.0619	0.05	Q			V
6+ 0	0.0620	0.05	Q			V
6+ 1	0.0620	0.05	Q			V
6+ 2	0.0621	0.05	Q			V
6+ 3	0.0622	0.05	Q			V
6+ 4	0.0622	0.04	Q			V
6+ 5	0.0623	0.04	Q			V
6+ 6	0.0623	0.04	Q			V

End of computations, total study area = 0.242 (Ac.)

PR2WODET

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 01/21/21

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
6 hour, precipitation(inches) = 3.700
24 hour precipitation(inches) = 8.200
P6/P24 = 45.1%
San Diego hydrology manual 'C' values used

Process from Point/Station 202.000 to Point/Station 203.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.840 given for subarea
Rainfall intensity (I) = 8.548(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 6.13 min. Rain intensity = 8.55(In/Hr)
Total area = 0.242(Ac.) Total runoff = 1.739(CFS)

Process from Point/Station 202.000 to Point/Station 203.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 0.242(Ac.)
Runoff from this stream = 1.739(CFS)
Time of concentration = 6.13 min.
Rainfall intensity = 8.548(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 205.000 to Point/Station 203.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.300 given for subarea
Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 5.00 min. Rain intensity = 9.75(In/Hr)
Total area = 0.023(Ac.) Total runoff = 0.070(CFS)

Process from Point/Station 205.000 to Point/Station 203.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2

PR2WODET

Stream flow area = 0.023(Ac.)
 Runoff from this stream = 0.070(CFS)
 Time of concentration = 5.00 min.
 Rainfall intensity = 9.749(In/Hr)
 Summary of stream data:

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

1	1.739	6.13	8.548
2	0.070	5.00	9.749

Q_{max}(1) =
 1.000 * 1.000 * 1.739) +
 0.877 * 1.000 * 0.070) + = 1.800

Q_{max}(2) =
 1.000 * 0.816 * 1.739) +
 1.000 * 1.000 * 0.070) + = 1.488

Total of 2 main streams to confluence:
 Flow rates before confluence point:

1.739	0.070
-------	-------

Maximum flow rates at confluence using above data:

1.800	1.488
-------	-------

Area of streams before confluence:
 0.242 0.023

Results of confluence:

Total flow rate = 1.800(CFS)
 Time of concentration = 6.130 min.
 Effective stream area after confluence = 0.265(Ac.)
 End of computations, total study area = 0.265 (Ac.)

Stage Storage Capacity Caculations

$Q_{out} = AV = A \text{ acres} * 43560 \text{ sf/Acre (infiltration rate in/hr)} * 1\text{ft}/12\text{in (1 hr/3600 sec)}$

Orifice Flow: $Q = C * A * \text{sqrt}(2gh)$
 $g = 32.20 \text{ ft/sec}^2$
 $C = 0.60$

Orifice-1

No. of openings 4
 Elevation 0.00
 diameter 2.5 inches 0.21 ft
 $A = 0.14 \text{ sf}$ $A = (\pi * D^2) / 4$

<u>Water Depth (ft)</u>	<u>Volume (cf)</u>	<u>Stage Storage Area (Ac.ft)</u>	<u>Area of Infiltration (ft)</u>	<u>Q infiltration</u>	<u>Effective Head Orifice-1</u>	<u>Q cfs Orifice-1</u>
0.00	0	0.000	N/A	0.000	N/A	0.000
0.50	340	0.008	N/A	0.000	0.40	0.413
1.00	680	0.016	N/A	0.000	0.90	0.621
1.50	1,020	0.023	N/A	0.000	1.40	0.776

PR2ADET

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012
Study date: 01/20/21

Program License Serial Number 6313

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

From study/file name: PR2A.rte
*****HYDROGRAPH DATA*****
Number of intervals = 366
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 1.739 (CFS)
Total volume = 0.062 (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

Flow into tree well

+++++
Process from Point/Station 201.000 to Point/Station 202.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 366
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 Storage Outflow (S-0*dt/2) (S+0*dt/2)
(Ft.) (Ac.Ft) (CFS) (Ac.Ft) (Ac.Ft)

0.000 0.000 0.000 0.000 0.000
0.500 0.008 0.413 0.008 0.008
1.000 0.016 0.621 0.016 0.016

Hydrograph Detention Basin Routing

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

Time Inflow Outflow Storage Depth
(Hours) (CFS) (CFS) (Ac.Ft) .0 0.4 0.87 1.30 1.74 (Ft.)
0.017 0.01 0.00 0.000 0 | | | | 0.00
0.033 0.01 0.00 0.000 0 | | | | 0.00
0.050 0.02 0.00 0.000 0 | | | | 0.00
0.067 0.03 0.00 0.000 0 | | | | 0.00
0.083 0.04 0.01 0.000 0 | | | | 0.01
0.100 0.04 0.01 0.000 0 | | | | 0.01

					PR2ADET	
0.117	0.04	0.01	0.000	0		0.01
0.133	0.05	0.01	0.000	0		0.02
0.150	0.05	0.02	0.000	0		0.02
0.167	0.05	0.02	0.000	0		0.02
0.183	0.05	0.02	0.000	0		0.02
0.200	0.05	0.02	0.000	0		0.03
0.217	0.05	0.02	0.000	0		0.03
0.233	0.05	0.02	0.000	0		0.03
0.250	0.05	0.03	0.001	0		0.03
0.267	0.05	0.03	0.001	0		0.03
0.283	0.05	0.03	0.001	0		0.03
0.300	0.05	0.03	0.001	0		0.04
0.317	0.05	0.03	0.001	0		0.04
0.333	0.05	0.03	0.001	0		0.04
0.350	0.05	0.03	0.001	0		0.04
0.367	0.05	0.03	0.001	0		0.04
0.383	0.05	0.03	0.001	0		0.04
0.400	0.05	0.04	0.001	0		0.04
0.417	0.05	0.04	0.001	0		0.04
0.433	0.05	0.04	0.001	0		0.04
0.450	0.05	0.04	0.001	0		0.05
0.467	0.05	0.04	0.001	0		0.05
0.483	0.05	0.04	0.001	0		0.05
0.500	0.05	0.04	0.001	0		0.05
0.517	0.05	0.04	0.001	0		0.05
0.533	0.05	0.04	0.001	0		0.05
0.550	0.05	0.04	0.001	0		0.05
0.567	0.05	0.04	0.001	0		0.05
0.583	0.05	0.04	0.001	0		0.05
0.600	0.05	0.04	0.001	0		0.05
0.617	0.05	0.04	0.001	0		0.05
0.633	0.05	0.04	0.001	0		0.05
0.650	0.05	0.04	0.001	0		0.05
0.667	0.05	0.04	0.001	0		0.05
0.683	0.05	0.04	0.001	0		0.05
0.700	0.05	0.05	0.001	0		0.05
0.717	0.05	0.05	0.001	0		0.05
0.733	0.05	0.05	0.001	0		0.06
0.750	0.05	0.05	0.001	0		0.06
0.767	0.05	0.05	0.001	0		0.06
0.783	0.05	0.05	0.001	0		0.06
0.800	0.05	0.05	0.001	0		0.06
0.817	0.05	0.05	0.001	0		0.06
0.833	0.05	0.05	0.001	0		0.06
0.850	0.05	0.05	0.001	0		0.06
0.867	0.05	0.05	0.001	0		0.06
0.883	0.05	0.05	0.001	0		0.06
0.900	0.05	0.05	0.001	0		0.06
0.917	0.05	0.05	0.001	0		0.06
0.933	0.05	0.05	0.001	0		0.06
0.950	0.05	0.05	0.001	0		0.06
0.967	0.05	0.05	0.001	0		0.06
0.983	0.05	0.05	0.001	0		0.06
1.000	0.05	0.05	0.001	0		0.06
1.017	0.05	0.05	0.001	0		0.06
1.033	0.05	0.05	0.001	0		0.06
1.050	0.05	0.05	0.001	0		0.06
1.067	0.05	0.05	0.001	0		0.06
1.083	0.05	0.05	0.001	0		0.06
1.100	0.05	0.05	0.001	0		0.06
1.117	0.05	0.05	0.001	0		0.06
1.133	0.05	0.05	0.001	OI		0.06
1.150	0.05	0.05	0.001	OI		0.06
1.167	0.05	0.05	0.001	OI		0.06
1.183	0.05	0.05	0.001	OI		0.06
1.200	0.05	0.05	0.001	OI		0.06
1.217	0.06	0.05	0.001	OI		0.06
1.233	0.06	0.05	0.001	OI		0.06

					PR2ADET					
1.250	0.06	0.05	0.001	OI						0.06
1.267	0.06	0.05	0.001	OI						0.06
1.283	0.06	0.05	0.001	OI						0.06
1.300	0.06	0.05	0.001	OI						0.06
1.317	0.06	0.05	0.001	OI						0.07
1.333	0.06	0.05	0.001	OI						0.07
1.350	0.06	0.05	0.001	OI						0.07
1.367	0.06	0.05	0.001	OI						0.07
1.383	0.06	0.05	0.001	O						0.07
1.400	0.06	0.05	0.001	O						0.07
1.417	0.06	0.05	0.001	O						0.07
1.433	0.06	0.06	0.001	O						0.07
1.450	0.06	0.06	0.001	O						0.07
1.467	0.06	0.06	0.001	O						0.07
1.483	0.06	0.06	0.001	O						0.07
1.500	0.06	0.06	0.001	O						0.07
1.517	0.06	0.06	0.001	O						0.07
1.533	0.06	0.06	0.001	O						0.07
1.550	0.06	0.06	0.001	O						0.07
1.567	0.06	0.06	0.001	O						0.07
1.583	0.06	0.06	0.001	O						0.07
1.600	0.06	0.06	0.001	O						0.07
1.617	0.06	0.06	0.001	O						0.07
1.633	0.06	0.06	0.001	O						0.07
1.650	0.06	0.06	0.001	O						0.07
1.667	0.06	0.06	0.001	O						0.07
1.683	0.06	0.06	0.001	O						0.07
1.700	0.06	0.06	0.001	O						0.07
1.717	0.06	0.06	0.001	O						0.07
1.733	0.06	0.06	0.001	O						0.07
1.750	0.06	0.06	0.001	O						0.07
1.767	0.06	0.06	0.001	O						0.07
1.783	0.06	0.06	0.001	O						0.07
1.800	0.06	0.06	0.001	O						0.07
1.817	0.06	0.06	0.001	O						0.07
1.833	0.06	0.06	0.001	O						0.07
1.850	0.07	0.06	0.001	O						0.07
1.867	0.07	0.06	0.001	O						0.07
1.883	0.07	0.06	0.001	O						0.07
1.900	0.07	0.06	0.001	O						0.08
1.917	0.07	0.06	0.001	O						0.08
1.933	0.07	0.06	0.001	O						0.08
1.950	0.07	0.06	0.001	O						0.08
1.967	0.07	0.06	0.001	O						0.08
1.983	0.07	0.06	0.001	O						0.08
2.000	0.07	0.06	0.001	O						0.08
2.017	0.07	0.06	0.001	O						0.08
2.033	0.07	0.06	0.001	O						0.08
2.050	0.07	0.06	0.001	O						0.08
2.067	0.07	0.06	0.001	O						0.08
2.083	0.07	0.07	0.001	O						0.08
2.100	0.07	0.07	0.001	O						0.08
2.117	0.07	0.07	0.001	O						0.08
2.133	0.07	0.07	0.001	O						0.08
2.150	0.07	0.07	0.001	O						0.08
2.167	0.07	0.07	0.001	O						0.08
2.183	0.07	0.07	0.001	O						0.08
2.200	0.07	0.07	0.001	O						0.08
2.217	0.07	0.07	0.001	O						0.08
2.233	0.07	0.07	0.001	O						0.08
2.250	0.07	0.07	0.001	O						0.08
2.267	0.07	0.07	0.001	O						0.08
2.283	0.08	0.07	0.001	O						0.08
2.300	0.08	0.07	0.001	O						0.08
2.317	0.08	0.07	0.001	O						0.09
2.333	0.08	0.07	0.001	O						0.09
2.350	0.08	0.07	0.001	O						0.09
2.367	0.08	0.07	0.001	O						0.09

						PR2ADET			
2.383	0.08	0.07	0.001	0					0.09
2.400	0.08	0.07	0.001	0					0.09
2.417	0.08	0.07	0.001	0					0.09
2.433	0.08	0.07	0.001	0					0.09
2.450	0.08	0.07	0.001	0					0.09
2.467	0.08	0.07	0.001	0					0.09
2.483	0.08	0.07	0.001	0					0.09
2.500	0.08	0.07	0.001	0					0.09
2.517	0.08	0.08	0.001	0					0.09
2.533	0.08	0.08	0.001	0					0.09
2.550	0.08	0.08	0.001	0					0.09
2.567	0.08	0.08	0.001	0					0.09
2.583	0.08	0.08	0.001	0					0.09
2.600	0.08	0.08	0.002	0					0.09
2.617	0.08	0.08	0.002	0					0.09
2.633	0.09	0.08	0.002	0					0.10
2.650	0.09	0.08	0.002	0					0.10
2.667	0.09	0.08	0.002	0					0.10
2.683	0.09	0.08	0.002	0					0.10
2.700	0.09	0.08	0.002	0					0.10
2.717	0.09	0.08	0.002	0					0.10
2.733	0.09	0.08	0.002	0					0.10
2.750	0.09	0.08	0.002	0					0.10
2.767	0.09	0.08	0.002	0					0.10
2.783	0.09	0.08	0.002	0					0.10
2.800	0.09	0.08	0.002	0					0.10
2.817	0.09	0.08	0.002	0					0.10
2.833	0.09	0.09	0.002	0					0.10
2.850	0.10	0.09	0.002	0					0.10
2.867	0.10	0.09	0.002	0					0.11
2.883	0.10	0.09	0.002	0					0.11
2.900	0.10	0.09	0.002	0					0.11
2.917	0.10	0.09	0.002	0					0.11
2.933	0.10	0.09	0.002	0					0.11
2.950	0.10	0.09	0.002	0					0.11
2.967	0.10	0.09	0.002	0					0.11
2.983	0.10	0.09	0.002	0					0.11
3.000	0.10	0.09	0.002	0					0.11
3.017	0.10	0.09	0.002	0					0.11
3.033	0.11	0.09	0.002	0					0.11
3.050	0.11	0.09	0.002	0					0.11
3.067	0.11	0.10	0.002	0					0.12
3.083	0.11	0.10	0.002	OI					0.12
3.100	0.11	0.10	0.002	OI					0.12
3.117	0.11	0.10	0.002	OI					0.12
3.133	0.11	0.10	0.002	OI					0.12
3.150	0.11	0.10	0.002	OI					0.12
3.167	0.12	0.10	0.002	OI					0.12
3.183	0.12	0.10	0.002	OI					0.12
3.200	0.12	0.10	0.002	OI					0.13
3.217	0.12	0.10	0.002	OI					0.13
3.233	0.12	0.11	0.002	OI					0.13
3.250	0.12	0.11	0.002	OI					0.13
3.267	0.13	0.11	0.002	OI					0.13
3.283	0.13	0.11	0.002	0					0.13
3.300	0.13	0.11	0.002	0					0.13
3.317	0.13	0.11	0.002	0					0.14
3.333	0.13	0.11	0.002	0					0.14
3.350	0.13	0.11	0.002	0					0.14
3.367	0.13	0.12	0.002	0					0.14
3.383	0.14	0.12	0.002	0					0.14
3.400	0.14	0.12	0.002	0					0.14
3.417	0.14	0.12	0.002	0					0.15
3.433	0.14	0.12	0.002	0					0.15
3.450	0.15	0.12	0.002	0					0.15
3.467	0.15	0.12	0.002	0					0.15
3.483	0.15	0.13	0.002	0					0.15
3.500	0.16	0.13	0.002	0					0.16

							PR2ADET							
3.517	0.16	0.13	0.003	0										0.16
3.533	0.16	0.13	0.003	0										0.16
3.550	0.16	0.14	0.003	OI										0.16
3.567	0.17	0.14	0.003	OI										0.17
3.583	0.17	0.14	0.003	OI										0.17
3.600	0.17	0.14	0.003	OI										0.17
3.617	0.18	0.14	0.003	OI										0.17
3.633	0.18	0.15	0.003	OI										0.18
3.650	0.19	0.15	0.003	OI										0.18
3.667	0.20	0.15	0.003	OI										0.18
3.683	0.20	0.16	0.003	OI										0.19
3.700	0.21	0.16	0.003	OI										0.19
3.717	0.21	0.16	0.003	OI										0.20
3.733	0.22	0.17	0.003	OI										0.20
3.750	0.22	0.17	0.003	OI										0.21
3.767	0.23	0.17	0.003	OI										0.21
3.783	0.23	0.18	0.003	OI										0.21
3.800	0.24	0.18	0.004	OI										0.22
3.817	0.26	0.19	0.004	OI										0.23
3.833	0.27	0.19	0.004	O I										0.23
3.850	0.29	0.20	0.004	O I										0.24
3.867	0.31	0.20	0.004	O I										0.25
3.883	0.33	0.21	0.004	O I										0.26
3.900	0.35	0.22	0.004	O I										0.27
3.917	0.37	0.23	0.004	O I										0.28
3.933	0.40	0.24	0.005	O I										0.29
3.950	0.42	0.25	0.005	O I										0.31
3.967	0.44	0.27	0.005	O I										0.32
3.983	0.47	0.28	0.005	O I										0.34
4.000	0.49	0.29	0.006	O I										0.35
4.017	0.70	0.31	0.006	O I										0.38
4.033	0.91	0.35	0.007	O I										0.42
4.050	1.12	0.39	0.008	O I										0.48
4.067	1.32	0.43	0.009	O I										0.54
4.083	1.53	0.47	0.010	O I										0.63
4.100	1.74	0.51	0.012	O I										0.73
4.117	1.50	0.55	0.013	O I										0.82
4.133	1.25	0.58	0.014	O I										0.89
4.150	1.01	0.60	0.015	O I										0.94
4.167	0.77	0.61	0.015	O I										0.96
4.183	0.52	0.61	0.015	I O										0.97
4.200	0.28	0.60	0.015	I O										0.95
4.217	0.26	0.59	0.015	I O										0.92
4.233	0.25	0.58	0.014	I O										0.89
4.250	0.23	0.56	0.014	I O										0.86
4.267	0.22	0.55	0.013	I O										0.84
4.283	0.20	0.54	0.013	I O										0.81
4.300	0.19	0.53	0.012	I O										0.78
4.317	0.18	0.52	0.012	I O										0.75
4.333	0.17	0.50	0.012	I O										0.72
4.350	0.17	0.49	0.011	I O										0.69
4.367	0.16	0.48	0.011	I O										0.66
4.383	0.15	0.47	0.010	I O										0.64
4.400	0.15	0.46	0.010	I O										0.61
4.417	0.14	0.45	0.009	I O										0.58
4.433	0.14	0.44	0.009	I O										0.56
4.450	0.13	0.43	0.009	I O										0.53
4.467	0.13	0.42	0.008	I O										0.51
4.483	0.13	0.40	0.008	I O										0.48
4.500	0.12	0.38	0.007	I O										0.46
4.517	0.12	0.36	0.007	I O										0.44
4.533	0.12	0.35	0.007	I O										0.42
4.550	0.11	0.33	0.006	I O										0.40
4.567	0.11	0.31	0.006	I O										0.38
4.583	0.11	0.30	0.006	I O										0.36
4.600	0.11	0.29	0.006	I O										0.35
4.617	0.10	0.28	0.005	I O										0.33
4.633	0.10	0.26	0.005	I O										0.32

Maximum Detention
Depth: 1.0'

						PR2ADET						
4.650	0.10	0.25	0.005	I	0							0.31
4.667	0.10	0.24	0.005	I	0							0.29
4.683	0.10	0.23	0.004	I	0							0.28
4.700	0.10	0.22	0.004	I	0							0.27
4.717	0.09	0.21	0.004	I	0							0.26
4.733	0.09	0.21	0.004	I	0							0.25
4.750	0.09	0.20	0.004	I	0							0.24
4.767	0.09	0.19	0.004	I	0							0.23
4.783	0.09	0.18	0.004	I	0							0.22
4.800	0.09	0.18	0.003	I	0							0.21
4.817	0.09	0.17	0.003	I	0							0.21
4.833	0.08	0.16	0.003	I	0							0.20
4.850	0.08	0.16	0.003	IO								0.19
4.867	0.08	0.15	0.003	IO								0.19
4.883	0.08	0.15	0.003	IO								0.18
4.900	0.08	0.14	0.003	IO								0.17
4.917	0.08	0.14	0.003	IO								0.17
4.933	0.08	0.14	0.003	IO								0.16
4.950	0.08	0.13	0.003	IO								0.16
4.967	0.08	0.13	0.002	IO								0.15
4.983	0.07	0.12	0.002	IO								0.15
5.000	0.07	0.12	0.002	IO								0.15
5.017	0.07	0.12	0.002	IO								0.14
5.033	0.07	0.11	0.002	IO								0.14
5.050	0.07	0.11	0.002	IO								0.13
5.067	0.07	0.11	0.002	O								0.13
5.083	0.07	0.11	0.002	O								0.13
5.100	0.07	0.10	0.002	O								0.13
5.117	0.07	0.10	0.002	O								0.12
5.133	0.07	0.10	0.002	O								0.12
5.150	0.07	0.10	0.002	O								0.12
5.167	0.07	0.09	0.002	O								0.11
5.183	0.07	0.09	0.002	O								0.11
5.200	0.06	0.09	0.002	O								0.11
5.217	0.06	0.09	0.002	O								0.11
5.233	0.06	0.09	0.002	O								0.11
5.250	0.06	0.09	0.002	O								0.10
5.267	0.06	0.08	0.002	O								0.10
5.283	0.06	0.08	0.002	O								0.10
5.300	0.06	0.08	0.002	O								0.10
5.317	0.06	0.08	0.002	O								0.10
5.333	0.06	0.08	0.002	O								0.10
5.350	0.06	0.08	0.001	O								0.09
5.367	0.06	0.08	0.001	O								0.09
5.383	0.06	0.07	0.001	O								0.09
5.400	0.06	0.07	0.001	O								0.09
5.417	0.06	0.07	0.001	O								0.09
5.433	0.06	0.07	0.001	O								0.09
5.450	0.06	0.07	0.001	O								0.09
5.467	0.06	0.07	0.001	O								0.08
5.483	0.06	0.07	0.001	O								0.08
5.500	0.06	0.07	0.001	O								0.08
5.517	0.06	0.07	0.001	O								0.08
5.533	0.05	0.07	0.001	O								0.08
5.550	0.05	0.07	0.001	O								0.08
5.567	0.05	0.06	0.001	IO								0.08
5.583	0.05	0.06	0.001	IO								0.08
5.600	0.05	0.06	0.001	IO								0.08
5.617	0.05	0.06	0.001	IO								0.08
5.633	0.05	0.06	0.001	IO								0.07
5.650	0.05	0.06	0.001	IO								0.07
5.667	0.05	0.06	0.001	IO								0.07
5.683	0.05	0.06	0.001	IO								0.07
5.700	0.05	0.06	0.001	IO								0.07
5.717	0.05	0.06	0.001	IO								0.07
5.733	0.05	0.06	0.001	IO								0.07
5.750	0.05	0.06	0.001	IO								0.07
5.767	0.05	0.06	0.001	IO								0.07

					PR2ADET	
5.783	0.05	0.06	0.001	IO		0.07
5.800	0.05	0.06	0.001	IO		0.07
5.817	0.05	0.06	0.001	IO		0.07
5.833	0.05	0.06	0.001	IO		0.07
5.850	0.05	0.05	0.001	IO		0.07
5.867	0.05	0.05	0.001	O		0.07
5.883	0.05	0.05	0.001	O		0.07
5.900	0.05	0.05	0.001	O		0.06
5.917	0.05	0.05	0.001	O		0.06
5.933	0.05	0.05	0.001	O		0.06
5.950	0.05	0.05	0.001	O		0.06
5.967	0.05	0.05	0.001	O		0.06
5.983	0.05	0.05	0.001	O		0.06
6.000	0.05	0.05	0.001	O		0.06
6.017	0.05	0.05	0.001	O		0.06
6.033	0.05	0.05	0.001	O		0.06
6.050	0.05	0.05	0.001	O		0.06
6.067	0.04	0.05	0.001	O		0.06
6.083	0.04	0.05	0.001	O		0.06
6.100	0.04	0.05	0.001	O		0.06
6.117	0.00	0.05	0.001	O		0.06
6.133	0.00	0.04	0.001	O		0.05
6.150	0.00	0.04	0.001	O		0.05
6.167	0.00	0.04	0.001	O		0.05
6.183	0.00	0.04	0.001	O		0.04
6.200	0.00	0.03	0.001	O		0.04
6.217	0.00	0.03	0.001	O		0.04
6.233	0.00	0.03	0.001	O		0.03
6.250	0.00	0.03	0.001	O		0.03
6.267	0.00	0.02	0.000	O		0.03
6.283	0.00	0.02	0.000	O		0.03
6.300	0.00	0.02	0.000	O		0.03
6.317	0.00	0.02	0.000	O		0.02
6.333	0.00	0.02	0.000	O		0.02
6.350	0.00	0.02	0.000	O		0.02
6.367	0.00	0.02	0.000	O		0.02
6.383	0.00	0.02	0.000	O		0.02
6.400	0.00	0.01	0.000	O		0.02
6.417	0.00	0.01	0.000	O		0.02
6.433	0.00	0.01	0.000	O		0.01
6.450	0.00	0.01	0.000	O		0.01
6.467	0.00	0.01	0.000	O		0.01
6.483	0.00	0.01	0.000	O		0.01
6.500	0.00	0.01	0.000	O		0.01
6.517	0.00	0.01	0.000	O		0.01
6.533	0.00	0.01	0.000	O		0.01
6.550	0.00	0.01	0.000	O		0.01
6.567	0.00	0.01	0.000	O		0.01
6.583	0.00	0.01	0.000	O		0.01
6.600	0.00	0.01	0.000	O		0.01
6.617	0.00	0.01	0.000	O		0.01
6.633	0.00	0.01	0.000	O		0.01
6.650	0.00	0.00	0.000	O		0.01
6.667	0.00	0.00	0.000	O		0.01
6.683	0.00	0.00	0.000	O		0.01
6.700	0.00	0.00	0.000	O		0.00
6.717	0.00	0.00	0.000	O		0.00
6.733	0.00	0.00	0.000	O		0.00
6.750	0.00	0.00	0.000	O		0.00
6.767	0.00	0.00	0.000	O		0.00
6.783	0.00	0.00	0.000	O		0.00
6.800	0.00	0.00	0.000	O		0.00
6.817	0.00	0.00	0.000	O		0.00
6.833	0.00	0.00	0.000	O		0.00
6.850	0.00	0.00	0.000	O		0.00
6.867	0.00	0.00	0.000	O		0.00
6.883	0.00	0.00	0.000	O		0.00
6.900	0.00	0.00	0.000	O		0.00

PR2ADET

Tree Well Outflow

Time interval = 1.0 (Min.)

←

Total volume = 0.062 (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
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PR2WDET

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 01/21/21

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
6 hour, precipitation(inches) = 3.700
24 hour precipitation(inches) = 8.200
P6/P24 = 45.1%
San Diego hydrology manual 'C' values used

Process from Point/Station 202.000 to Point/Station 203.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.300 given for subarea
Rainfall intensity (I) = 6.175(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 10.15 min. Rain intensity = 6.17(In/Hr)
Total area = 0.242(Ac.) Total runoff = 0.607(CFS)

Process from Point/Station 202.000 to Point/Station 203.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 0.242(Ac.)
Runoff from this stream = 0.607(CFS)
Time of concentration = 10.15 min.
Rainfall intensity = 6.175(In/Hr)
Program is now starting with Main Stream No. 2

Process from Point/Station 205.000 to Point/Station 203.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.300 given for subarea
Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
User specified values are as follows:
TC = 5.00 min. Rain intensity = 9.75(In/Hr)
Total area = 0.023(Ac.) Total runoff = 0.070(CFS)

Process from Point/Station 205.000 to Point/Station 203.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2

PR2WDET

Stream flow area = 0.023(Ac.)
Runoff from this stream = 0.070(CFS)
Time of concentration = 5.00 min.
Rainfall intensity = 9.749(In/Hr)
Summary of stream data:

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

1	0.607	10.15	6.175
2	0.070	5.00	9.749

Qmax(1) =
1.000 * 1.000 * 0.607) +
0.633 * 1.000 * 0.070) + = 0.651
Qmax(2) =
1.000 * 0.493 * 0.607) +
1.000 * 1.000 * 0.070) + = 0.369

Total of 2 main streams to confluence:
Flow rates before confluence point:

0.607 0.070
Maximum flow rates at confluence using above data:
0.651 0.369

Area of streams before confluence:
0.242 0.023

Results of confluence:

Total flow rate = 0.651(CFS)
Time of concentration = 10.150 min.
Effective stream area after confluence = 0.265(Ac.)
End of computations, total study area = 0.265 (Ac.)

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Thursday, Jan 21 2021

PR-2 GUTTER

User-defined

Invert Elev (ft) = 1346.60
Slope (%) = 0.87
N-Value = 0.013

Calculations

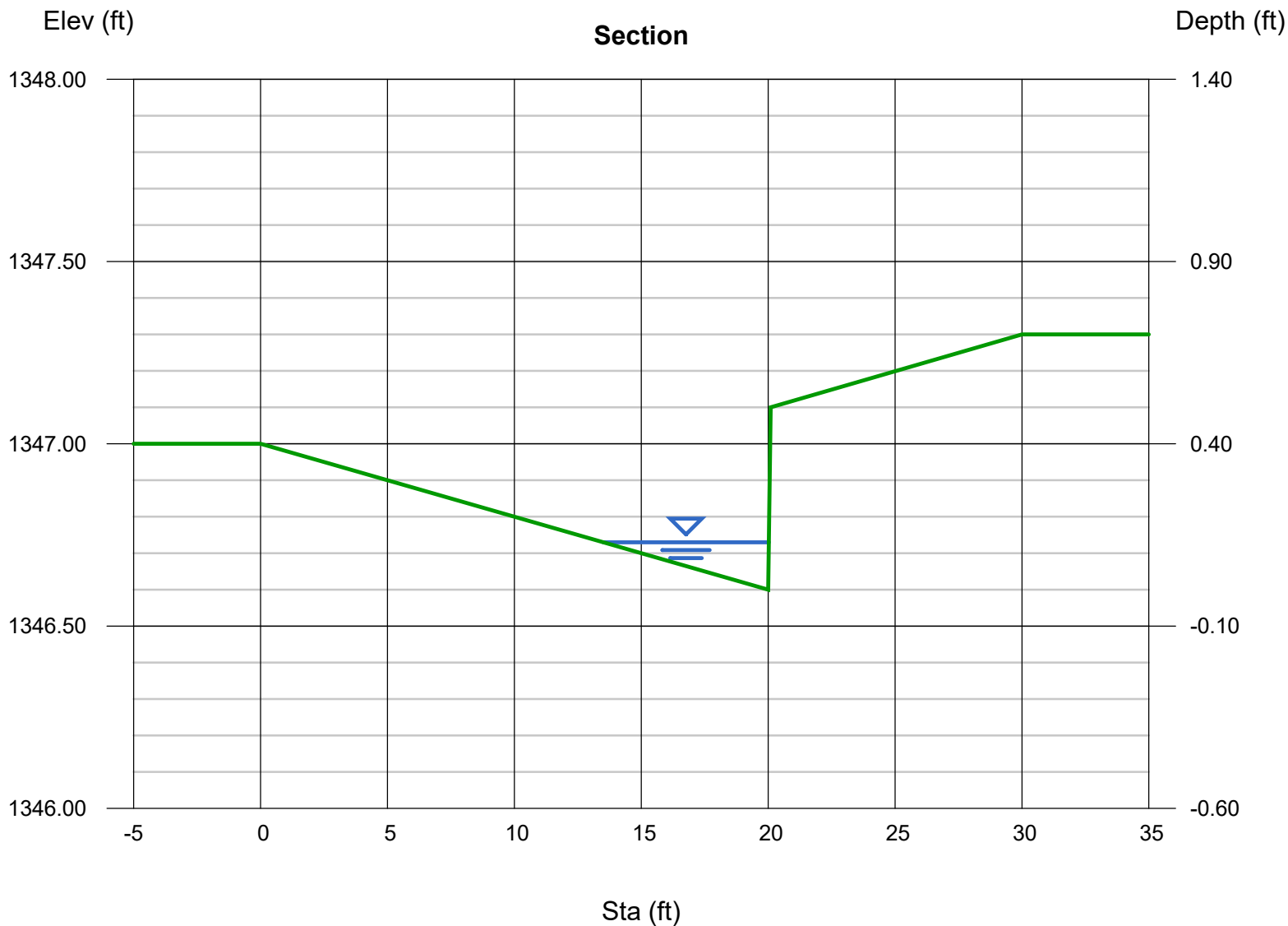
Compute by: Known Q
Known Q (cfs) = 0.65

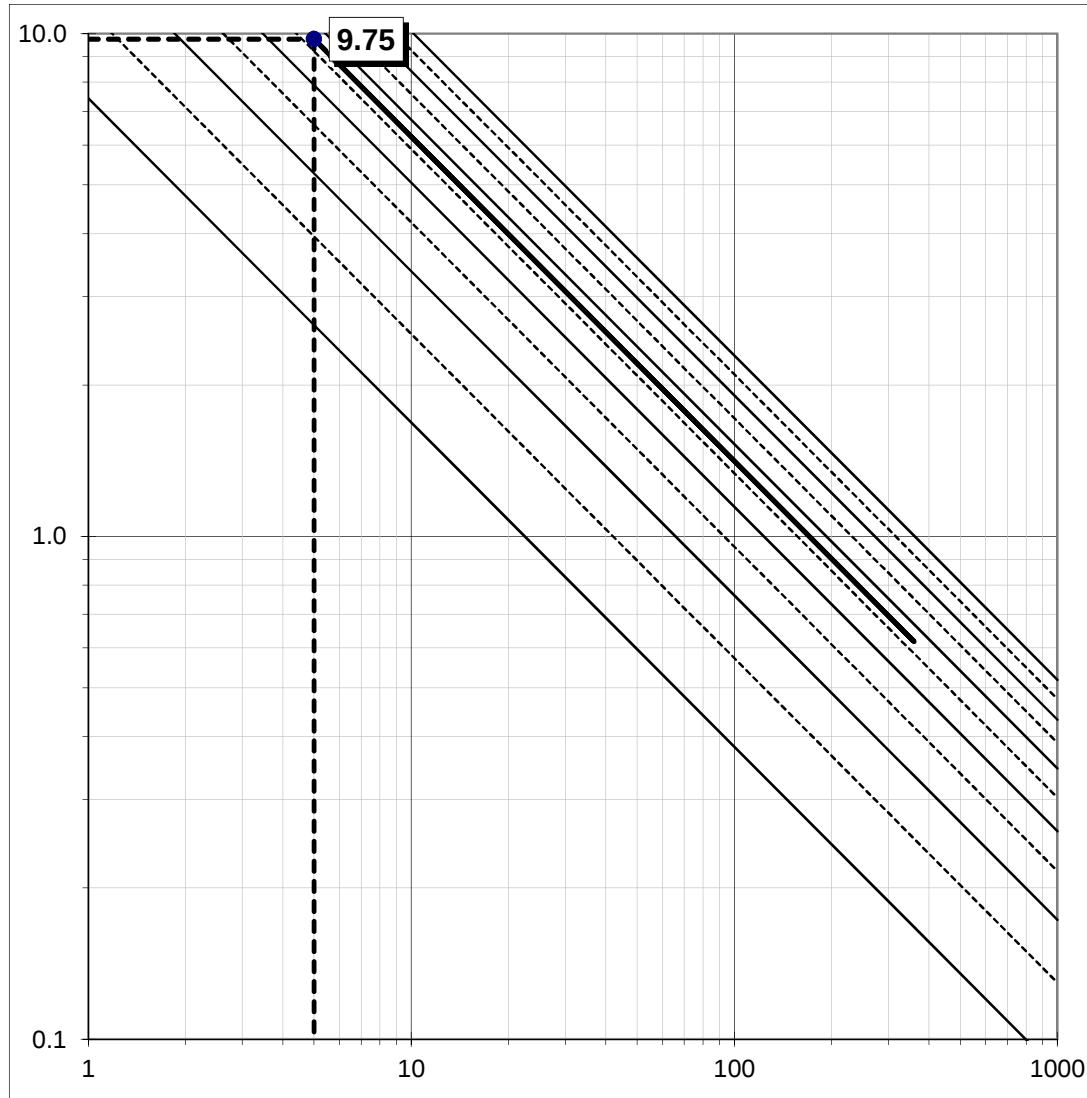
Highlighted

Depth (ft) = 0.13
Q (cfs) = 0.651
Area (sqft) = 0.42
Velocity (ft/s) = 1.53
Wetted Perim (ft) = 6.63
Crit Depth, Yc (ft) = 0.14
Top Width (ft) = 6.53
EGL (ft) = 0.17

(Sta, El, n)-(Sta, El, n)...

(0.00, 1347.00)-(20.00, 1346.60, 0.013)-(20.10, 1347.10, 0.013)-(30.00, 1347.30, 0.013)





PR-3A

Existing Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

C = 0.90

Dist. = 87.00 ft.

slope = 1.150 %

*T_c = 5.00 min.

* Minimum T_c = 5 Minutes

Natural Watershed (Kirpich)

L = 373 ft

ΔE = 0 ft

**T_c = #DIV/0! min.

** Minimum T_c = 10 Minutes

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

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

Basin Intensity Calculations

Selected Frequency, 100 year

P₆ = 3.7 in.

P₂₄ = 8.2 in.

P₆ / P₂₄ = 45%

Adjusted P₆ = 3.70 in.

T_c (D) = 5.00 min.

I = 9.75 in/hr

P₆ must be within
45% to 65% of P₂₄.
Adjust P₆ as needed.

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

Basin Flow Calculations

Q = 0.79 cfs

C = 0.90

I = 9.75 in/hr

A = 0.090 ac.

$$Q = C * I * A$$

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
 San Diego County Flood Control Division 2003 hydrology manual
 Rational Hydrology Study Date: 02/26/19

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
 6 hour, precipitation(inches) = 3.700
 24 hour precipitation(inches) = 8.200
 P6/P24 = 45.1%
 San Diego hydrology manual 'C' values used

 Process from Point/Station 301.000 to Point/Station 302.000
 **** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.900 given for subarea
 Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
 User specified values are as follows:
 TC = 5.00 min. Rain intensity = 9.75(In/Hr)
 Total area = 0.090(Ac.) Total runoff = 0.790(CFS)

 Process from Point/Station 302.000 to Point/Station 303.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.988(CFS)
 Depth of flow = 0.164(Ft.), Average velocity = 3.011(Ft/s)
 ***** Irregular Channel Data *****

Information entered for subchannel number 1 :

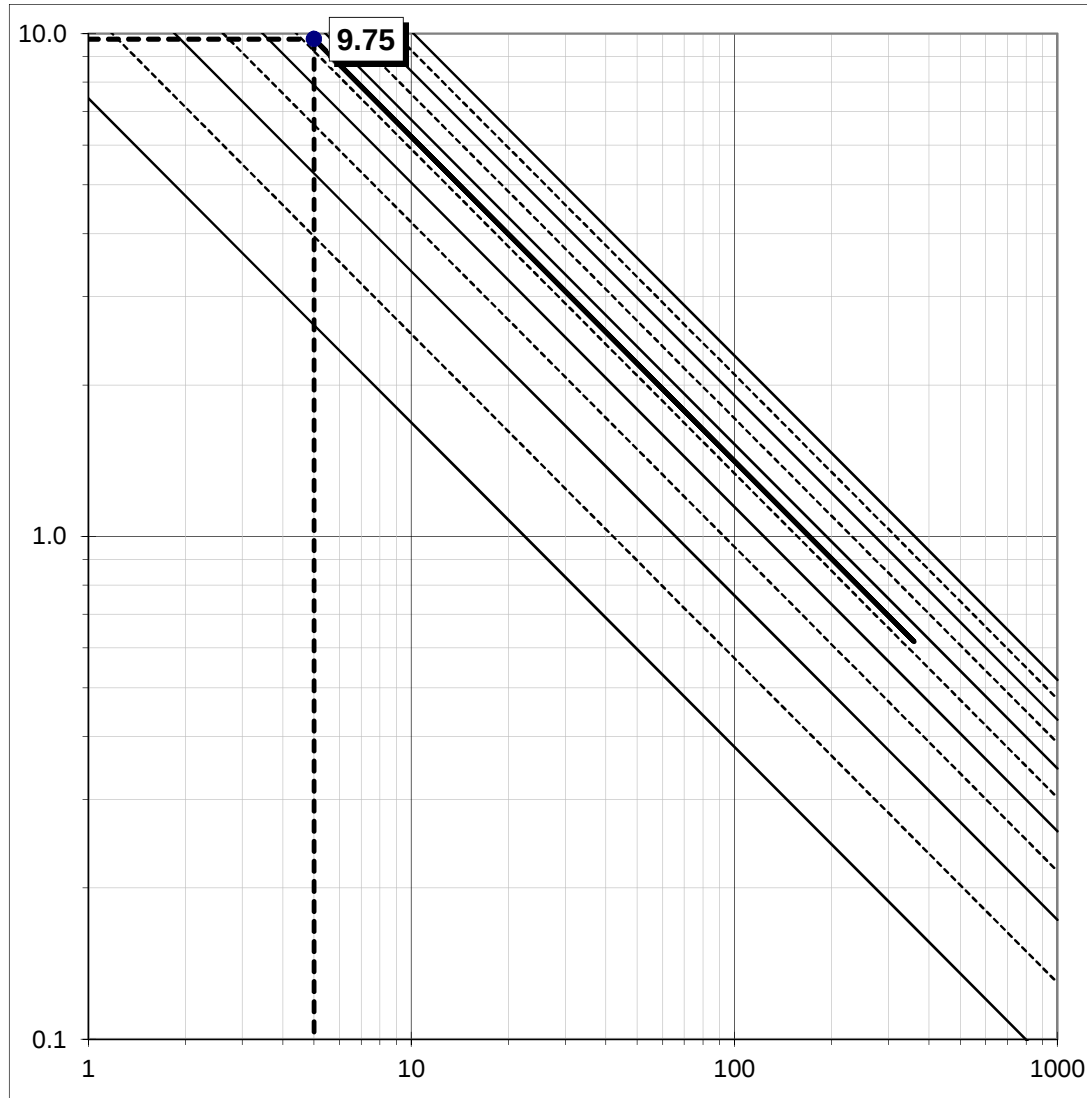
Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	24.00	0.00
3	24.50	0.50
4	30.00	0.70

Manning's 'N' friction factor = 0.013

Sub-Channel flow = 1.988(CFS)
 flow top width = 8.043(Ft.)
 velocity = 3.011(Ft/s)
 area = 0.660(Sq.Ft)
 Froude number = 1.852

Upstream point elevation = 1353.000(Ft.)
 Downstream point elevation = 1344.300(Ft.)
 Flow length = 442.000(Ft.)
 Travel time = 2.45 min.
 Time of concentration = 7.45 min.
 Depth of flow = 0.164(Ft.)
 Average velocity = 3.011(Ft/s)
 Total irregular channel flow = 1.988(CFS)
 Irregular channel normal depth above invert elev. = 0.164(Ft.)
 Average velocity of channel(s) = 3.011(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.540(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.900 given for subarea
 Rainfall intensity = 7.540(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.900 CA = 0.414
 Subarea runoff = 2.332(CFS) for 0.370(Ac.)
 Total runoff = 3.122(CFS) Total area = 0.460(Ac.)
 Depth of flow = 0.194(Ft.), Average velocity = 3.371(Ft/s)

End of computations, total study area = PR3 0.460 (Ac.)



PR-4

Proposed Conditions

Time of Concentration Calculations

Overland Flow Method

Land Use =

$C = 0.85$

Dist. = 126.00 ft.

slope = 1.350 %

* $T_c = 5.00$ min.

$$T_c = \frac{1.8(1.1 - C)\sqrt{D}}{\sqrt[3]{s}}$$

* Minimum $T_c = 5$ Minutes

Natural Watershed (Kirpich)

$L = 0$ ft

$\Delta E = 0$ ft

** $T_c = \text{\#DIV/0!}$ min.

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

** Minimum $T_c = 10$ Minutes

Basin Intensity Calculations

Selected Frequency, **100** year

$P_6 = 3.7$ in.

$P_{24} = 8.2$ in.

$P_6 / P_{24} = 45\%$

Adjusted $P_6 = 3.70$ in.

$T_c(D) = 5.00$ min.

$I = 9.75$ in/hr

P_6 must be within
45% to 65% of P_{24} .
Adjust P_6 as needed.

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

Basin Flow Calculations

$Q = 1.90$ cfs

$C = 0.85$

$I = 9.75$ in/hr

$A = 0.228$ ac.

$$Q = C * I * A$$

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
 San Diego County Flood Control Division 2003 hydrology manual
 Rational Hydrology Study Date: 01/21/21

***** Hydrology Study Control Information *****

Program License Serial Number 6313

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

Map data precipitation entered:
 6 hour, precipitation(inches) = 3.700
 24 hour precipitation(inches) = 8.200
 P6/P24 = 45.1%
 San Diego hydrology manual 'C' values used

 Process from Point/Station 401.000 to Point/Station 402.000
 **** USER DEFINED FLOW INFORMATION AT A POINT ****

User specified 'C' value of 0.850 given for subarea
 Rainfall intensity (I) = 9.749(In/Hr) for a 100.0 year storm
 User specified values are as follows:
 TC = 5.00 min. Rain intensity = 9.75(In/Hr)
 Total area = 0.228(Ac.) Total runoff = 1.900(CFS)

 Process from Point/Station 401.000 to Point/Station 402.000
 **** 6 HOUR HYDROGRAPH ****

 Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003

Time of Concentration = 5.00
 Basin Area = 0.23 Acres
 6 Hour Rainfall = 3.700 Inches
 Runoff Coefficient = 0.850
 Peak Discharge = 1.90 CFS

Time (Min)	Discharge (CFS)
0	0.000
5	0.043
10	0.043
15	0.044
20	0.044
25	0.045
30	0.046
35	0.047
40	0.047
45	0.048
50	0.049
55	0.050
60	0.050
65	0.051
70	0.052
75	0.053

PR4

80	0.054
85	0.056
90	0.056
95	0.058
100	0.059
105	0.061
110	0.062
115	0.064
120	0.065
125	0.067
130	0.068
135	0.071
140	0.072
145	0.076
150	0.077
155	0.081
160	0.083
165	0.088
170	0.090
175	0.096
180	0.099
185	0.106
190	0.110
195	0.120
200	0.125
205	0.139
210	0.147
215	0.169
220	0.183
225	0.224
230	0.255
235	0.374
240	0.527
245	1.900
250	0.300
255	0.201
260	0.157
265	0.132
270	0.115
275	0.102
280	0.093
285	0.085
290	0.079
295	0.074
300	0.070
305	0.066
310	0.063
315	0.060
320	0.057
325	0.055
330	0.053
335	0.051
340	0.049
345	0.048
350	0.046
355	0.045
360	0.043
365	0.042

+++++

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	0.5	0.9	1.4	1.9
0+ 0	0.0000	0.00	Q				

0+ 1	0.0000	0.01	Q
0+ 2	0.0000	0.02	Q
0+ 3	0.0001	0.03	Q
0+ 4	0.0001	0.03	Q
0+ 5	0.0002	0.04	Q
0+ 6	0.0002	0.04	Q
0+ 7	0.0003	0.04	Q
0+ 8	0.0004	0.04	Q
0+ 9	0.0004	0.04	Q
0+10	0.0005	0.04	Q
0+11	0.0005	0.04	Q
0+12	0.0006	0.04	Q
0+13	0.0007	0.04	Q
0+14	0.0007	0.04	Q
0+15	0.0008	0.04	Q
0+16	0.0008	0.04	Q
0+17	0.0009	0.04	Q
0+18	0.0010	0.04	Q
0+19	0.0010	0.04	Q
0+20	0.0011	0.04	Q
0+21	0.0011	0.04	Q
0+22	0.0012	0.04	Q
0+23	0.0013	0.04	Q
0+24	0.0013	0.05	Q
0+25	0.0014	0.05	Q
0+26	0.0014	0.05	Q
0+27	0.0015	0.05	QV
0+28	0.0016	0.05	QV
0+29	0.0016	0.05	QV
0+30	0.0017	0.05	QV
0+31	0.0018	0.05	QV
0+32	0.0018	0.05	QV
0+33	0.0019	0.05	QV
0+34	0.0020	0.05	QV
0+35	0.0020	0.05	QV
0+36	0.0021	0.05	QV
0+37	0.0021	0.05	QV
0+38	0.0022	0.05	QV
0+39	0.0023	0.05	QV
0+40	0.0023	0.05	QV
0+41	0.0024	0.05	QV
0+42	0.0025	0.05	QV
0+43	0.0025	0.05	Q
0+44	0.0026	0.05	Q
0+45	0.0027	0.05	Q
0+46	0.0027	0.05	Q
0+47	0.0028	0.05	Q
0+48	0.0029	0.05	Q
0+49	0.0029	0.05	Q
0+50	0.0030	0.05	QV
0+51	0.0031	0.05	QV
0+52	0.0031	0.05	QV
0+53	0.0032	0.05	QV
0+54	0.0033	0.05	QV
0+55	0.0033	0.05	QV
0+56	0.0034	0.05	QV
0+57	0.0035	0.05	QV
0+58	0.0035	0.05	QV
0+59	0.0036	0.05	QV
1+ 0	0.0037	0.05	QV
1+ 1	0.0038	0.05	QV
1+ 2	0.0038	0.05	QV
1+ 3	0.0039	0.05	QV
1+ 4	0.0040	0.05	QV
1+ 5	0.0040	0.05	QV
1+ 6	0.0041	0.05	QV
1+ 7	0.0042	0.05	QV
1+ 8	0.0043	0.05	QV

PR4

1+ 9	0.0043	0.05	QV
1+10	0.0044	0.05	QV
1+11	0.0045	0.05	QV
1+12	0.0045	0.05	Q V
1+13	0.0046	0.05	Q V
1+14	0.0047	0.05	Q V
1+15	0.0048	0.05	Q V
1+16	0.0048	0.05	Q V
1+17	0.0049	0.05	Q V
1+18	0.0050	0.05	Q V
1+19	0.0051	0.05	Q V
1+20	0.0051	0.05	Q V
1+21	0.0052	0.05	Q V
1+22	0.0053	0.05	Q V
1+23	0.0054	0.06	Q V
1+24	0.0054	0.06	Q V
1+25	0.0055	0.06	Q V
1+26	0.0056	0.06	Q V
1+27	0.0057	0.06	Q V
1+28	0.0057	0.06	Q V
1+29	0.0058	0.06	Q V
1+30	0.0059	0.06	Q V
1+31	0.0060	0.06	Q V
1+32	0.0061	0.06	Q V
1+33	0.0061	0.06	Q V
1+34	0.0062	0.06	Q V
1+35	0.0063	0.06	Q V
1+36	0.0064	0.06	Q V
1+37	0.0064	0.06	Q V
1+38	0.0065	0.06	Q V
1+39	0.0066	0.06	Q V
1+40	0.0067	0.06	Q V
1+41	0.0068	0.06	Q V
1+42	0.0069	0.06	Q V
1+43	0.0069	0.06	Q V
1+44	0.0070	0.06	Q V
1+45	0.0071	0.06	Q V
1+46	0.0072	0.06	Q V
1+47	0.0073	0.06	Q V
1+48	0.0074	0.06	Q V
1+49	0.0074	0.06	Q V
1+50	0.0075	0.06	Q V
1+51	0.0076	0.06	Q V
1+52	0.0077	0.06	Q V
1+53	0.0078	0.06	Q V
1+54	0.0079	0.06	Q V
1+55	0.0080	0.06	Q V
1+56	0.0080	0.06	Q V
1+57	0.0081	0.06	Q V
1+58	0.0082	0.06	Q V
1+59	0.0083	0.06	Q V
2+ 0	0.0084	0.06	Q V
2+ 1	0.0085	0.07	Q V
2+ 2	0.0086	0.07	Q V
2+ 3	0.0087	0.07	Q V
2+ 4	0.0088	0.07	Q V
2+ 5	0.0089	0.07	Q V
2+ 6	0.0090	0.07	Q V
2+ 7	0.0090	0.07	Q V
2+ 8	0.0091	0.07	Q V
2+ 9	0.0092	0.07	Q V
2+10	0.0093	0.07	Q V
2+11	0.0094	0.07	Q V
2+12	0.0095	0.07	Q V
2+13	0.0096	0.07	Q V
2+14	0.0097	0.07	Q V
2+15	0.0098	0.07	Q V
2+16	0.0099	0.07	Q V

2+17	0.0100	0.07	Q	V			
2+18	0.0101	0.07	Q	V			
2+19	0.0102	0.07	Q	V			
2+20	0.0103	0.07	Q	V			
2+21	0.0104	0.07	Q	V			
2+22	0.0105	0.07	Q	V			
2+23	0.0106	0.07	Q	V			
2+24	0.0107	0.07	Q	V			
2+25	0.0108	0.08	Q	V			
2+26	0.0109	0.08	Q	V			
2+27	0.0110	0.08	Q	V			
2+28	0.0111	0.08	Q	V			
2+29	0.0112	0.08	Q	V			
2+30	0.0113	0.08	Q	V			
2+31	0.0114	0.08	Q	V			
2+32	0.0116	0.08	Q	V			
2+33	0.0117	0.08	Q	V			
2+34	0.0118	0.08	Q	V			
2+35	0.0119	0.08	Q	V			
2+36	0.0120	0.08	Q	V			
2+37	0.0121	0.08	Q	V			
2+38	0.0122	0.08	Q	V			
2+39	0.0123	0.08	Q	V			
2+40	0.0125	0.08	Q	V			
2+41	0.0126	0.08	Q	V			
2+42	0.0127	0.08	Q	V			
2+43	0.0128	0.09	Q	V			
2+44	0.0129	0.09	Q	V			
2+45	0.0130	0.09	Q	V			
2+46	0.0132	0.09	Q	V			
2+47	0.0133	0.09	Q	V			
2+48	0.0134	0.09	Q	V			
2+49	0.0135	0.09	Q	V			
2+50	0.0137	0.09	Q	V			
2+51	0.0138	0.09	Q	V			
2+52	0.0139	0.09	Q	V			
2+53	0.0140	0.09	Q	V			
2+54	0.0142	0.09	Q	V			
2+55	0.0143	0.10	Q	V			
2+56	0.0144	0.10	Q	V			
2+57	0.0146	0.10	Q	V			
2+58	0.0147	0.10	Q	V			
2+59	0.0148	0.10	Q	V			
3+ 0	0.0150	0.10	Q	V			
3+ 1	0.0151	0.10	Q	V			
3+ 2	0.0153	0.10	Q	V			
3+ 3	0.0154	0.10	Q	V			
3+ 4	0.0155	0.10	Q	V			
3+ 5	0.0157	0.11	Q	V			
3+ 6	0.0158	0.11	Q	V			
3+ 7	0.0160	0.11	Q	V			
3+ 8	0.0161	0.11	Q	V			
3+ 9	0.0163	0.11	Q	V			
3+10	0.0164	0.11	Q	V			
3+11	0.0166	0.11	Q	V			
3+12	0.0167	0.11	Q	V			
3+13	0.0169	0.12	Q	V			
3+14	0.0171	0.12	Q	V			
3+15	0.0172	0.12	Q	V			
3+16	0.0174	0.12	Q	V			
3+17	0.0176	0.12	Q	V			
3+18	0.0177	0.12	Q	V			
3+19	0.0179	0.12	Q	V			
3+20	0.0181	0.13	Q	V			
3+21	0.0182	0.13	Q	V			
3+22	0.0184	0.13	Q	V			
3+23	0.0186	0.13	Q	V			
3+24	0.0188	0.14	Q	V			

3+25	0.0190	0.14	Q	V	PR4				
3+26	0.0192	0.14	Q	V					
3+27	0.0194	0.14	Q	V					
3+28	0.0196	0.14	Q	V					
3+29	0.0198	0.15	Q	V					
3+30	0.0200	0.15	Q	V					
3+31	0.0202	0.15	Q	V					
3+32	0.0204	0.16	Q	V					
3+33	0.0206	0.16	Q	V					
3+34	0.0209	0.16	Q	V					
3+35	0.0211	0.17	Q	V					
3+36	0.0213	0.17	Q	V					
3+37	0.0216	0.17	Q	V					
3+38	0.0218	0.18	Q	V					
3+39	0.0221	0.18	Q	V					
3+40	0.0223	0.18	Q	V					
3+41	0.0226	0.19	Q	V					
3+42	0.0228	0.20	Q	V					
3+43	0.0231	0.21	Q	V					
3+44	0.0234	0.22	Q	V					
3+45	0.0237	0.22	Q	V					
3+46	0.0241	0.23	Q	V					
3+47	0.0244	0.24	Q	V					
3+48	0.0247	0.24	Q	V					
3+49	0.0251	0.25	Q	V					
3+50	0.0254	0.25	Q	V					
3+51	0.0258	0.28	Q	V					
3+52	0.0262	0.30	Q	V					
3+53	0.0267	0.33	Q	V					
3+54	0.0271	0.35	Q	V					
3+55	0.0277	0.37	Q	V					
3+56	0.0282	0.40	Q	V					
3+57	0.0288	0.44	Q	V					
3+58	0.0295	0.47	Q	V					
3+59	0.0301	0.50	Q	V					
4+ 0	0.0309	0.53	Q	V					
4+ 1	0.0320	0.80		Q	V				
4+ 2	0.0334	1.08			Q	V			
4+ 3	0.0353	1.35				Q			
4+ 4	0.0375	1.63				V	Q		
4+ 5	0.0402	1.90					V		Q
4+ 6	0.0423	1.58					V		
4+ 7	0.0441	1.26				Q	V	Q	
4+ 8	0.0454	0.94			Q		V		
4+ 9	0.0462	0.62		Q			V		
4+10	0.0466	0.30	Q				V		
4+11	0.0470	0.28	Q				V		
4+12	0.0474	0.26	Q				V		
4+13	0.0477	0.24	Q				V		
4+14	0.0480	0.22	Q				V		
4+15	0.0483	0.20	Q				V		
4+16	0.0486	0.19	Q				V		
4+17	0.0488	0.18	Q				V		
4+18	0.0491	0.17	Q				V		
4+19	0.0493	0.17	Q				V		
4+20	0.0495	0.16	Q				V		
4+21	0.0497	0.15	Q				V		
4+22	0.0499	0.15	Q				V		
4+23	0.0501	0.14	Q				V		
4+24	0.0503	0.14	Q				V		
4+25	0.0505	0.13	Q				V		
4+26	0.0506	0.13	Q				V		
4+27	0.0508	0.12	Q				V		
4+28	0.0510	0.12	Q				V		
4+29	0.0511	0.12	Q				V		
4+30	0.0513	0.11	Q				V		
4+31	0.0515	0.11	Q				V		
4+32	0.0516	0.11	Q				V		

					PR4	
4+33	0.0518	0.11	Q		V	
4+34	0.0519	0.10	Q		V	
4+35	0.0520	0.10	Q		V	
4+36	0.0522	0.10	Q		V	
4+37	0.0523	0.10	Q		V	
4+38	0.0525	0.10	Q		V	
4+39	0.0526	0.09	Q		V	
4+40	0.0527	0.09	Q		V	
4+41	0.0528	0.09	Q		V	
4+42	0.0530	0.09	Q		V	
4+43	0.0531	0.09	Q		V	
4+44	0.0532	0.09	Q		V	
4+45	0.0533	0.09	Q		V	
4+46	0.0534	0.08	Q		V	
4+47	0.0535	0.08	Q		V	
4+48	0.0537	0.08	Q		V	
4+49	0.0538	0.08	Q		V	
4+50	0.0539	0.08	Q		V	
4+51	0.0540	0.08	Q		V	
4+52	0.0541	0.08	Q		V	
4+53	0.0542	0.08	Q		V	
4+54	0.0543	0.08	Q		V	
4+55	0.0544	0.07	Q		V	
4+56	0.0545	0.07	Q		V	
4+57	0.0546	0.07	Q		V	
4+58	0.0547	0.07	Q		V	
4+59	0.0548	0.07	Q		V	
5+ 0	0.0549	0.07	Q		V	
5+ 1	0.0550	0.07	Q		V	
5+ 2	0.0551	0.07	Q		V	
5+ 3	0.0552	0.07	Q		V	
5+ 4	0.0553	0.07	Q		V	
5+ 5	0.0554	0.07	Q		V	
5+ 6	0.0554	0.07	Q		V	
5+ 7	0.0555	0.06	Q		V	
5+ 8	0.0556	0.06	Q		V	
5+ 9	0.0557	0.06	Q		V	
5+10	0.0558	0.06	Q		V	
5+11	0.0559	0.06	Q		V	
5+12	0.0560	0.06	Q		V	
5+13	0.0561	0.06	Q		V	
5+14	0.0561	0.06	Q		V	
5+15	0.0562	0.06	Q		V	
5+16	0.0563	0.06	Q		V	
5+17	0.0564	0.06	Q		V	
5+18	0.0565	0.06	Q		V	
5+19	0.0565	0.06	Q		V	
5+20	0.0566	0.06	Q		V	
5+21	0.0567	0.06	Q		V	
5+22	0.0568	0.06	Q		V	
5+23	0.0569	0.06	Q		V	
5+24	0.0569	0.06	Q		V	
5+25	0.0570	0.05	Q		V	
5+26	0.0571	0.05	Q		V	
5+27	0.0572	0.05	Q		V	
5+28	0.0572	0.05	Q		V	
5+29	0.0573	0.05	Q		V	
5+30	0.0574	0.05	Q		V	
5+31	0.0574	0.05	Q		V	
5+32	0.0575	0.05	Q		V	
5+33	0.0576	0.05	Q		V	
5+34	0.0577	0.05	Q		V	
5+35	0.0577	0.05	Q		V	
5+36	0.0578	0.05	Q		V	
5+37	0.0579	0.05	Q		V	
5+38	0.0579	0.05	Q		V	
5+39	0.0580	0.05	Q		V	
5+40	0.0581	0.05	Q		V	

					PR4		
5+41	0.0581	0.05	Q			V	
5+42	0.0582	0.05	Q			V	
5+43	0.0583	0.05	Q			V	
5+44	0.0583	0.05	Q			V	
5+45	0.0584	0.05	Q			V	
5+46	0.0585	0.05	Q			V	
5+47	0.0585	0.05	Q			V	
5+48	0.0586	0.05	Q			V	
5+49	0.0587	0.05	Q			V	
5+50	0.0587	0.05	Q			V	
5+51	0.0588	0.05	Q			V	
5+52	0.0589	0.05	Q			V	
5+53	0.0589	0.05	Q			V	
5+54	0.0590	0.05	Q			V	
5+55	0.0590	0.04	Q			V	
5+56	0.0591	0.04	Q			V	
5+57	0.0592	0.04	Q			V	
5+58	0.0592	0.04	Q			V	
5+59	0.0593	0.04	Q			V	
6+ 0	0.0593	0.04	Q			V	
6+ 1	0.0594	0.04	Q			V	
6+ 2	0.0595	0.04	Q			V	
6+ 3	0.0595	0.04	Q			V	
6+ 4	0.0596	0.04	Q			V	
6+ 5	0.0596	0.04	Q			V	

End of computations, total study area = 0.228 (Ac.)

Stage Storage Capacity Caculations

$Q_{out} = AV = A \text{ acres} * 43560 \text{ sf/Acre (infiltration rate in/hr)} * 1\text{ft}/12\text{in (1 hr/3600 sec)}$

Orifice Flow: $Q = C * A * \text{sqrt}(2gh)$
 $g = 32.20 \text{ ft/sec}^2$
 $C = 0.60$

Orifice-1

No. of openings 4
 Elevation 0.00
 diameter 4 inches 0.33 ft
 $A = 0.35 \text{ sf}$

$A = (\pi * D^2) / 4$

<u>Water Depth (ft)</u>	<u>Volume (cf)</u>	<u>Stage Storage Area (Ac.ft)</u>	<u>Area of Infiltration (ft)</u>	<u>Q infiltration</u>	<u>Effective Head Orifice-1</u>	<u>Q cfs Orifice-1</u>
0.00	0	0.000	N/A	0.000	N/A	0.000
0.50	52	0.001	N/A	0.000	0.33	0.970
1.00	103	0.002	N/A	0.000	0.83	1.534
1.25	129	0.003	N/A	0.000	1.08	1.749

PR4DET

FLOOD HYDROGRAPH ROUTING PROGRAM
Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2012
Study date: 01/21/21

Program License Serial Number 6313

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

From study/file name: PR4.rte
*****HYDROGRAPH DATA*****
Number of intervals = 365
Time interval = 1.0 (Min.)
Maximum/Peak flow rate = 1.900 (CFS)
Total volume = 0.060 (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

Flow into tree well

+++++
Process from Point/Station 401.000 to Point/Station 402.000
**** RETARDING BASIN ROUTING ****

User entry of depth-outflow-storage data

Total number of inflow hydrograph intervals = 365
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 Storage Outflow (S-0*dt/2) (S+0*dt/2)
(Ft.) (Ac.Ft) (CFS) (Ac.Ft) (Ac.Ft)

0.000 0.000 0.000 0.000 0.000
0.500 0.001 1.189 0.000 0.002
1.000 0.002 1.917 0.001 0.003
1.500 0.003 2.193 0.001 0.005

Hydrograph Detention Basin Routing

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

Time Inflow Outflow Storage Depth
(Hours) (CFS) (CFS) (Ac.Ft) .0 0.5 0.95 1.42 1.90 (Ft.)
0.017 0.01 0.00 0.000 0 | | | | 0.00
0.033 0.02 0.01 0.000 0 | | | | 0.01
0.050 0.03 0.02 0.000 0 | | | | 0.01
0.067 0.03 0.03 0.000 0 | | | | 0.01
0.083 0.04 0.04 0.000 0 | | | | 0.02

					PR4DET	
0.100	0.04	0.04	0.000	0		0.02
0.117	0.04	0.04	0.000	0		0.02
0.133	0.04	0.04	0.000	0		0.02
0.150	0.04	0.04	0.000	0		0.02
0.167	0.04	0.04	0.000	0		0.02
0.183	0.04	0.04	0.000	0		0.02
0.200	0.04	0.04	0.000	0		0.02
0.217	0.04	0.04	0.000	0		0.02
0.233	0.04	0.04	0.000	0		0.02
0.250	0.04	0.04	0.000	0		0.02
0.267	0.04	0.04	0.000	0		0.02
0.283	0.04	0.04	0.000	0		0.02
0.300	0.04	0.04	0.000	0		0.02
0.317	0.04	0.04	0.000	0		0.02
0.333	0.04	0.04	0.000	0		0.02
0.350	0.04	0.04	0.000	0		0.02
0.367	0.04	0.04	0.000	0		0.02
0.383	0.04	0.04	0.000	0		0.02
0.400	0.05	0.04	0.000	0		0.02
0.417	0.05	0.05	0.000	0		0.02
0.433	0.05	0.05	0.000	0		0.02
0.450	0.05	0.05	0.000	0		0.02
0.467	0.05	0.05	0.000	0		0.02
0.483	0.05	0.05	0.000	0		0.02
0.500	0.05	0.05	0.000	0		0.02
0.517	0.05	0.05	0.000	0		0.02
0.533	0.05	0.05	0.000	0		0.02
0.550	0.05	0.05	0.000	0		0.02
0.567	0.05	0.05	0.000	0		0.02
0.583	0.05	0.05	0.000	0		0.02
0.600	0.05	0.05	0.000	0		0.02
0.617	0.05	0.05	0.000	0		0.02
0.633	0.05	0.05	0.000	0		0.02
0.650	0.05	0.05	0.000	0		0.02
0.667	0.05	0.05	0.000	0		0.02
0.683	0.05	0.05	0.000	0		0.02
0.700	0.05	0.05	0.000	0		0.02
0.717	0.05	0.05	0.000	0		0.02
0.733	0.05	0.05	0.000	0		0.02
0.750	0.05	0.05	0.000	0		0.02
0.767	0.05	0.05	0.000	0		0.02
0.783	0.05	0.05	0.000	0		0.02
0.800	0.05	0.05	0.000	0		0.02
0.817	0.05	0.05	0.000	0		0.02
0.833	0.05	0.05	0.000	0		0.02
0.850	0.05	0.05	0.000	0		0.02
0.867	0.05	0.05	0.000	0		0.02
0.883	0.05	0.05	0.000	0		0.02
0.900	0.05	0.05	0.000	0		0.02
0.917	0.05	0.05	0.000	0		0.02
0.933	0.05	0.05	0.000	0		0.02
0.950	0.05	0.05	0.000	0		0.02
0.967	0.05	0.05	0.000	0		0.02
0.983	0.05	0.05	0.000	0		0.02
1.000	0.05	0.05	0.000	0		0.02
1.017	0.05	0.05	0.000	0		0.02
1.033	0.05	0.05	0.000	0		0.02
1.050	0.05	0.05	0.000	0		0.02
1.067	0.05	0.05	0.000	0		0.02
1.083	0.05	0.05	0.000	0		0.02
1.100	0.05	0.05	0.000	0		0.02
1.117	0.05	0.05	0.000	0		0.02
1.133	0.05	0.05	0.000	0		0.02
1.150	0.05	0.05	0.000	0		0.02
1.167	0.05	0.05	0.000	0		0.02
1.183	0.05	0.05	0.000	0		0.02
1.200	0.05	0.05	0.000	0		0.02
1.217	0.05	0.05	0.000	0		0.02

						PR4DET			
1.233	0.05	0.05	0.000	0					0.02
1.250	0.05	0.05	0.000	0					0.02
1.267	0.05	0.05	0.000	0					0.02
1.283	0.05	0.05	0.000	0					0.02
1.300	0.05	0.05	0.000	0					0.02
1.317	0.05	0.05	0.000	0					0.02
1.333	0.05	0.05	0.000	0					0.02
1.350	0.05	0.05	0.000	0					0.02
1.367	0.05	0.05	0.000	0					0.02
1.383	0.06	0.05	0.000	0					0.02
1.400	0.06	0.06	0.000	0					0.02
1.417	0.06	0.06	0.000	0					0.02
1.433	0.06	0.06	0.000	0					0.02
1.450	0.06	0.06	0.000	0					0.02
1.467	0.06	0.06	0.000	0					0.02
1.483	0.06	0.06	0.000	0					0.02
1.500	0.06	0.06	0.000	0					0.02
1.517	0.06	0.06	0.000	0					0.02
1.533	0.06	0.06	0.000	0					0.02
1.550	0.06	0.06	0.000	0					0.02
1.567	0.06	0.06	0.000	0					0.02
1.583	0.06	0.06	0.000	0					0.02
1.600	0.06	0.06	0.000	0					0.02
1.617	0.06	0.06	0.000	0					0.02
1.633	0.06	0.06	0.000	0					0.02
1.650	0.06	0.06	0.000	0					0.02
1.667	0.06	0.06	0.000	0					0.02
1.683	0.06	0.06	0.000	0					0.02
1.700	0.06	0.06	0.000	OI					0.02
1.717	0.06	0.06	0.000	0					0.03
1.733	0.06	0.06	0.000	0					0.03
1.750	0.06	0.06	0.000	0					0.03
1.767	0.06	0.06	0.000	0					0.03
1.783	0.06	0.06	0.000	0					0.03
1.800	0.06	0.06	0.000	0					0.03
1.817	0.06	0.06	0.000	0					0.03
1.833	0.06	0.06	0.000	0					0.03
1.850	0.06	0.06	0.000	0					0.03
1.867	0.06	0.06	0.000	0					0.03
1.883	0.06	0.06	0.000	0					0.03
1.900	0.06	0.06	0.000	0					0.03
1.917	0.06	0.06	0.000	0					0.03
1.933	0.06	0.06	0.000	0					0.03
1.950	0.06	0.06	0.000	0					0.03
1.967	0.06	0.06	0.000	0					0.03
1.983	0.06	0.06	0.000	0					0.03
2.000	0.06	0.06	0.000	0					0.03
2.017	0.07	0.06	0.000	0					0.03
2.033	0.07	0.07	0.000	0					0.03
2.050	0.07	0.07	0.000	0					0.03
2.067	0.07	0.07	0.000	0					0.03
2.083	0.07	0.07	0.000	0					0.03
2.100	0.07	0.07	0.000	0					0.03
2.117	0.07	0.07	0.000	0					0.03
2.133	0.07	0.07	0.000	0					0.03
2.150	0.07	0.07	0.000	0					0.03
2.167	0.07	0.07	0.000	0					0.03
2.183	0.07	0.07	0.000	0					0.03
2.200	0.07	0.07	0.000	0					0.03
2.217	0.07	0.07	0.000	0					0.03
2.233	0.07	0.07	0.000	0					0.03
2.250	0.07	0.07	0.000	0					0.03
2.267	0.07	0.07	0.000	0					0.03
2.283	0.07	0.07	0.000	0					0.03
2.300	0.07	0.07	0.000	0					0.03
2.317	0.07	0.07	0.000	0					0.03
2.333	0.07	0.07	0.000	0					0.03
2.350	0.07	0.07	0.000	0					0.03

						PR4DET						
3.500	0.15	0.15	0.000	0								0.06
3.517	0.15	0.15	0.000	0								0.06
3.533	0.16	0.15	0.000	0								0.06
3.550	0.16	0.16	0.000	0								0.07
3.567	0.16	0.16	0.000	0								0.07
3.583	0.17	0.17	0.000	0								0.07
3.600	0.17	0.17	0.000	0								0.07
3.617	0.17	0.17	0.000	0								0.07
3.633	0.18	0.18	0.000	0								0.07
3.650	0.18	0.18	0.000	0								0.08
3.667	0.18	0.18	0.000	0								0.08
3.683	0.19	0.19	0.000	0								0.08
3.700	0.20	0.19	0.000	0								0.08
3.717	0.21	0.20	0.000	0								0.09
3.733	0.22	0.21	0.000	0								0.09
3.750	0.22	0.22	0.000	0								0.09
3.767	0.23	0.23	0.000	0								0.10
3.783	0.24	0.23	0.000	0								0.10
3.800	0.24	0.24	0.000	0								0.10
3.817	0.25	0.24	0.000	0								0.10
3.833	0.25	0.25	0.000	0								0.11
3.850	0.28	0.27	0.000	0								0.11
3.867	0.30	0.29	0.000	0I								0.12
3.883	0.33	0.31	0.000	0								0.13
3.900	0.35	0.34	0.000	0								0.14
3.917	0.37	0.36	0.000	0								0.15
3.933	0.40	0.39	0.000	0								0.16
3.950	0.44	0.42	0.000	0								0.18
3.967	0.47	0.45	0.000	0								0.19
3.983	0.50	0.48	0.000	0								0.20
4.000	0.53	0.51	0.000	0								0.21
4.017	0.80	0.65	0.001		0	I						0.27
4.033	1.08	0.91	0.001			0	I					0.38
4.050	1.35	1.18	0.001				0	I				0.50
4.067	1.63	1.39	0.001					0	I			0.64
4.083	1.90	1.64	0.002						0	I		0.81
4.100	1.58	1.71	0.002	I				I	I	0	I	0.86
4.117	1.26	1.52	0.001					I		0		0.72
4.133	0.94	1.24	0.001				I		0			0.53
4.150	0.62	0.84	0.001			I		0				0.35
4.167	0.30	0.50	0.000	I	0							0.21
4.183	0.28	0.31	0.000	IO								0.13
4.200	0.26	0.27	0.000	0								0.12
4.217	0.24	0.25	0.000	0								0.11
4.233	0.22	0.23	0.000	0								0.10
4.250	0.20	0.21	0.000	0								0.09
4.267	0.19	0.20	0.000	0								0.08
4.283	0.18	0.19	0.000	0								0.08
4.300	0.17	0.18	0.000	IO								0.08
4.317	0.17	0.17	0.000	0								0.07
4.333	0.16	0.16	0.000	0								0.07
4.350	0.15	0.16	0.000	0								0.07
4.367	0.15	0.15	0.000	0								0.06
4.383	0.14	0.14	0.000	0								0.06
4.400	0.14	0.14	0.000	0								0.06
4.417	0.13	0.13	0.000	0								0.06
4.433	0.13	0.13	0.000	0								0.05
4.450	0.12	0.13	0.000	0								0.05
4.467	0.12	0.12	0.000	0								0.05
4.483	0.12	0.12	0.000	IO								0.05
4.500	0.11	0.12	0.000	0								0.05
4.517	0.11	0.11	0.000	0								0.05
4.533	0.11	0.11	0.000	0								0.05
4.550	0.11	0.11	0.000	0								0.05
4.567	0.10	0.11	0.000	0								0.04
4.583	0.10	0.10	0.000	0								0.04
4.600	0.10	0.10	0.000	0								0.04
4.617	0.10	0.10	0.000	0								0.04

Maximum Detention
Depth: 0.9'

						PR4DET		
4.633	0.10	0.10	0.000	0				0.04
4.650	0.09	0.10	0.000	0				0.04
4.667	0.09	0.09	0.000	0				0.04
4.683	0.09	0.09	0.000	0				0.04
4.700	0.09	0.09	0.000	0				0.04
4.717	0.09	0.09	0.000	0				0.04
4.733	0.09	0.09	0.000	0				0.04
4.750	0.09	0.09	0.000	0				0.04
4.767	0.08	0.08	0.000	0				0.04
4.783	0.08	0.08	0.000	0				0.04
4.800	0.08	0.08	0.000	0				0.03
4.817	0.08	0.08	0.000	0				0.03
4.833	0.08	0.08	0.000	0				0.03
4.850	0.08	0.08	0.000	0				0.03
4.867	0.08	0.08	0.000	0				0.03
4.883	0.08	0.08	0.000	0				0.03
4.900	0.08	0.08	0.000	0				0.03
4.917	0.07	0.07	0.000	0				0.03
4.933	0.07	0.07	0.000	0				0.03
4.950	0.07	0.07	0.000	0				0.03
4.967	0.07	0.07	0.000	0				0.03
4.983	0.07	0.07	0.000	0				0.03
5.000	0.07	0.07	0.000	0				0.03
5.017	0.07	0.07	0.000	0				0.03
5.033	0.07	0.07	0.000	0				0.03
5.050	0.07	0.07	0.000	0				0.03
5.067	0.07	0.07	0.000	0				0.03
5.083	0.07	0.07	0.000	0				0.03
5.100	0.07	0.07	0.000	0				0.03
5.117	0.06	0.06	0.000	0				0.03
5.133	0.06	0.06	0.000	0				0.03
5.150	0.06	0.06	0.000	0				0.03
5.167	0.06	0.06	0.000	0				0.03
5.183	0.06	0.06	0.000	0				0.03
5.200	0.06	0.06	0.000	0				0.03
5.217	0.06	0.06	0.000	0				0.03
5.233	0.06	0.06	0.000	0				0.03
5.250	0.06	0.06	0.000	0				0.03
5.267	0.06	0.06	0.000	IO				0.03
5.283	0.06	0.06	0.000	0				0.02
5.300	0.06	0.06	0.000	0				0.02
5.317	0.06	0.06	0.000	0				0.02
5.333	0.06	0.06	0.000	0				0.02
5.350	0.06	0.06	0.000	0				0.02
5.367	0.06	0.06	0.000	0				0.02
5.383	0.06	0.06	0.000	0				0.02
5.400	0.06	0.06	0.000	0				0.02
5.417	0.05	0.06	0.000	0				0.02
5.433	0.05	0.05	0.000	0				0.02
5.450	0.05	0.05	0.000	0				0.02
5.467	0.05	0.05	0.000	0				0.02
5.483	0.05	0.05	0.000	0				0.02
5.500	0.05	0.05	0.000	0				0.02
5.517	0.05	0.05	0.000	0				0.02
5.533	0.05	0.05	0.000	0				0.02
5.550	0.05	0.05	0.000	0				0.02
5.567	0.05	0.05	0.000	0				0.02
5.583	0.05	0.05	0.000	0				0.02
5.600	0.05	0.05	0.000	0				0.02
5.617	0.05	0.05	0.000	0				0.02
5.633	0.05	0.05	0.000	0				0.02
5.650	0.05	0.05	0.000	0				0.02
5.667	0.05	0.05	0.000	0				0.02
5.683	0.05	0.05	0.000	0				0.02
5.700	0.05	0.05	0.000	0				0.02
5.717	0.05	0.05	0.000	0				0.02
5.733	0.05	0.05	0.000	0				0.02
5.750	0.05	0.05	0.000	0				0.02

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc.

Thursday, Jan 21 2021

OFF-1 GUTTER

User-defined

Invert Elev (ft) = 1346.60
Slope (%) = 1.00
N-Value = 0.013

Calculations

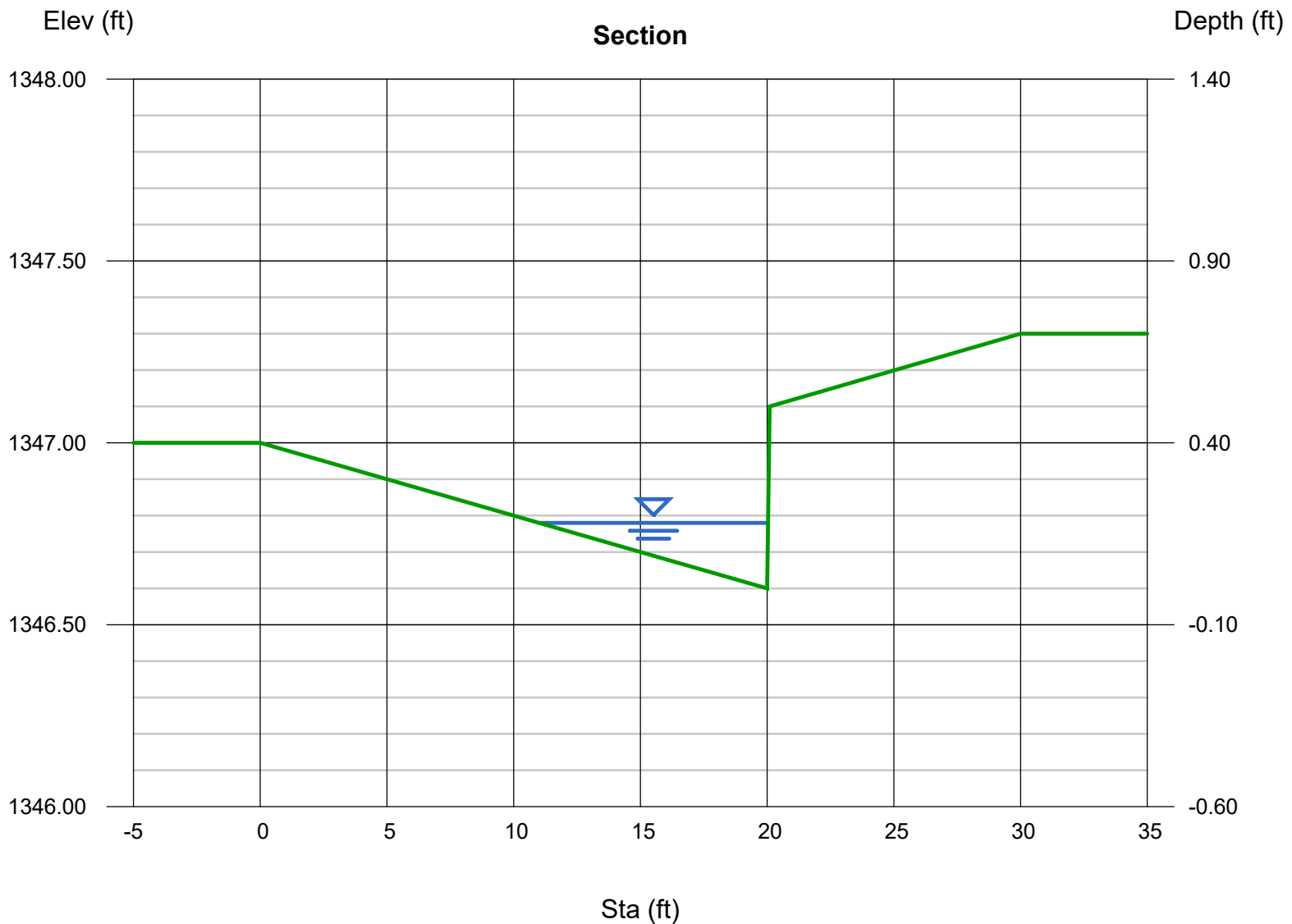
Compute by: Known Q
Known Q (cfs) = 1.71

Highlighted

Depth (ft) = 0.18
Q (cfs) = 1.710
Area (sqft) = 0.81
Velocity (ft/s) = 2.10
Wetted Perim (ft) = 9.19
Crit Depth, Yc (ft) = 0.20
Top Width (ft) = 9.04
EGL (ft) = 0.25

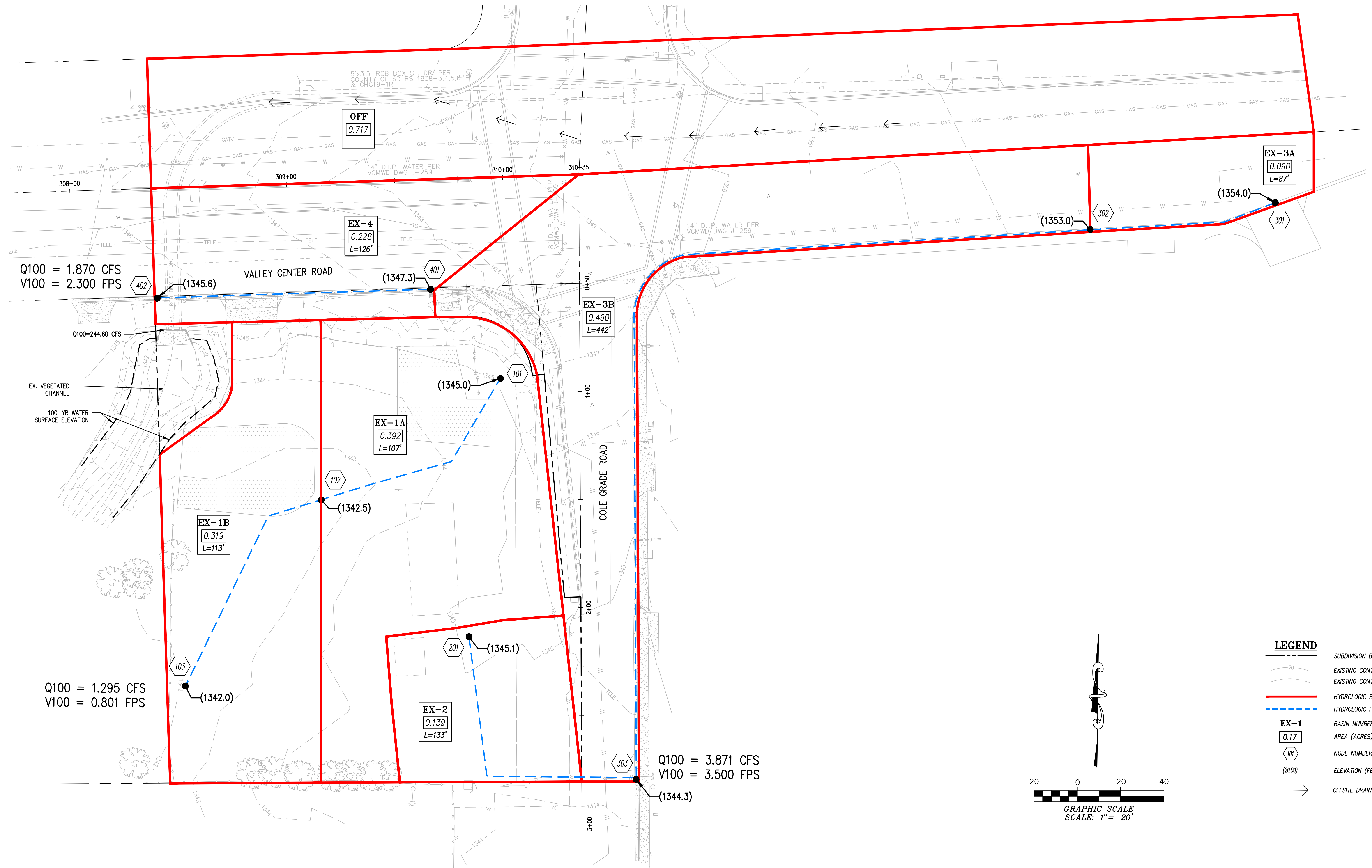
(Sta, El, n)-(Sta, El, n)...

(0.00, 1347.00)-(20.00, 1346.60, 0.013)-(20.10, 1347.10, 0.013)-(30.00, 1347.30, 0.013)



ATTACHMENT 5

HYDROLOGY MAP - EXISTING CONDITIONS



ATTACHMENT 6

HYDROLOGY MAP - PROPOSED CONDITIONS

