PRELIMINARY DRAINAGE REPORT

For

PARADISE VALLEY ROAD GAS STATION

NORTH EAST CORNER OF PARADISE VALLEY ROAD AND ELKELTON BLVD.
SPRING VALLEY, CA 91977

APN 584-160-52-00

November, 2019
Revised: February, 2023

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PREPARED BY:
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Introduction

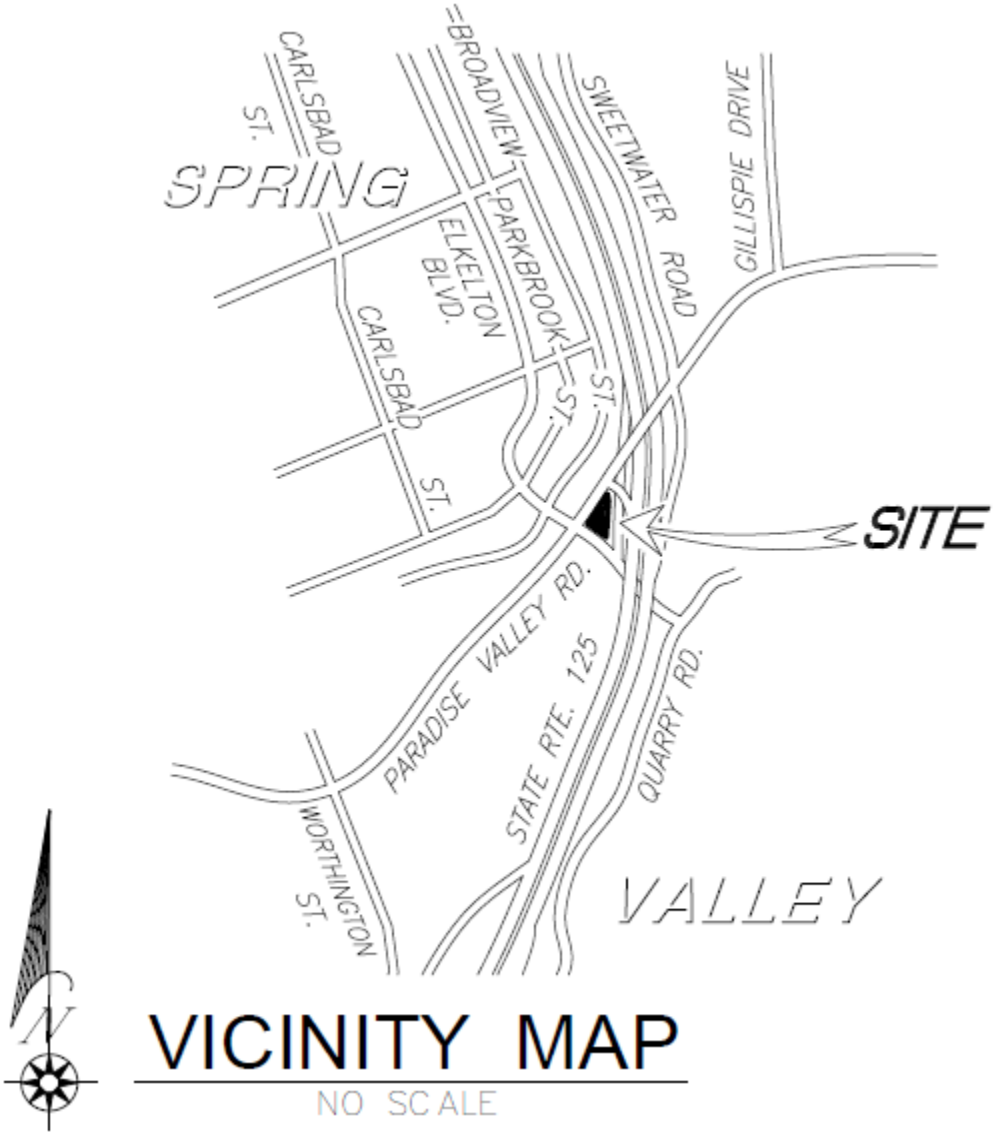
This Drainage Study for the proposed Gas Station development for APN 584-160-52 has been prepared to analyze the hydrologic and hydraulic characteristics of the existing and proposed project site. This report intends to present both the methodology and the calculations used for determining the runoff from the project site in both the pre-developed (existing) conditions and the post-developed (proposed) conditions produced by the 100-year, 6-hour storm. In addition, this report will propose the sizing of all necessary storm drain facilities and storm drain piping to safely convey the runoff, based on the 100-year rainfall event, per County of San Diego Hydrology and Storm Drain Design Standards.

Elevations range for APN 584-160-52 are approximately 287 feet above mean sea level (mls) in the north corner of the site adjacent to Paradise valley road to approximately 283.5 feet, approximately at the midpoint of the south east property line which runs parallel to state route 125.

The project is a proposed gas station, a retail building with parking, carwash and all the necessary utilities. The site is located at the north east corner of Paradise Valle Road and Elkelton Place in Spring Valley. Project site is a triangular shape and is bordered Paradise Valley road on the north, a freeway on ramp on the east and by Elkelton Blvd to the south.

Project site is currently undeveloped, with a driveway access approximately 120 feet north or intersection of Paradise Valley Road and Elkelton Blvd. The site has never been developed and has no impervious surfaces located within the site.

PROJECT VICINITY MAP



Existing Drainage Conditions

Project site is fairly flat terrain with a low point located approximately at the midpoint of the easterly property line, the site has high points located at the north corner of the project site with the terrain sloping in a south east direction towards the low point. The south portion of the site flows on a north easterly direction towards the low point. Flow leaves the site as sheet flow and enter an existing concrete swale, which runs parallel to the easterly property line, once flows enter the concrete swale they are collected by an underground storm drain system which conveys flow under State Route 125 ultimately discharging in a creek located on the east side of state route 125, which flows in a south westerly direction and ultimately connecting to the Sweetwater river, approximately 0.25 miles west of the Sweetwater Reservoir. An existing curb inlet is located approximately 15 feet south of the existing driveway on Paradise Valley Road, flows are capture and immediately conveyed under ground and routed to the same creek located on the east side of State Route 125.

Proposed Drainage Conditions

The project proposes to create new impervious surfaces consistent with a gas station: Rooftop, driveways, gas station canopy, and parking and a carwash. There will be grading activities to level out areas for new improvements, the drainage patterns will be adjusted to allow for surface flows to be collected at the access driveway of the site via a trench drain. The project proposes installation of storm drain structures that will convey flows to the same pre-development discharge point. All generated will sheet flows in a northerly direction and will be collected by a trench drain located along the access driveway to the site. Flows will then be taken via an 8” HDPE storm drain system to proposed bio-filtration facilities for water quality pollution control, hydromodification management and Q_{100} attenuation. Treated flows will then be conveyed via a 12” PVC storm drain to a Pump structure which will ultimately discharge flows through an onsite curb outlet located in a landscape area south of the parking stalls. Flows will eventually leave the site as surface flows before entering an existing Caltrans concrete ditch which is parallel to the southernly property line. Said flows will ultimately comingle with the creek flows located on the east side on State Route 125, and be directed to the Sweetwater River.

Peak flow attenuation

BMP will store and manage the Q_{100} peak flows for flow attenuation to pre-development levels. The basins have a 24”x24” riser box with varying heights which will act as a spillway such that peak flows can be safely discharged to the receiving storm drain system. The development condition Peak flows were calculated using modified rational. The corresponding 6-hr hydrographs were generated using the CivilDesign extension. These

hydrographs were then routed through the proposed-on site detention facilities in the CivilDesign Flood Hydrograph Routing Program, input values were based on Depth vs Storage and Depth vs Discharge data. In order to have a more accurate model the elevation inputs were every 0.10 feet to allow for an increase in the precision of the results, see Appendix 3 for input values. The weirs located on all four sides of the riser box begin 6-inches above the finish grade of the bioretention basin (283.0 FG), therefor any storage volume below the weir was not considered in the model. The results are summarized on table 3 below.

Emergency Weir

This study has performed Spillway calculations for the basin being proposed as part of this project, assuming a complete clogging of the water quality facilities, and with peak flows being conveyed through the overflow system only. After the analysis it has been determined that the basin will not require a secondary emergency box to allow peak flows to be conveyed without having detrimental effect on the basins. The results being presented on Appendix 4, of this report, represent the maximum flow capacity of each box. See table 2 of this report for peak flows.

Study Methodology

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

Flows were computed based on the Rational formula:

$$Q = CIA$$

Where Q = Peak discharge (cfs);
C = runoff coefficient, based on land use and soil type
I = rainfall intensity (in/hr)
A = watershed area (acre)

(1) Runoff Coefficient, C

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

Table 4-1

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

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

The runoff coefficient (C) represents the ratio of rainfall that runs off the watershed versus the portion that infiltrates to the soil. The runoff coefficient is dependent on the land use coverage and soil type (Table 4-1). Adjustment have been made to accurately represent the existing compacted rough graded condition.

See appendix 4, for runoff coefficient calculations, which were prepared based on soil type and impervious percentage using the formula by the San Diego County Hydrology Manual

$C = 0.90 \times (\%\ \text{Impervious}) + Cp \times (1 - \%\ \text{Impervious})$

Where: Cp = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map provided in Appendix A of the San Diego County Hydrology Manual.

(2) Rainfall Intensity, I

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

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

$P_6 = 2.9$ in

P_{24} = 5.0 in
P_6 is in the range of 45% to 65% of P_{24} and therefore doesn't need to be adjusted.

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

(1) Time of Concentration, Tc

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

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

Where,

T_c = Time of Concentration (hours)

D = Watercourse Distance (ft)

S = Slope (%)

C = Runoff Coefficient

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

Where,

T_c = Time of Concentration in hours (hours)

L = Watercourse Distance (miles)

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

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

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

Where,

I = Rainfall Intensity (in/hr)

P_6 = Six hour precipitation (inches)

D = Duration (min.)

There is an illustration of this formula in Figure 2, which is per County 2003 Hydrology Manual. Time of concentration (T_C) is composed of two components: The initial time of concentration (T_i), and the travel time (T_t).

The maximum overland flow length (L_M) is used from Table 4 in calculating the initial time of concentration. The source for this chart is the San Diego County Hydrology Manual (Table 3.2), June 2003.

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

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

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

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

Summary

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

Table 1 - Summary of existing conditions

BASIN / Node	Effective C	Tc (min.)	I in/hr	Area (ac) Total	Q_{peak} (cfs) Total
A / 15	0.35	7.89	5.69	0.49	0.98
Total				0.49	0.98

Table 2 – Summary of unmitigated- developed conditions

BASIN / Node	Effective C	Tc (min.)	I in/hr	Area (ac) Total	Q_{peak} (cfs) Total
A / 15	0.80	9.21	5.15	0.49	1.98
Total				0.49	1.98

Table 3 – Summary of peak flows

Discharge location	Area (ac)			100-Yr peak Flows (cfs)			
	Existing	Developed	Difference	Existing	Developed Unmitigated	Developed Mitigated	Difference
Node 16	0.49	0.49	0.0	0.98	1.98	1.03	+0.05

As shown in the above table peak flow mitigation being performed at BMP will reduce the peak flows to 1.03 cfs, although this value is 5% higher than the pre-development condition which is within the tolerable difference; flow will be discharged via a pump system which will further regulated to discharge flows to pre-development levels. Final design details will be provided at the final engineering phase.

Conclusions

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

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

- The ultimate discharge points will not be changed.
- Graded areas and slopes will be landscaped to reduce or eliminate sediment discharge.
- Construction and post-construction BMPs will address mitigation measures to protect water quality and protection of water quality objectives and beneficial uses to the maximum extent practicable.
- The project proposes to route runoff on bio-filtration facilities that will improve water quality and will help avoid flooding off-site by attenuating velocities and reducing peak flows.

References

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

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

Certification and Declaration of Responsible Charge:

I hereby declare that I am the engineer for this project. That I have exercised responsible charge over this submittal as defined in section 6703 of the business and professions code.

Engineer of Work:

_____ _____

Mellor R. Landy R.E.C. 81085 Expires: 09-30-21 Date:

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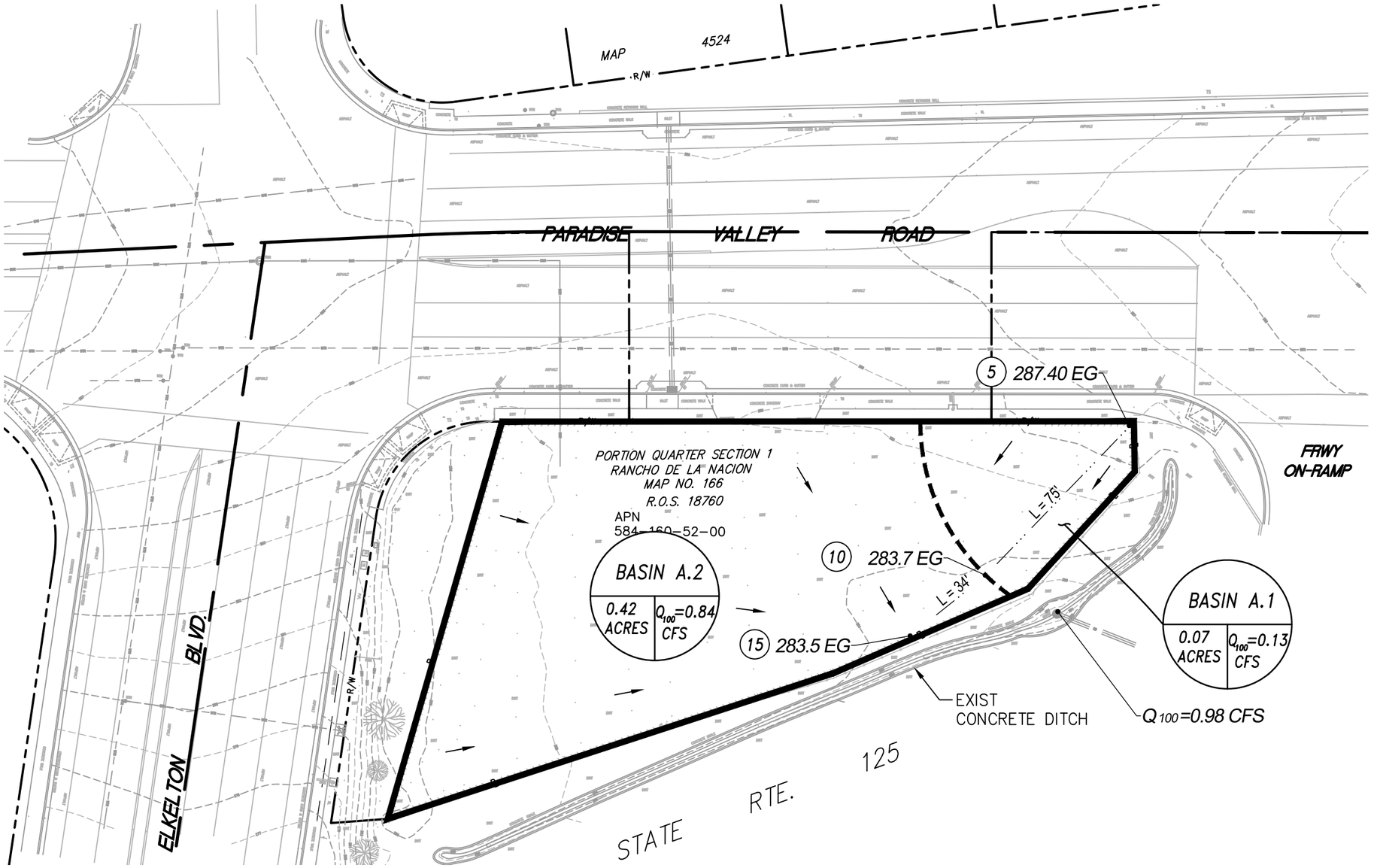

LEGEND

ITEM	SYMBOL
SUBBASIN BOUNDARY	
DRAINAGE DIRECTION	
DRAINAGE DESCRIPTION	BASIN / ACRES / Q_{100} CFS
NODE	(40)
EX. IMPERVIOUS	

SCALE: 1" = 40'

40 20 0 40 80 120

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HYDROLOGY MAP

PRE-DEVELOPMENT

PARADISE VALLEY RD. GAS STATION

DATE: 2/1/23

DRAWING: JS

SHEET 1 OF 1

APPENDIX 1
Existing Conditions Calculations & Drainage Map

```
            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2018 Version 9.0

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
      Rational Hydrology Study        Date: 11/03/19
--------------------------------------------------------------------------
Paradise Valley Road Gas Station
Pre-Development Condition
100 Year Storm Event

--------------------------------------------------------------------------
Program License Serial Number 6446
--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.900
24 hour precipitation(inches) =  5.000
P6/P24 =    58.0%
San Diego hydrology manual 'C' values used

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station       10.000
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   75.000(Ft.)
Highest elevation =  287.400(Ft.)
Lowest elevation =  283.700(Ft.)
Elevation difference =    3.700(Ft.) Slope =  4.933 %
Top of Initial Area Slope adjusted by User to  5.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   5.00 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   7.89 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   5.000^(1/3)]=   7.89
Rainfall intensity (I) =      5.691(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
```

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Subarea runoff =      0.139(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       15.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
Rainfall intensity (I) =      5.691(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =     7.89 min.
Rainfall intensity =      5.691(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.171
Subarea runoff =      0.837(CFS) for      0.420(Ac.)
Total runoff =      0.976(CFS)      Total area =       0.490(Ac.)

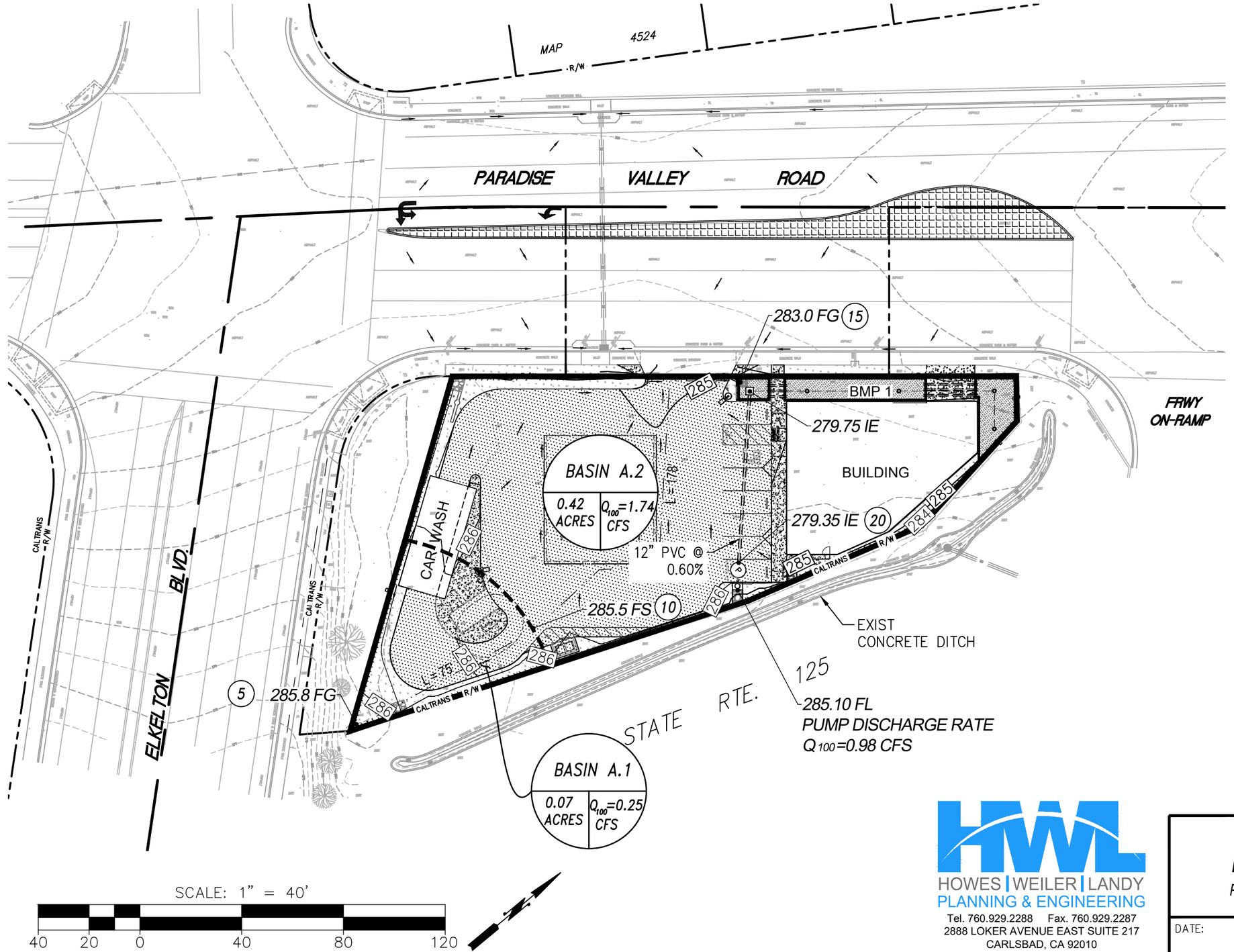
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.490(Ac.)
Runoff from this stream =      0.976(CFS)
Time of concentration =    7.89 min.
Rainfall intensity =     5.691(In/Hr)
Summary of stream data:

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

1        0.976      7.89               5.691
Qmax(1) =
         1.000 *    1.000 *     0.976) + =       0.976

Total of 1 streams to confluence:
Flow rates before confluence point:
       0.976
Maximum flow rates at confluence using above data:
        0.976
Area of streams before confluence:
        0.490
Results of confluence:
Total flow rate =      0.976(CFS)
Time of concentration =     7.895 min.
Effective stream area after confluence =      0.490(Ac.)
End of computations, total study area =           0.490 (Ac.)
```

APPENDIX 2
Developed Conditions Calculations & Drainage Map



LEGEND

ITEM	SYMBOL
SUBBASIN BOUNDARY	
DRAINAGE DIRECTION	
DRAINAGE DESCRIPTION	BASIN / ACRES / Q_{100} CFS
NODE	(40)
EX. IMPERVIOUS	
STORMWATER PUMP STATION	(P)
REVERSED CURB OUTLET	

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HYDROLOGY MAP

POST-DEVELOPMENT

PARADISE VALLEY RD. GAS STATION

DATE: 2/1/23

DRAWING: JS

SHEET 1 OF 1

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            San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2018 Version 9.0

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
      Rational Hydrology Study        Date: 11/03/19
--------------------------------------------------------------------------
Paradise Valley Road Gas Station
Post-Development Condition
100 Year Storm Event

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

--------------------------------------------------------------------------
Program License Serial Number 6446
--------------------------------------------------------------------------
Rational hydrology study storm event year is   100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour,  precipitation(inches) =  2.900
24 hour precipitation(inches) =  5.000
P6/P24 =    58.0%
San Diego hydrology manual 'C' values used

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station        5.000 to Point/Station       10.000
**** INITIAL AREA EVALUATION ****
__________________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                 ]
(14.5 DU/A or Less      )
Impervious value, Ai = 0.500
Sub-Area C Value = 0.630
Initial subarea total flow distance  =   75.000(Ft.)
Highest elevation =  285.800(Ft.)
Lowest elevation =  285.500(Ft.)
Elevation difference =    0.300(Ft.) Slope =  0.400 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.40 %, in a development type of
 14.5 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   8.12 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
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```
TC = [1.8*(1.1-0.6300)*(  50.000^.5)/(   0.400^(1/3)]=   8.12
Rainfall intensity (I) =      5.589(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.630
Subarea runoff =      0.246(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       10.000 to Point/Station       15.000
**** IMPROVED CHANNEL TRAVEL TIME ****
________________________________________________________________________
Upstream point elevation =   285.500(Ft.)
Downstream point elevation =   283.000(Ft.)
Channel length thru subarea  =   178.000(Ft.)
Channel base width      =    0.000(Ft.)
Slope or 'Z' of left channel bank =   8.000
Slope or 'Z' of right channel bank =   8.000
Estimated mean flow rate at midpoint of channel =      1.081(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    0.500(Ft.)
Flow(q) thru subarea =      1.081(CFS)
Depth of flow =   0.223(Ft.), Average velocity =   2.708(Ft/s)
Channel flow top width =    3.573(Ft.)
Flow Velocity =    2.71(Ft/s)
Travel time  =    1.10 min.
Time of concentration =    9.21 min.
Critical depth =      0.258(Ft.)
 Adding area flow to channel
Rainfall intensity (I) =      5.151(In/Hr) for a   100.0 year storm
User specified 'C' value of 0.810 given for subarea
Rainfall intensity =      5.151(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.784  CA =      0.384
Subarea runoff =      1.733(CFS) for      0.420(Ac.)
Total runoff =      1.980(CFS)      Total area =       0.490(Ac.)
Depth of flow =   0.280(Ft.), Average velocity =   3.151(Ft/s)
Critical depth =      0.328(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       15.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.490(Ac.)
Runoff from this stream =      1.980(CFS)
Time of concentration =    9.21 min.
Rainfall intensity =     5.151(In/Hr)
Summary of stream data:

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

```
1        1.980      9.21               5.151
Qmax(1) =
          1.000 *    1.000 *     1.980) + =       1.980

Total of 1 streams to confluence:
Flow rates before confluence point:
       1.980
Maximum flow rates at confluence using above data:
        1.980
Area of streams before confluence:
        0.490
Results of confluence:
Total flow rate =      1.980(CFS)
Time of concentration =     9.214 min.
Effective stream area after confluence =      0.490(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.000
**** 6 HOUR HYDROGRAPH ****
______________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June
2003


Time of Concentration =   9.21
Basin Area =     0.49 Acres
6 Hour Rainfall =  2.900 Inches
Runoff Coefficient =  0.784
Peak Discharge =     1.98 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       9               0.066
       18               0.068
       27               0.069
       36               0.071
       45               0.073
       54               0.076
       63               0.077
       72               0.080
       81               0.082
       90               0.086
       99               0.088
       108               0.093
       117               0.096
       126               0.102
       135               0.105
       144               0.113
       153               0.117
       162               0.127
       171               0.133
       180               0.148
       189               0.157
```

198	0.180
207	0.195
216	0.238
225	0.271
234	0.398
243	0.561
252	1.980
261	0.319
270	0.214
279	0.167
288	0.140
297	0.122
306	0.109
315	0.099
324	0.091
333	0.084
342	0.079
351	0.074
360	0.070
369	0.067

++

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	1.0	1.5	2.0
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	Q	|	|	|	|
0+ 7	0.0003	0.05	VQ	|	|	|	|
0+ 8	0.0004	0.06	VQ	|	|	|	|
0+ 9	0.0005	0.07	VQ	|	|	|	|
0+10	0.0005	0.07	VQ	|	|	|	|
0+11	0.0006	0.07	VQ	|	|	|	|
0+12	0.0007	0.07	VQ	|	|	|	|
0+13	0.0008	0.07	VQ	|	|	|	|
0+14	0.0009	0.07	VQ	|	|	|	|
0+15	0.0010	0.07	VQ	|	|	|	|
0+16	0.0011	0.07	VQ	|	|	|	|
0+17	0.0012	0.07	VQ	|	|	|	|
0+18	0.0013	0.07	VQ	|	|	|	|
0+19	0.0014	0.07	VQ	|	|	|	|
0+20	0.0015	0.07	VQ	|	|	|	|
0+21	0.0016	0.07	VQ	|	|	|	|
0+22	0.0017	0.07	VQ	|	|	|	|
0+23	0.0017	0.07	VQ	|	|	|	|
0+24	0.0018	0.07	VQ	|	|	|	|

```
0+25       0.0019      0.07  VQ        |          |          |          |
0+26       0.0020      0.07  VQ        |          |          |          |
0+27       0.0021      0.07  VQ        |          |          |          |
0+28       0.0022      0.07  VQ        |          |          |          |
0+29       0.0023      0.07  |Q        |          |          |          |
0+30       0.0024      0.07  |Q        |          |          |          |
0+31       0.0025      0.07  |Q        |          |          |          |
0+32       0.0026      0.07  |Q        |          |          |          |
0+33       0.0027      0.07  |Q        |          |          |          |
0+34       0.0028      0.07  |Q        |          |          |          |
0+35       0.0029      0.07  |Q        |          |          |          |
0+36       0.0030      0.07  |Q        |          |          |          |
0+37       0.0031      0.07  |Q        |          |          |          |
0+38       0.0032      0.07  |Q        |          |          |          |
0+39       0.0033      0.07  |Q        |          |          |          |
0+40       0.0034      0.07  |Q        |          |          |          |
0+41       0.0035      0.07  |Q        |          |          |          |
0+42       0.0036      0.07  |Q        |          |          |          |
0+43       0.0037      0.07  |Q        |          |          |          |
0+44       0.0038      0.07  |Q        |          |          |          |
0+45       0.0039      0.07  |Q        |          |          |          |
0+46       0.0040      0.07  |Q        |          |          |          |
0+47       0.0041      0.07  |Q        |          |          |          |
0+48       0.0042      0.07  |Q        |          |          |          |
0+49       0.0043      0.07  |Q        |          |          |          |
0+50       0.0044      0.07  |Q        |          |          |          |
0+51       0.0045      0.07  |Q        |          |          |          |
0+52       0.0046      0.07  |Q        |          |          |          |
0+53       0.0047      0.08  |QV       |          |          |          |
0+54       0.0048      0.08  |QV       |          |          |          |
0+55       0.0049      0.08  |QV       |          |          |          |
0+56       0.0050      0.08  |QV       |          |          |          |
0+57       0.0051      0.08  |QV       |          |          |          |
0+58       0.0052      0.08  |QV       |          |          |          |
0+59       0.0053      0.08  |QV       |          |          |          |
1+ 0       0.0054      0.08  |QV       |          |          |          |
1+ 1       0.0055      0.08  |QV       |          |          |          |
1+ 2       0.0057      0.08  |QV       |          |          |          |
1+ 3       0.0058      0.08  |QV       |          |          |          |
1+ 4       0.0059      0.08  |QV       |          |          |          |
1+ 5       0.0060      0.08  |QV       |          |          |          |
1+ 6       0.0061      0.08  |QV       |          |          |          |
1+ 7       0.0062      0.08  |QV       |          |          |          |
1+ 8       0.0063      0.08  |QV       |          |          |          |
1+ 9       0.0064      0.08  |QV       |          |          |          |
1+10       0.0065      0.08  |QV       |          |          |          |
1+11       0.0066      0.08  |QV       |          |          |          |
1+12       0.0067      0.08  |QV       |          |          |          |
1+13       0.0068      0.08  |QV       |          |          |          |
1+14       0.0070      0.08  |Q V      |          |          |          |
1+15       0.0071      0.08  |Q V      |          |          |          |
1+16       0.0072      0.08  |Q V      |          |          |          |
1+17       0.0073      0.08  |Q V      |          |          |          |
1+18       0.0074      0.08  |Q V      |          |          |          |
```

1+19	0.0075	0.08	|Q V	|	|	|
1+20	0.0076	0.08	|Q V	|	|	|
1+21	0.0077	0.08	|Q V	|	|	|
1+22	0.0079	0.08	|Q V	|	|	|
1+23	0.0080	0.08	|Q V	|	|	|
1+24	0.0081	0.08	|Q V	|	|	|
1+25	0.0082	0.08	|Q V	|	|	|
1+26	0.0083	0.08	|Q V	|	|	|
1+27	0.0084	0.08	|Q V	|	|	|
1+28	0.0086	0.09	|Q V	|	|	|
1+29	0.0087	0.09	|Q V	|	|	|
1+30	0.0088	0.09	|Q V	|	|	|
1+31	0.0089	0.09	|Q V	|	|	|
1+32	0.0090	0.09	|Q V	|	|	|
1+33	0.0092	0.09	|Q V	|	|	|
1+34	0.0093	0.09	|Q V	|	|	|
1+35	0.0094	0.09	|Q V	|	|	|
1+36	0.0095	0.09	|Q V	|	|	|
1+37	0.0096	0.09	|Q V	|	|	|
1+38	0.0098	0.09	|Q V	|	|	|
1+39	0.0099	0.09	|Q V	|	|	|
1+40	0.0100	0.09	|Q V	|	|	|
1+41	0.0101	0.09	|Q V	|	|	|
1+42	0.0102	0.09	|Q V	|	|	|
1+43	0.0104	0.09	|Q V	|	|	|
1+44	0.0105	0.09	|Q V	|	|	|
1+45	0.0106	0.09	|Q V	|	|	|
1+46	0.0107	0.09	|Q V	|	|	|
1+47	0.0109	0.09	|Q V	|	|	|
1+48	0.0110	0.09	|Q V	|	|	|
1+49	0.0111	0.09	|Q V	|	|	|
1+50	0.0113	0.09	|Q V	|	|	|
1+51	0.0114	0.09	|Q V	|	|	|
1+52	0.0115	0.09	|Q V	|	|	|
1+53	0.0117	0.09	|Q V	|	|	|
1+54	0.0118	0.09	|Q V	|	|	|
1+55	0.0119	0.10	|Q V	|	|	|
1+56	0.0120	0.10	|Q V	|	|	|
1+57	0.0122	0.10	|Q V	|	|	|
1+58	0.0123	0.10	|Q V	|	|	|
1+59	0.0124	0.10	|Q V	|	|	|
2+ 0	0.0126	0.10	|Q V	|	|	|
2+ 1	0.0127	0.10	|Q V	|	|	|
2+ 2	0.0129	0.10	| Q V	|	|	|
2+ 3	0.0130	0.10	| Q V	|	|	|
2+ 4	0.0131	0.10	| Q V	|	|	|
2+ 5	0.0133	0.10	| Q V	|	|	|
2+ 6	0.0134	0.10	| Q V	|	|	|
2+ 7	0.0135	0.10	| Q V	|	|	|
2+ 8	0.0137	0.10	| Q V	|	|	|
2+ 9	0.0138	0.10	| Q V	|	|	|
2+10	0.0140	0.10	| Q V	|	|	|
2+11	0.0141	0.10	| Q V	|	|	|
2+12	0.0143	0.10	| Q V	|	|	|

```
2+13       0.0144      0.10  | Q   V   |          |          |          |
2+14       0.0145      0.10  | Q   V   |          |          |          |
2+15       0.0147      0.11  | Q   V   |          |          |          |
2+16       0.0148      0.11  | Q   V   |          |          |          |
2+17       0.0150      0.11  | Q   V   |          |          |          |
2+18       0.0151      0.11  | Q   V   |          |          |          |
2+19       0.0153      0.11  | Q   V   |          |          |          |
2+20       0.0154      0.11  | Q   V   |          |          |          |
2+21       0.0156      0.11  | Q   V   |          |          |          |
2+22       0.0157      0.11  | Q   V   |          |          |          |
2+23       0.0159      0.11  | Q   V   |          |          |          |
2+24       0.0160      0.11  | Q   V   |          |          |          |
2+25       0.0162      0.11  | Q    V  |          |          |          |
2+26       0.0164      0.11  | Q    V  |          |          |          |
2+27       0.0165      0.11  | Q    V  |          |          |          |
2+28       0.0167      0.11  | Q    V  |          |          |          |
2+29       0.0168      0.12  | Q    V  |          |          |          |
2+30       0.0170      0.12  | Q    V  |          |          |          |
2+31       0.0171      0.12  | Q    V  |          |          |          |
2+32       0.0173      0.12  | Q    V  |          |          |          |
2+33       0.0175      0.12  | Q    V  |          |          |          |
2+34       0.0176      0.12  | Q    V  |          |          |          |
2+35       0.0178      0.12  | Q    V  |          |          |          |
2+36       0.0180      0.12  | Q    V  |          |          |          |
2+37       0.0181      0.12  | Q    V  |          |          |          |
2+38       0.0183      0.12  | Q    V  |          |          |          |
2+39       0.0185      0.12  | Q    V  |          |          |          |
2+40       0.0186      0.12  | Q     V |          |          |          |
2+41       0.0188      0.13  | Q     V |          |          |          |
2+42       0.0190      0.13  | Q     V |          |          |          |
2+43       0.0192      0.13  | Q     V |          |          |          |
2+44       0.0193      0.13  | Q     V |          |          |          |
2+45       0.0195      0.13  | Q     V |          |          |          |
2+46       0.0197      0.13  | Q     V |          |          |          |
2+47       0.0199      0.13  | Q     V |          |          |          |
2+48       0.0201      0.13  | Q     V |          |          |          |
2+49       0.0202      0.13  | Q     V |          |          |          |
2+50       0.0204      0.13  | Q     V |          |          |          |
2+51       0.0206      0.13  | Q     V |          |          |          |
2+52       0.0208      0.13  | Q      V|          |          |          |
2+53       0.0210      0.14  | Q      V|          |          |          |
2+54       0.0212      0.14  | Q      V|          |          |          |
2+55       0.0214      0.14  | Q      V|          |          |          |
2+56       0.0216      0.14  | Q      V|          |          |          |
2+57       0.0218      0.14  | Q      V|          |          |          |
2+58       0.0220      0.14  | Q      V|          |          |          |
2+59       0.0222      0.15  | Q      V|          |          |          |
3+ 0        0.0224      0.15  | Q      V|          |          |          |
3+ 1        0.0226      0.15  |  Q     V|          |          |          |
3+ 2        0.0228      0.15  |  Q     V|          |          |          |
3+ 3        0.0230      0.15  |  Q     V|          |          |          |
3+ 4        0.0232      0.15  |  Q      V          |          |          |
3+ 5        0.0234      0.15  |  Q      V          |          |          |
3+ 6        0.0236      0.15  |  Q      V          |          |          |
```

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3+ 7       0.0238      0.15  |  Q      V          |          |          |
3+ 8       0.0240      0.16  |  Q      V          |          |          |
3+ 9       0.0243      0.16  |  Q      V          |          |          |
3+10       0.0245      0.16  |  Q      V          |          |          |
3+11       0.0247      0.16  |  Q      V          |          |          |
3+12       0.0249      0.16  |  Q      V          |          |          |
3+13       0.0252      0.17  |  Q      V          |          |          |
3+14       0.0254      0.17  |  Q      V          |          |          |
3+15       0.0256      0.17  |  Q      |V         |          |          |
3+16       0.0259      0.17  |  Q      |V         |          |          |
3+17       0.0261      0.18  |  Q      |V         |          |          |
3+18       0.0264      0.18  |  Q      |V         |          |          |
3+19       0.0266      0.18  |  Q      |V         |          |          |
3+20       0.0269      0.18  |  Q      |V         |          |          |
3+21       0.0271      0.18  |  Q      |V         |          |          |
3+22       0.0274      0.19  |  Q      |V         |          |          |
3+23       0.0276      0.19  |  Q      |V         |          |          |
3+24       0.0279      0.19  |  Q      | V        |          |          |
3+25       0.0281      0.19  |  Q      | V        |          |          |
3+26       0.0284      0.19  |  Q      | V        |          |          |
3+27       0.0287      0.19  |  Q      | V        |          |          |
3+28       0.0290      0.20  |   Q     | V        |          |          |
3+29       0.0292      0.20  |   Q     | V        |          |          |
3+30       0.0295      0.21  |   Q     | V        |          |          |
3+31       0.0298      0.21  |   Q     | V        |          |          |
3+32       0.0301      0.22  |   Q     |  V       |          |          |
3+33       0.0304      0.22  |   Q     |  V       |          |          |
3+34       0.0307      0.23  |   Q     |  V       |          |          |
3+35       0.0311      0.23  |   Q     |  V       |          |          |
3+36       0.0314      0.24  |   Q     |  V       |          |          |
3+37       0.0317      0.24  |   Q     |  V       |          |          |
3+38       0.0321      0.25  |   Q     |  V       |          |          |
3+39       0.0324      0.25  |    Q    |   V      |          |          |
3+40       0.0328      0.25  |    Q    |   V      |          |          |
3+41       0.0331      0.26  |    Q    |   V      |          |          |
3+42       0.0335      0.26  |    Q    |   V      |          |          |
3+43       0.0338      0.26  |    Q    |   V      |          |          |
3+44       0.0342      0.27  |    Q    |   V      |          |          |
3+45       0.0346      0.27  |    Q    |   V      |          |          |
3+46       0.0350      0.29  |    Q    |    V     |          |          |
3+47       0.0354      0.30  |     Q   |    V     |          |          |
3+48       0.0358      0.31  |     Q   |    V     |          |          |
3+49       0.0363      0.33  |     Q   |    V     |          |          |
3+50       0.0367      0.34  |     Q   |    V     |          |          |
3+51       0.0372      0.36  |      Q  |     V    |          |          |
3+52       0.0377      0.37  |      Q  |     V    |          |          |
3+53       0.0383      0.38  |      Q  |     V    |          |          |
3+54       0.0388      0.40  |       Q |     V    |          |          |
3+55       0.0394      0.42  |       Q |      V   |          |          |
3+56       0.0400      0.43  |       Q |      V   |          |          |
3+57       0.0406      0.45  |        Q|      V   |          |          |
3+58       0.0412      0.47  |        Q|      V   |          |          |
3+59       0.0419      0.49  |        Q|       V  |          |          |
4+ 0       0.0426      0.51  |         Q       V  |          |          |
```

```
4+ 1        0.0433      0.52  |          Q        V |          |          |
4+ 2        0.0441      0.54  |          Q         V|          |          |
4+ 3        0.0449      0.56  |          |Q        V|          |          |
4+ 4        0.0458      0.72  |          |    Q     V|          |          |
4+ 5        0.0471      0.88  |          |       Q  V          |          |
4+ 6        0.0485      1.03  |          |          Q          |          |
4+ 7        0.0501      1.19  |          |           |V  Q      |          |
4+ 8        0.0520      1.35  |          |           | V    Q  |          |
4+ 9        0.0541      1.51  |          |           |  V      Q          |
4+10        0.0563      1.66  |          |           |   V      |   Q      |
4+11        0.0589      1.82  |          |           |    V     |      Q   |
4+12        0.0616      1.98  |          |           |     V    |          Q
4+13        0.0641      1.80  |          |           |      V   |      Q   |
4+14        0.0663      1.61  |          |           |       V  | Q        |
4+15        0.0682      1.43  |          |           |       QV|          |
4+16        0.0699      1.24  |          |           |    Q    V          |
4+17        0.0714      1.06  |          |           |Q        V          |
4+18        0.0726      0.87  |          |       Q   |          |V         |
4+19        0.0736      0.69  |          |   Q       |          |V         |
4+20        0.0742      0.50  |          Q           |          | V        |
4+21        0.0747      0.32  |      Q   |           |          | V        |
4+22        0.0751      0.31  |      Q   |           |          | V        |
4+23        0.0755      0.30  |     Q    |           |          | V        |
4+24        0.0759      0.28  |     Q    |           |          | V        |
4+25        0.0763      0.27  |     Q    |           |          |  V       |
4+26        0.0766      0.26  |     Q    |           |          |  V       |
4+27        0.0770      0.25  |     Q    |           |          |  V       |
4+28        0.0773      0.24  |    Q     |           |          |  V       |
4+29        0.0776      0.23  |    Q     |           |          |  V       |
4+30        0.0779      0.21  |    Q     |           |          |  V       |
4+31        0.0782      0.21  |    Q     |           |          |  V       |
4+32        0.0785      0.20  |    Q     |           |          |  V       |
4+33        0.0788      0.20  |    Q     |           |          |   V      |
4+34        0.0790      0.19  |   Q      |           |          |   V      |
4+35        0.0793      0.19  |   Q      |           |          |   V      |
4+36        0.0795      0.18  |   Q      |           |          |   V      |
4+37        0.0798      0.18  |   Q      |           |          |   V      |
4+38        0.0800      0.17  |   Q      |           |          |   V      |
4+39        0.0802      0.17  |   Q      |           |          |   V      |
4+40        0.0805      0.16  |   Q      |           |          |   V      |
4+41        0.0807      0.16  |   Q      |           |          |   V      |
4+42        0.0809      0.16  |   Q      |           |          |    V     |
4+43        0.0811      0.16  |   Q      |           |          |    V     |
4+44        0.0813      0.15  |   Q      |           |          |    V     |
4+45        0.0815      0.15  |   Q      |           |          |    V     |
4+46        0.0817      0.15  |  Q       |           |          |    V     |
4+47        0.0819      0.14  |  Q       |           |          |    V     |
4+48        0.0821      0.14  |  Q       |           |          |    V     |
4+49        0.0823      0.14  |  Q       |           |          |    V     |
4+50        0.0825      0.14  |  Q       |           |          |    V     |
4+51        0.0827      0.13  |  Q       |           |          |    V     |
4+52        0.0829      0.13  |  Q       |           |          |    V     |
4+53        0.0831      0.13  |  Q       |           |          |    V     |
4+54        0.0832      0.13  |  Q       |           |          |     V    |
```

```
4+55       0.0834      0.13  | Q       |         |         |      V   |
4+56       0.0836      0.12  | Q       |         |         |      V   |
4+57       0.0837      0.12  | Q       |         |         |      V   |
4+58       0.0839      0.12  | Q       |         |         |      V   |
4+59       0.0841      0.12  | Q       |         |         |      V   |
5+ 0       0.0842      0.12  | Q       |         |         |      V   |
5+ 1       0.0844      0.12  | Q       |         |         |      V   |
5+ 2       0.0845      0.11  | Q       |         |         |      V   |
5+ 3       0.0847      0.11  | Q       |         |         |      V   |
5+ 4       0.0849      0.11  | Q       |         |         |      V   |
5+ 5       0.0850      0.11  | Q       |         |         |      V   |
5+ 6       0.0852      0.11  | Q       |         |         |      V   |
5+ 7       0.0853      0.11  | Q       |         |         |      V   |
5+ 8       0.0855      0.11  | Q       |         |         |       V  |
5+ 9       0.0856      0.11  | Q       |         |         |       V  |
5+10       0.0857      0.10  | Q       |         |         |       V  |
5+11       0.0859      0.10  | Q       |         |         |       V  |
5+12       0.0860      0.10  | Q       |         |         |       V  |
5+13       0.0862      0.10  | Q       |         |         |       V  |
5+14       0.0863      0.10  | Q       |         |         |       V  |
5+15       0.0864      0.10  |Q        |         |         |       V  |
5+16       0.0866      0.10  |Q        |         |         |       V  |
5+17       0.0867      0.10  |Q        |         |         |       V  |
5+18       0.0868      0.10  |Q        |         |         |       V  |
5+19       0.0870      0.10  |Q        |         |         |       V  |
5+20       0.0871      0.09  |Q        |         |         |       V  |
5+21       0.0872      0.09  |Q        |         |         |       V  |
5+22       0.0874      0.09  |Q        |         |         |       V  |
5+23       0.0875      0.09  |Q        |         |         |       V  |
5+24       0.0876      0.09  |Q        |         |         |       V  |
5+25       0.0877      0.09  |Q        |         |         |       V  |
5+26       0.0879      0.09  |Q        |         |         |        V |
5+27       0.0880      0.09  |Q        |         |         |        V |
5+28       0.0881      0.09  |Q        |         |         |        V |
5+29       0.0882      0.09  |Q        |         |         |        V |
5+30       0.0883      0.09  |Q        |         |         |        V |
5+31       0.0884      0.09  |Q        |         |         |        V |
5+32       0.0886      0.08  |Q        |         |         |        V |
5+33       0.0887      0.08  |Q        |         |         |        V |
5+34       0.0888      0.08  |Q        |         |         |        V |
5+35       0.0889      0.08  |Q        |         |         |        V |
5+36       0.0890      0.08  |Q        |         |         |        V |
5+37       0.0891      0.08  |Q        |         |         |        V |
5+38       0.0892      0.08  |Q        |         |         |        V |
5+39       0.0894      0.08  |Q        |         |         |        V |
5+40       0.0895      0.08  |Q        |         |         |        V |
5+41       0.0896      0.08  |Q        |         |         |        V |
5+42       0.0897      0.08  |Q        |         |         |        V |
5+43       0.0898      0.08  |Q        |         |         |        V |
5+44       0.0899      0.08  |Q        |         |         |        V |
5+45       0.0900      0.08  |Q        |         |         |        V |
5+46       0.0901      0.08  |Q        |         |         |         V|
5+47       0.0902      0.08  |Q        |         |         |         V|
5+48       0.0903      0.08  |Q        |         |         |         V|
```

```
    5+49       0.0904      0.08  |Q        |         |         |        V|
    5+50       0.0905      0.07  |Q        |         |         |        V|
    5+51       0.0906      0.07  |Q        |         |         |        V|
    5+52       0.0907      0.07  |Q        |         |         |        V|
    5+53       0.0908      0.07  |Q        |         |         |        V|
    5+54       0.0909      0.07  |Q        |         |         |        V|
    5+55       0.0910      0.07  |Q        |         |         |        V|
    5+56       0.0911      0.07  |Q        |         |         |        V|
    5+57       0.0912      0.07  |Q        |         |         |        V|
    5+58       0.0913      0.07  |Q        |         |         |        V|
    5+59       0.0914      0.07  |Q        |         |         |        V|
    6+ 0       0.0915      0.07  |Q        |         |         |        V|
    6+ 1       0.0916      0.07  |Q        |         |         |        V|
    6+ 2       0.0917      0.07  |Q        |         |         |        V|
    6+ 3       0.0918      0.07  |Q        |         |         |        V|
    6+ 4       0.0919      0.07  |Q        |         |         |        V|
    6+ 5       0.0920      0.07  |Q        |         |         |        V|
    6+ 6       0.0921      0.07  |Q        |         |         |        V|
    6+ 7       0.0922      0.07  |Q        |         |         |        V|
    6+ 8       0.0923      0.07  |Q        |         |         |        V|
    6+ 9       0.0924      0.07  |Q        |         |         |        V|
-------------------------------------------------------------------------
```

```
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       15.000 to Point/Station       20.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
___________________________________________________________________________
Upstream point/station elevation =   279.750(Ft.)
Downstream point/station elevation =   279.350(Ft.)
Pipe length  =    66.00(Ft.) Slope =   0.0061  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.980(CFS)
Given pipe size =     12.00(In.)
Calculated individual pipe flow  =     1.980(CFS)
Normal flow depth in pipe =    7.49(In.)
Flow top width inside pipe =   11.62(In.)
Critical Depth =    7.20(In.)
Pipe flow velocity =      3.84(Ft/s)
Travel time through pipe =    0.29 min.
Time of concentration (TC) =     9.50 min.
End of computations, total study area =           0.490 (Ac.)
```

APPENDIX 3
Modified-Puls Detention Routing

```
                FLOOD HYDROGRAPH ROUTING PROGRAM
          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2018
                      Study date: 11/03/19

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

Program License Serial Number 6446

------------------------------------------------------------------------
********************* HYDROGRAPH INFORMATION **********************

            From study/file name: gasstationpost.rte
****************************HYDROGRAPH DATA*****************************
            Number of intervals =   369
            Time interval =    1.0 (Min.)
            Maximum/Peak flow rate =        1.980 (CFS)
            Total volume =       0.092 (Ac.Ft)
      Status of hydrographs being held in storage
                  Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
      Peak (CFS)      0.000     0.000     0.000     0.000     0.000
      Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
************************************************************************

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station       16.000 to Point/Station       16.000
**** RETARDING BASIN ROUTING ****
________________________________________________________________________

Program computation of outflow v. depth


CALCULATED OUTFLOW DATA AT DEPTH =    3.50(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.25(Ft.)    Capacity =   0.00(CFS)

Total outflow at this depth =      0.00(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    3.60(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.35(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
```

```
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.10(Ft.)   Flow =      0.02 (CFS)

Total outflow at this depth =      0.03(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    3.70(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.45(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.20(Ft.)   Flow =      0.07 (CFS)

Total outflow at this depth =      0.07(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    3.80(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.55(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.30(Ft.)   Flow =      0.12 (CFS)

Total outflow at this depth =      0.13(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    3.90(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.65(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.40(Ft.)   Flow =      0.19 (CFS)

Total outflow at this depth =      0.19(CFS)
```

```
CALCULATED OUTFLOW DATA AT DEPTH =    4.00(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.75(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.50(Ft.)   Flow =      0.27 (CFS)

Total outflow at this depth =      0.27(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.10(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.85(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.60(Ft.)   Flow =      0.35 (CFS)

Total outflow at this depth =      0.35(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.20(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   3.95(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.70(Ft.)   Flow =      0.44 (CFS)

Total outflow at this depth =      0.44(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.30(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
```

```
Depth above pipe =   4.05(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.80(Ft.)   Flow =      0.54 (CFS)

Total outflow at this depth =      0.54(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.40(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   4.15(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    0.90(Ft.)   Flow =      0.64 (CFS)

Total outflow at this depth =      0.64(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.50(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   4.25(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    1.00(Ft.)   Flow =      0.75 (CFS)

Total outflow at this depth =      0.75(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.60(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   4.35(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    1.10(Ft.)   Flow =      0.87 (CFS)
```

```
Total outflow at this depth =      0.87(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.70(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   4.45(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    1.20(Ft.)   Flow =      0.99 (CFS)

Total outflow at this depth =      0.99(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.80(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   4.55(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    1.30(Ft.)   Flow =      1.11 (CFS)

Total outflow at this depth =      1.12(CFS)


CALCULATED OUTFLOW DATA AT DEPTH =    4.90(Ft.))

Free outlet pipe flow:  Pipe Diameter =     0.05(Ft.)
Capacity = 8 * Pipe area * depth ^ 0.5(Using feet as units)
Note: Depth of   0.05(Ft.) is greater than diameter of pipe,
flow capacity is being calculated using depth = diameter
Depth above pipe =   4.65(Ft.)    Capacity =   0.00(CFS)


Weir capacity using equation Q = CLH^Exp(Using Feet as units)
Weir Length =   0.25(Ft.)   C value =   3.00   Exp =   1.50
Weir flow:  Depth = H =    1.40(Ft.)   Flow =      1.24 (CFS)

Total outflow at this depth =      1.25(CFS)

------------------------------------------------------------------------
Total number of inflow hydrograph intervals = 369
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-O*dt/2)   (S+O*dt/2)
     (Ft.)    (Ac.Ft)    (CFS)     (Ac.Ft)    (Ac.Ft)
--------------------------------------------------------------------
    0.000      0.000      0.000      0.000        0.000
    3.500      0.019      0.004      0.019        0.019
    3.600      0.021      0.027      0.021        0.021
    3.700      0.023      0.071      0.023        0.023
    3.800      0.025      0.127      0.025        0.025
    3.900      0.027      0.193      0.027        0.027
    4.000      0.029      0.269      0.029        0.029
    4.100      0.031      0.352      0.031        0.031
    4.200      0.033      0.443      0.033        0.033
    4.300      0.035      0.540      0.035        0.035
    4.400      0.037      0.644      0.037        0.037
    4.500      0.039      0.754      0.038        0.040
    4.600      0.041      0.869      0.040        0.042
    4.700      0.043      0.989      0.042        0.044
    4.800      0.045      1.115      0.044        0.046
    4.900      0.048      1.246      0.047        0.049
--------------------------------------------------------------------
            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    0.99    1.48    1.98 (Ft.)
 0.017    0.01    0.00      0.000  O       |       |       |       |     0.00
 0.033    0.01    0.00      0.000  O       |       |       |       |     0.00
 0.050    0.02    0.00      0.000  O       |       |       |       |     0.01
 0.067    0.03    0.00      0.000  O       |       |       |       |     0.01
 0.083    0.04    0.00      0.000  O       |       |       |       |     0.02
 0.100    0.04    0.00      0.000  O       |       |       |       |     0.03
 0.117    0.05    0.00      0.000  O       |       |       |       |     0.05
 0.133    0.06    0.00      0.000  O       |       |       |       |     0.06
 0.150    0.07    0.00      0.000  OI      |       |       |       |     0.07
 0.167    0.07    0.00      0.000  OI      |       |       |       |     0.09
 0.183    0.07    0.00      0.001  OI      |       |       |       |     0.11
 0.200    0.07    0.00      0.001  OI      |       |       |       |     0.12
 0.217    0.07    0.00      0.001  OI      |       |       |       |     0.14
 0.233    0.07    0.00      0.001  OI      |       |       |       |     0.16
 0.250    0.07    0.00      0.001  OI      |       |       |       |     0.18
 0.267    0.07    0.00      0.001  OI      |       |       |       |     0.19
 0.283    0.07    0.00      0.001  OI      |       |       |       |     0.21
 0.300    0.07    0.00      0.001  OI      |       |       |       |     0.23
```

0.317	0.07	0.00	0.001	OI				0.24
0.333	0.07	0.00	0.001	OI				0.26
0.350	0.07	0.00	0.002	OI				0.28
0.367	0.07	0.00	0.002	OI				0.30
0.383	0.07	0.00	0.002	OI				0.31
0.400	0.07	0.00	0.002	OI				0.33
0.417	0.07	0.00	0.002	OI				0.35
0.433	0.07	0.00	0.002	OI				0.36
0.450	0.07	0.00	0.002	OI				0.38
0.467	0.07	0.00	0.002	OI				0.40
0.483	0.07	0.00	0.002	OI				0.42
0.500	0.07	0.00	0.002	OI				0.43
0.517	0.07	0.00	0.002	OI				0.45
0.533	0.07	0.00	0.003	OI				0.47
0.550	0.07	0.00	0.003	OI				0.49
0.567	0.07	0.00	0.003	OI				0.51
0.583	0.07	0.00	0.003	OI				0.52
0.600	0.07	0.00	0.003	OI				0.54
0.617	0.07	0.00	0.003	OI				0.56
0.633	0.07	0.00	0.003	OI				0.58
0.650	0.07	0.00	0.003	OI				0.60
0.667	0.07	0.00	0.003	OI				0.61
0.683	0.07	0.00	0.003	OI				0.63
0.700	0.07	0.00	0.004	OI				0.65
0.717	0.07	0.00	0.004	OI				0.67
0.733	0.07	0.00	0.004	OI				0.69
0.750	0.07	0.00	0.004	OI				0.70
0.767	0.07	0.00	0.004	OI				0.72
0.783	0.07	0.00	0.004	OI				0.74
0.800	0.07	0.00	0.004	OI				0.76
0.817	0.07	0.00	0.004	OI				0.78
0.833	0.07	0.00	0.004	OI				0.80
0.850	0.07	0.00	0.004	OI				0.82
0.867	0.07	0.00	0.005	OI				0.83
0.883	0.08	0.00	0.005	OI				0.85
0.900	0.08	0.00	0.005	OI				0.87
0.917	0.08	0.00	0.005	OI				0.89
0.933	0.08	0.00	0.005	OI				0.91
0.950	0.08	0.00	0.005	OI				0.93
0.967	0.08	0.00	0.005	OI				0.95
0.983	0.08	0.00	0.005	OI				0.97
1.000	0.08	0.00	0.005	OI				0.99
2.000	0.10	0.00	0.012	OI				2.27
2.017	0.10	0.00	0.012	OI				2.30
2.033	0.10	0.00	0.013	OI				2.32
2.050	0.10	0.00	0.013	OI				2.35
2.067	0.10	0.00	0.013	OI				2.37
2.083	0.10	0.00	0.013	OI				2.40
2.100	0.10	0.00	0.013	OI				2.42
2.117	0.10	0.00	0.013	OI				2.45
2.133	0.10	0.00	0.013	OI				2.47
2.150	0.10	0.00	0.014	OI				2.50
2.167	0.10	0.00	0.014	OI				2.52
2.183	0.10	0.00	0.014	OI				2.55

2.200	0.10	0.00	0.014	OI	|	|	|	| 2.57
2.217	0.10	0.00	0.014	OI	|	|	|	| 2.60
2.233	0.10	0.00	0.014	OI	|	|	|	| 2.63
2.250	0.11	0.00	0.014	OI	|	|	|	| 2.65
2.267	0.11	0.00	0.015	OI	|	|	|	| 2.68
2.283	0.11	0.00	0.015	OI	|	|	|	| 2.70
2.300	0.11	0.00	0.015	OI	|	|	|	| 2.73
2.317	0.11	0.00	0.015	OI	|	|	|	| 2.76
2.333	0.11	0.00	0.015	OI	|	|	|	| 2.78
2.350	0.11	0.00	0.015	OI	|	|	|	| 2.81
2.367	0.11	0.00	0.015	OI	|	|	|	| 2.84
2.383	0.11	0.00	0.016	OI	|	|	|	| 2.87
2.400	0.11	0.00	0.016	OI	|	|	|	| 2.89
2.417	0.11	0.00	0.016	OI	|	|	|	| 2.92
2.433	0.11	0.00	0.016	OI	|	|	|	| 2.95
2.450	0.11	0.00	0.016	OI	|	|	|	| 2.98
2.467	0.11	0.00	0.016	OI	|	|	|	| 3.01
2.483	0.12	0.00	0.016	OI	|	|	|	| 3.03
2.500	0.12	0.00	0.017	OI	|	|	|	| 3.06
2.517	0.12	0.00	0.017	OI	|	|	|	| 3.09
2.533	0.12	0.00	0.017	OI	|	|	|	| 3.12
2.550	0.12	0.00	0.017	OI	|	|	|	| 3.15
2.567	0.12	0.00	0.017	OI	|	|	|	| 3.18
2.583	0.12	0.00	0.017	OI	|	|	|	| 3.21
2.600	0.12	0.00	0.018	OI	|	|	|	| 3.24
2.617	0.12	0.00	0.018	OI	|	|	|	| 3.27
2.633	0.12	0.00	0.018	OI	|	|	|	| 3.30
2.650	0.12	0.00	0.018	O I	|	|	|	| 3.33
2.667	0.12	0.00	0.018	O I	|	|	|	| 3.36
2.683	0.13	0.00	0.018	O I	|	|	|	| 3.39
2.700	0.13	0.00	0.019	O I	|	|	|	| 3.42
2.717	0.13	0.00	0.019	O I	|	|	|	| 3.45
2.733	0.13	0.00	0.019	O I	|	|	|	| 3.48
2.750	0.13	0.00	0.019	O I	|	|	|	| 3.50
2.767	0.13	0.01	0.019	O I	|	|	|	| 3.51
2.783	0.13	0.01	0.019	O I	|	|	|	| 3.52
2.800	0.13	0.01	0.020	O I	|	|	|	| 3.53
2.817	0.13	0.01	0.020	O I	|	|	|	| 3.54
2.833	0.13	0.01	0.020	O I	|	|	|	| 3.55
2.850	0.13	0.02	0.020	O I	|	|	|	| 3.55
2.867	0.13	0.02	0.020	O I	|	|	|	| 3.56
2.883	0.14	0.02	0.020	O I	|	|	|	| 3.57
2.900	0.14	0.02	0.021	O I	|	|	|	| 3.58
2.917	0.14	0.02	0.021	O I	|	|	|	| 3.59
2.933	0.14	0.03	0.021	O I	|	|	|	| 3.59
2.950	0.14	0.03	0.021	O I	|	|	|	| 3.60
2.967	0.14	0.03	0.021	O I	|	|	|	| 3.61
2.983	0.15	0.03	0.021	O I	|	|	|	| 3.62
3.000	0.15	0.04	0.022	O I	|	|	|	| 3.63
3.017	0.15	0.04	0.022	O I	|	|	|	| 3.63
3.033	0.15	0.04	0.022	O I	|	|	|	| 3.64
3.050	0.15	0.05	0.022	O I	|	|	|	| 3.65
3.067	0.15	0.05	0.022	O I	|	|	|	| 3.65
3.083	0.15	0.05	0.022	O I	|	|	|	| 3.66

3.100	0.15	0.06	0.022	O I	|	|	|	3.67
3.117	0.15	0.06	0.022	O I	|	|	|	3.67
3.133	0.16	0.06	0.023	|OI	|	|	|	3.68
3.150	0.16	0.07	0.023	|OI	|	|	|	3.69
3.167	0.16	0.07	0.023	|OI	|	|	|	3.69
3.183	0.16	0.07	0.023	|OI	|	|	|	3.70
3.200	0.16	0.07	0.023	|OI	|	|	|	3.71
3.217	0.17	0.08	0.023	|OI	|	|	|	3.71
3.233	0.17	0.08	0.023	|OI	|	|	|	3.72
3.250	0.17	0.08	0.023	|OI	|	|	|	3.72
3.267	0.17	0.09	0.024	|OI	|	|	|	3.73
3.283	0.18	0.09	0.024	|OI	|	|	|	3.74
3.300	0.18	0.09	0.024	|OI	|	|	|	3.74
3.317	0.18	0.10	0.024	|OI	|	|	|	3.75
3.333	0.18	0.10	0.024	|OI	|	|	|	3.75
3.350	0.18	0.10	0.024	|OI	|	|	|	3.76
3.367	0.19	0.11	0.024	|O I	|	|	|	3.76
3.383	0.19	0.11	0.024	|O I	|	|	|	3.77
3.400	0.19	0.11	0.025	|O I	|	|	|	3.78
3.417	0.19	0.12	0.025	|O I	|	|	|	3.78
3.433	0.19	0.12	0.025	|O I	|	|	|	3.79
3.450	0.19	0.12	0.025	|O I	|	|	|	3.79
3.467	0.20	0.12	0.025	| OI	|	|	|	3.80
3.483	0.20	0.13	0.025	| OI	|	|	|	3.80
3.500	0.21	0.13	0.025	| OI	|	|	|	3.81
3.517	0.21	0.13	0.025	| OI	|	|	|	3.81
3.533	0.22	0.14	0.025	| OI	|	|	|	3.82
3.550	0.22	0.14	0.025	| OI	|	|	|	3.82
3.567	0.23	0.15	0.026	| OI	|	|	|	3.83
3.583	0.23	0.15	0.026	| OI	|	|	|	3.83
3.600	0.24	0.15	0.026	| OI	|	|	|	3.84
3.617	0.24	0.16	0.026	| OI	|	|	|	3.85
3.633	0.25	0.16	0.026	| OI	|	|	|	3.85
3.650	0.25	0.17	0.026	| O I	|	|	|	3.86
3.667	0.25	0.17	0.026	| O I	|	|	|	3.86
3.683	0.26	0.17	0.026	| O I	|	|	|	3.87
3.700	0.26	0.18	0.026	| O I	|	|	|	3.87
3.717	0.26	0.18	0.027	| O I	|	|	|	3.88
3.733	0.27	0.18	0.027	| O I	|	|	|	3.89
3.750	0.27	0.19	0.027	| OI	|	|	|	3.89
3.767	0.29	0.19	0.027	| OI	|	|	|	3.90
3.783	0.30	0.20	0.027	| OI	|	|	|	3.90
3.800	0.31	0.20	0.027	| O I	|	|	|	3.91
3.817	0.33	0.21	0.027	| O I	|	|	|	3.92
3.833	0.34	0.21	0.028	| O I	|	|	|	3.93
3.850	0.36	0.22	0.028	| O I	|	|	|	3.94
3.867	0.37	0.23	0.028	| O I	|	|	|	3.95
3.883	0.38	0.24	0.028	| O I |	|	|	|	3.96
3.900	0.40	0.24	0.028	| O I |	|	|	|	3.97
3.917	0.42	0.25	0.029	| O I |	|	|	|	3.98
3.933	0.43	0.26	0.029	| O I|	|	|	|	3.99
3.950	0.45	0.27	0.029	| O I|	|	|	|	4.00
3.967	0.47	0.28	0.029	| O I|	|	|	|	4.01
3.983	0.49	0.29	0.030	| O I|	|	|	|	4.03

4.000	0.51	0.30	0.030	| O I | | |				4.04
4.017	0.52	0.32	0.030	| O I | | |				4.06
4.033	0.54	0.33	0.030	| O I | | |				4.07
4.050	0.56	0.34	0.031	| O |I | | |				4.09
4.067	0.72	0.36	0.031	| O | I | | |				4.11
4.083	0.88	0.38	0.032	| O | I | | |				4.14
4.100	1.03	0.42	0.032	| O | I | | |				4.17
4.117	1.19	0.46	0.033	| O| | I | |				4.22
4.133	1.35	0.51	0.034	| O | I |				4.27
4.150	1.51	0.58	0.036	| |O | | I |				4.33
4.167	1.66	0.65	0.037	| | O | | I |				4.40
4.183	1.82	0.73	0.038	| | O | | I |				4.47
4.200	1.98	0.81	0.040	| | O | | I|				4.55
4.217	1.80	0.90	0.041	| | O | | I |				4.62
4.233	1.61	0.96	0.043	| | O| | I |				4.68
4.250	1.43	1.01	0.043	| | O I| |				4.71
4.267	1.24	1.02	0.044	| | O I | |				4.73
4.283	1.06	1.03	0.044	| | OI | |				4.74
4.300	0.87	1.03	0.044	| | I O | |				4.74
4.317	0.69	1.02	0.043	| | I O | |				4.72
4.333	0.50	0.98	0.043	| I O| | |				4.69
4.350	0.32	0.94	0.042	| I | O| | |				4.66
4.367	0.31	0.89	0.041	| I | O | | |				4.61
4.383	0.30	0.84	0.041	| I | O | | |				4.58
4.400	0.28	0.80	0.040	| I | O | | |				4.54
4.417	0.27	0.76	0.039	| I | O | | |				4.50
4.433	0.26	0.72	0.038	| I | O | | |				4.47
4.450	0.25	0.69	0.038	| I | O | | |				4.44
4.467	0.24	0.66	0.037	| I | O | | |				4.41
4.483	0.23	0.63	0.037	| I | O | | |				4.38
4.500	0.21	0.60	0.036	| I |O | | |				4.36
4.517	0.21	0.57	0.036	| I |O | | |				4.33
4.533	0.20	0.55	0.035	| I O | | |				4.31
4.550	0.20	0.52	0.035	| I O | | |				4.28
4.567	0.19	0.50	0.034	| I O | | |				4.26
4.583	0.19	0.48	0.034	| I O| | |				4.24
4.600	0.18	0.46	0.033	| I O| | |				4.22
4.617	0.18	0.44	0.033	| I O| | |				4.20
4.633	0.17	0.43	0.033	| I O | | |				4.18
4.650	0.17	0.41	0.032	| I O | | |				4.17
4.667	0.16	0.40	0.032	| I O | | |				4.15
4.683	0.16	0.38	0.032	| I O | | |				4.13
4.700	0.16	0.37	0.031	| I O | | |				4.12
4.717	0.16	0.36	0.031	| I O | | |				4.11
4.733	0.15	0.34	0.031	| I O | | |				4.09
4.750	0.15	0.33	0.031	| I O | | |				4.08
4.767	0.15	0.32	0.030	| I O | | |				4.07
4.783	0.14	0.31	0.030	| I O | | |				4.05
4.800	0.14	0.30	0.030	| I O | | |				4.04
4.817	0.14	0.29	0.030	| I O | | |				4.03
4.833	0.14	0.29	0.029	| I O | | |				4.02
4.850	0.13	0.28	0.029	| I O | | |				4.01
4.867	0.13	0.27	0.029	| I O | | |				4.00
4.883	0.13	0.26	0.029	| I O | | |				3.99

4.900	0.13	0.26	0.029	I O				3.98
4.917	0.13	0.25	0.028	I O				3.97
4.933	0.12	0.24	0.028	IO				3.97
4.950	0.12	0.24	0.028	I O				3.96
4.967	0.12	0.23	0.028	I O				3.95
4.983	0.12	0.23	0.028	I O				3.94
5.000	0.12	0.22	0.028	I O				3.94
5.017	0.12	0.21	0.028	I O				3.93
5.033	0.11	0.21	0.027	I O				3.92
5.050	0.11	0.20	0.027	I O				3.92
5.067	0.11	0.20	0.027	I O				3.91
5.083	0.11	0.20	0.027	I O				3.90
5.100	0.11	0.19	0.027	I O				3.90
5.117	0.11	0.19	0.027	I O				3.89
5.133	0.11	0.18	0.027	IO				3.89
5.150	0.11	0.18	0.027	IO				3.88
5.167	0.10	0.18	0.027	IO				3.88
5.183	0.10	0.17	0.026	IO				3.87
5.200	0.10	0.17	0.026	IO				3.87
5.217	0.10	0.17	0.026	IO				3.86
5.233	0.10	0.16	0.026	IO				3.86
5.250	0.10	0.16	0.026	IO				3.85
5.267	0.10	0.16	0.026	IO				3.85
5.283	0.10	0.16	0.026	IO				3.84
5.300	0.10	0.15	0.026	IO				3.84
5.317	0.10	0.15	0.026	IO				3.84
5.333	0.09	0.15	0.026	IO				3.83
5.350	0.09	0.15	0.026	IO				3.83
5.367	0.09	0.14	0.026	IO				3.83
5.383	0.09	0.14	0.025	IO				3.82
5.400	0.09	0.14	0.025	IO				3.82
5.417	0.09	0.14	0.025	IO				3.82
5.433	0.09	0.13	0.025	IO				3.81
5.450	0.09	0.13	0.025	IO				3.81
5.467	0.09	0.13	0.025	IO				3.81
5.483	0.09	0.13	0.025	IO				3.80
5.500	0.09	0.13	0.025	IO				3.80
5.517	0.09	0.13	0.025	IO				3.80
5.533	0.08	0.12	0.025	O				3.79
5.550	0.08	0.12	0.025	O				3.79
5.567	0.08	0.12	0.025	O				3.79
5.583	0.08	0.12	0.025	O				3.79
5.600	0.08	0.12	0.025	O				3.78
5.617	0.08	0.12	0.025	O				3.78
5.633	0.08	0.12	0.025	O				3.78
5.650	0.08	0.11	0.025	O				3.78
5.667	0.08	0.11	0.024	O				3.77
5.683	0.08	0.11	0.024	O				3.77
5.700	0.08	0.11	0.024	O				3.77
5.717	0.08	0.11	0.024	O				3.77
5.733	0.08	0.11	0.024	O				3.77
5.750	0.08	0.11	0.024	O				3.76
5.767	0.08	0.11	0.024	O				3.76
5.783	0.08	0.10	0.024	O				3.76

5.800	0.08	0.10	0.024	|O	|	|	|	3.76
5.817	0.08	0.10	0.024	|O	|	|	|	3.76
5.833	0.07	0.10	0.024	|O	|	|	|	3.75
5.850	0.07	0.10	0.024	|O	|	|	|	3.75
5.867	0.07	0.10	0.024	|O	|	|	|	3.75
5.883	0.07	0.10	0.024	|O	|	|	|	3.75
5.900	0.07	0.10	0.024	|O	|	|	|	3.75
5.917	0.07	0.10	0.024	|O	|	|	|	3.75
5.933	0.07	0.10	0.024	|O	|	|	|	3.74
5.950	0.07	0.09	0.024	|O	|	|	|	3.74
5.967	0.07	0.09	0.024	|O	|	|	|	3.74
5.983	0.07	0.09	0.024	|O	|	|	|	3.74
6.000	0.07	0.09	0.024	|O	|	|	|	3.74
6.017	0.07	0.09	0.024	|O	|	|	|	3.74
6.033	0.07	0.09	0.024	|O	|	|	|	3.74
6.050	0.07	0.09	0.024	|O	|	|	|	3.73
6.067	0.07	0.09	0.024	|O	|	|	|	3.73
6.083	0.07	0.09	0.024	|O	|	|	|	3.73
6.100	0.07	0.09	0.024	|O	|	|	|	3.73
6.117	0.07	0.09	0.024	|O	|	|	|	3.73
6.133	0.07	0.09	0.024	|O	|	|	|	3.73
6.150	0.07	0.08	0.024	|O	|	|	|	3.73
6.167	0.00	0.08	0.023	IO	|	|	|	3.72
6.183	0.00	0.08	0.023	IO	|	|	|	3.72
6.200	0.00	0.08	0.023	IO	|	|	|	3.71
6.217	0.00	0.07	0.023	IO	|	|	|	3.71
6.233	0.00	0.07	0.023	IO	|	|	|	3.70
6.250	0.00	0.07	0.023	IO	|	|	|	3.70
6.267	0.00	0.07	0.023	IO	|	|	|	3.69
6.283	0.00	0.06	0.023	IO	|	|	|	3.69
6.300	0.00	0.06	0.023	IO	|	|	|	3.68
6.317	0.00	0.06	0.023	O	|	|	|	3.68
6.333	0.00	0.06	0.022	O	|	|	|	3.67
6.350	0.00	0.06	0.022	O	|	|	|	3.67
6.367	0.00	0.06	0.022	O	|	|	|	3.67
6.383	0.00	0.05	0.022	O	|	|	|	3.66
6.400	0.00	0.05	0.022	O	|	|	|	3.66
6.417	0.00	0.05	0.022	O	|	|	|	3.66
6.433	0.00	0.05	0.022	O	|	|	|	3.65
6.450	0.00	0.05	0.022	O	|	|	|	3.65
6.467	0.00	0.05	0.022	O	|	|	|	3.64
6.483	0.00	0.05	0.022	O	|	|	|	3.64
6.500	0.00	0.04	0.022	O	|	|	|	3.64
6.517	0.00	0.04	0.022	O	|	|	|	3.64
6.533	0.00	0.04	0.022	O	|	|	|	3.63
6.550	0.00	0.04	0.022	O	|	|	|	3.63
6.567	0.00	0.04	0.022	O	|	|	|	3.63
6.583	0.00	0.04	0.021	O	|	|	|	3.62
6.600	0.00	0.04	0.021	O	|	|	|	3.62
6.617	0.00	0.04	0.021	O	|	|	|	3.62
6.633	0.00	0.03	0.021	O	|	|	|	3.62
6.650	0.00	0.03	0.021	O	|	|	|	3.61
6.667	0.00	0.03	0.021	O	|	|	|	3.61
6.683	0.00	0.03	0.021	O	|	|	|	3.61

6.700	0.00	0.03	0.021	O	|	|	|	3.61
6.717	0.00	0.03	0.021	O	|	|	|	3.61
6.733	0.00	0.03	0.021	O	|	|	|	3.60
6.750	0.00	0.03	0.021	O	|	|	|	3.60
6.767	0.00	0.03	0.021	O	|	|	|	3.60
6.783	0.00	0.03	0.021	O	|	|	|	3.60
6.800	0.00	0.03	0.021	O	|	|	|	3.60
6.817	0.00	0.03	0.021	O	|	|	|	3.59
6.833	0.00	0.03	0.021	O	|	|	|	3.59
6.850	0.00	0.03	0.021	O	|	|	|	3.59
6.867	0.00	0.02	0.021	O	|	|	|	3.59
6.883	0.00	0.02	0.021	O	|	|	|	3.59
6.900	0.00	0.02	0.021	O	|	|	|	3.59
6.917	0.00	0.02	0.021	O	|	|	|	3.58
6.933	0.00	0.02	0.021	O	|	|	|	3.58
6.950	0.00	0.02	0.021	O	|	|	|	3.58
6.967	0.00	0.02	0.021	O	|	|	|	3.58
6.983	0.00	0.02	0.021	O	|	|	|	3.58
7.000	0.00	0.02	0.021	O	|	|	|	3.58
7.017	0.00	0.02	0.021	O	|	|	|	3.58
7.033	0.00	0.02	0.020	O	|	|	|	3.57
7.050	0.00	0.02	0.020	O	|	|	|	3.57
7.067	0.00	0.02	0.020	O	|	|	|	3.57
7.083	0.00	0.02	0.020	O	|	|	|	3.57
7.100	0.00	0.02	0.020	O	|	|	|	3.57
7.117	0.00	0.02	0.020	O	|	|	|	3.57
7.133	0.00	0.02	0.020	O	|	|	|	3.57
7.150	0.00	0.02	0.020	O	|	|	|	3.56
7.167	0.00	0.02	0.020	O	|	|	|	3.56
7.183	0.00	0.02	0.020	O	|	|	|	3.56
7.200	0.00	0.02	0.020	O	|	|	|	3.56
7.217	0.00	0.02	0.020	O	|	|	|	3.56
7.233	0.00	0.02	0.020	O	|	|	|	3.56
7.250	0.00	0.02	0.020	O	|	|	|	3.56
7.267	0.00	0.02	0.020	O	|	|	|	3.56
7.283	0.00	0.02	0.020	O	|	|	|	3.55
7.300	0.00	0.02	0.020	O	|	|	|	3.55
7.317	0.00	0.02	0.020	O	|	|	|	3.55
7.333	0.00	0.02	0.020	O	|	|	|	3.55
7.350	0.00	0.02	0.020	O	|	|	|	3.55
7.367	0.00	0.02	0.020	O	|	|	|	3.55
7.383	0.00	0.01	0.020	O	|	|	|	3.55
7.400	0.00	0.01	0.020	O	|	|	|	3.55
7.417	0.00	0.01	0.020	O	|	|	|	3.55
7.433	0.00	0.01	0.020	O	|	|	|	3.55
7.450	0.00	0.01	0.020	O	|	|	|	3.54
7.467	0.00	0.01	0.020	O	|	|	|	3.54
7.483	0.00	0.01	0.020	O	|	|	|	3.54
7.500	0.00	0.01	0.020	O	|	|	|	3.54
7.517	0.00	0.01	0.020	O	|	|	|	3.54
7.533	0.00	0.01	0.020	O	|	|	|	3.54
7.550	0.00	0.01	0.020	O	|	|	|	3.54
7.567	0.00	0.01	0.020	O	|	|	|	3.54
7.583	0.00	0.01	0.020	O	|	|	|	3.54

7.600	0.00	0.01	0.020	O	|	|	|	3.54
7.617	0.00	0.01	0.020	O	|	|	|	3.54
7.633	0.00	0.01	0.020	O	|	|	|	3.53
7.650	0.00	0.01	0.020	O	|	|	|	3.53
7.667	0.00	0.01	0.020	O	|	|	|	3.53
7.683	0.00	0.01	0.020	O	|	|	|	3.53
7.700	0.00	0.01	0.020	O	|	|	|	3.53
7.717	0.00	0.01	0.020	O	|	|	|	3.53
7.733	0.00	0.01	0.020	O	|	|	|	3.53
7.750	0.00	0.01	0.020	O	|	|	|	3.53
7.767	0.00	0.01	0.020	O	|	|	|	3.53
7.783	0.00	0.01	0.020	O	|	|	|	3.53
7.800	0.00	0.01	0.020	O	|	|	|	3.53
7.817	0.00	0.01	0.020	O	|	|	|	3.53
7.833	0.00	0.01	0.020	O	|	|	|	3.53
7.850	0.00	0.01	0.019	O	|	|	|	3.52
7.867	0.00	0.01	0.019	O	|	|	|	3.52
7.883	0.00	0.01	0.019	O	|	|	|	3.52
7.900	0.00	0.01	0.019	O	|	|	|	3.52
7.917	0.00	0.01	0.019	O	|	|	|	3.52
7.933	0.00	0.01	0.019	O	|	|	|	3.52
7.950	0.00	0.01	0.019	O	|	|	|	3.52
7.967	0.00	0.01	0.019	O	|	|	|	3.52
7.983	0.00	0.01	0.019	O	|	|	|	3.52
8.000	0.00	0.01	0.019	O	|	|	|	3.52
8.017	0.00	0.01	0.019	O	|	|	|	3.52
8.033	0.00	0.01	0.019	O	|	|	|	3.52
8.050	0.00	0.01	0.019	O	|	|	|	3.52
8.067	0.00	0.01	0.019	O	|	|	|	3.52
8.083	0.00	0.01	0.019	O	|	|	|	3.52
8.100	0.00	0.01	0.019	O	|	|	|	3.52
8.117	0.00	0.01	0.019	O	|	|	|	3.52
8.133	0.00	0.01	0.019	O	|	|	|	3.52
8.150	0.00	0.01	0.019	O	|	|	|	3.51
8.167	0.00	0.01	0.019	O	|	|	|	3.51
8.183	0.00	0.01	0.019	O	|	|	|	3.51
8.200	0.00	0.01	0.019	O	|	|	|	3.51
8.217	0.00	0.01	0.019	O	|	|	|	3.51
8.233	0.00	0.01	0.019	O	|	|	|	3.51
8.250	0.00	0.01	0.019	O	|	|	|	3.51
8.267	0.00	0.01	0.019	O	|	|	|	3.51
8.283	0.00	0.01	0.019	O	|	|	|	3.51
8.300	0.00	0.01	0.019	O	|	|	|	3.51
8.317	0.00	0.01	0.019	O	|	|	|	3.51
8.333	0.00	0.01	0.019	O	|	|	|	3.51
8.350	0.00	0.01	0.019	O	|	|	|	3.51
8.367	0.00	0.01	0.019	O	|	|	|	3.51
8.383	0.00	0.01	0.019	O	|	|	|	3.51
8.400	0.00	0.01	0.019	O	|	|	|	3.51
8.417	0.00	0.01	0.019	O	|	|	|	3.51
8.433	0.00	0.01	0.019	O	|	|	|	3.51
8.450	0.00	0.01	0.019	O	|	|	|	3.51
8.467	0.00	0.01	0.019	O	|	|	|	3.51
8.483	0.00	0.01	0.019	O	|	|	|	3.51

8.500	0.00	0.00	0.019	O	|	|	|	| 3.51
8.517	0.00	0.00	0.019	O	|	|	|	| 3.51
8.533	0.00	0.00	0.019	O	|	|	|	| 3.51
8.550	0.00	0.00	0.019	O	|	|	|	| 3.51
8.567	0.00	0.00	0.019	O	|	|	|	| 3.50
8.583	0.00	0.00	0.019	O	|	|	|	| 3.50
8.600	0.00	0.00	0.019	O	|	|	|	| 3.50
8.617	0.00	0.00	0.019	O	|	|	|	| 3.50
8.633	0.00	0.00	0.019	O	|	|	|	| 3.50
8.650	0.00	0.00	0.019	O	|	|	|	| 3.50
8.667	0.00	0.00	0.019	O	|	|	|	| 3.50
8.683	0.00	0.00	0.019	O	|	|	|	| 3.50
8.700	0.00	0.00	0.019	O	|	|	|	| 3.50
8.717	0.00	0.00	0.019	O	|	|	|	| 3.50
8.733	0.00	0.00	0.019	O	|	|	|	| 3.50
8.750	0.00	0.00	0.019	O	|	|	|	| 3.50
8.767	0.00	0.00	0.019	O	|	|	|	| 3.50
8.783	0.00	0.00	0.019	O	|	|	|	| 3.50
8.800	0.00	0.00	0.019	O	|	|	|	| 3.50
8.817	0.00	0.00	0.019	O	|	|	|	| 3.50
8.833	0.00	0.00	0.019	O	|	|	|	| 3.50
8.850	0.00	0.00	0.019	O	|	|	|	| 3.50
8.867	0.00	0.00	0.019	O	|	|	|	| 3.50
8.883	0.00	0.00	0.019	O	|	|	|	| 3.50
8.900	0.00	0.00	0.019	O	|	|	|	| 3.50
8.917	0.00	0.00	0.019	O	|	|	|	| 3.50
8.933	0.00	0.00	0.019	O	|	|	|	| 3.50
8.950	0.00	0.00	0.019	O	|	|	|	| 3.50
8.967	0.00	0.00	0.019	O	|	|	|	| 3.49
8.983	0.00	0.00	0.019	O	|	|	|	| 3.49
9.000	0.00	0.00	0.019	O	|	|	|	| 3.49
9.017	0.00	0.00	0.019	O	|	|	|	| 3.49
9.033	0.00	0.00	0.019	O	|	|	|	| 3.49
9.050	0.00	0.00	0.019	O	|	|	|	| 3.49
9.067	0.00	0.00	0.019	O	|	|	|	| 3.49
9.083	0.00	0.00	0.019	O	|	|	|	| 3.49
9.100	0.00	0.00	0.019	O	|	|	|	| 3.49
9.117	0.00	0.00	0.019	O	|	|	|	| 3.49
9.133	0.00	0.00	0.019	O	|	|	|	| 3.49
9.150	0.00	0.00	0.019	O	|	|	|	| 3.48
9.167	0.00	0.00	0.019	O	|	|	|	| 3.48
9.183	0.00	0.00	0.019	O	|	|	|	| 3.48
9.200	0.00	0.00	0.019	O	|	|	|	| 3.48
9.217	0.00	0.00	0.019	O	|	|	|	| 3.48
9.233	0.00	0.00	0.019	O	|	|	|	| 3.48
9.250	0.00	0.00	0.019	O	|	|	|	| 3.48
9.267	0.00	0.00	0.019	O	|	|	|	| 3.48
9.283	0.00	0.00	0.019	O	|	|	|	| 3.48
9.300	0.00	0.00	0.019	O	|	|	|	| 3.48
9.317	0.00	0.00	0.019	O	|	|	|	| 3.48
9.333	0.00	0.00	0.019	O	|	|	|	| 3.47
9.350	0.00	0.00	0.019	O	|	|	|	| 3.47
9.367	0.00	0.00	0.019	O	|	|	|	| 3.47
9.383	0.00	0.00	0.019	O	|	|	|	| 3.47

```
 9.400    0.00    0.00      0.019  O       |       |       |       |      3.47
 9.417    0.00    0.00      0.019  O       |       |       |       |      3.47
 9.433    0.00    0.00      0.019  O       |       |       |       |      3.47
 9.450    0.00    0.00      0.019  O       |       |       |       |      3.47
 9.467    0.00    0.00      0.019  O       |       |       |       |      3.47
 9.483    0.00    0.00      0.019  O       |       |       |       |      3.47
 9.500    0.00    0.00      0.019  O       |       |       |       |      3.47
 9.517    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.533    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.550    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.567    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.583    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.600    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.617    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.633    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.650    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.667    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.683    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.700    0.00    0.00      0.019  O       |       |       |       |      3.46
 9.717    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.733    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.750    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.767    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.783    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.800    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.817    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.833    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.850    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.867    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.883    0.00    0.00      0.019  O       |       |       |       |      3.45
 9.900    0.00    0.00      0.019  O       |       |       |       |      3.44
 9.917    0.00    0.00      0.019  O       |       |       |       |      3.44
 9.933    0.00    0.00      0.019  O       |       |       |       |      3.44
 9.950    0.00    0.00      0.019  O       |       |       |       |      3.44
 9.967    0.00    0.00      0.019  O       |       |       |       |      3.44
 9.983    0.00    0.00      0.019  O       |       |       |       |      3.44
10.000    0.00    0.00      0.019  O       |       |       |       |      3.44

     Remaining water in basin =    0.01 (Ac.Ft)


     ****************************HYDROGRAPH DATA****************************
               Number of intervals =  5001
               Time interval =    1.0 (Min.)
               Maximum/Peak flow rate =        1.043 (CFS)
               Total volume =       0.086 (Ac.Ft)
          Status of hydrographs being held in storage
                     Stream 1  Stream 2  Stream 3  Stream 4  Stream 5
          Peak (CFS)      0.000     0.000     0.000     0.000     0.000
          Vol (Ac.Ft)      0.000     0.000     0.000     0.000     0.000
     ***********************************************************************

     ---------------------------------------------------------------------
```

APPENDIX 4
Maps and Charts

Outlet structure for Discharge of Detention Basin BF-1

Discharge vs Elevation Table

Emergency Weir			
Invert:	1.750	ft	
B:	8	ft	Wier Perimeter Length

h (ft)	H/D-low -	H/D-mid -	Qemer (cfs)	
0.000	0.000	0.000	0.000	Bottom of Basin
0.042	0.500	0.000	0.000	
0.083	1.000	0.000	0.000	
0.125	1.500	0.000	0.000	
0.167	2.000	0.000	0.000	
0.208	2.500	0.000	0.000	
0.250	3.000	0.000	0.000	
0.292	3.500	0.500	0.000	
0.333	4.000	1.000	0.000	
0.375	4.500	1.500	0.000	
0.417	5.000	2.000	0.000	
0.458	5.500	2.500	0.000	
0.500	6.000	3.000	0.000	
0.542	6.500	3.500	0.000	
0.583	7.000	4.000	0.000	
0.625	7.500	4.500	0.000	
0.667	8.000	5.000	0.000	
0.708	8.500	5.500	0.000	
0.750	9.000	6.000	0.000	
0.792	9.500	6.500	0.000	
0.833	10.000	7.000	0.000	
0.875	10.500	7.500	0.000	
0.917	11.000	8.000	0.000	
0.958	11.500	8.500	0.000	
1.000	12.000	9.000	0.000	
1.042	12.500	9.500	0.000	
1.083	13.000	10.000	0.000	
1.125	13.500	10.500	0.000	
1.167	14.000	11.000	0.000	
1.208	14.500	11.500	0.000	
1.250	15.000	12.000	0.000	
1.292	15.500	12.500	0.000	
1.333	16.000	13.000	0.000	
1.375	16.500	13.500	0.000	
1.417	17.000	14.000	0.000	
1.458	17.500	14.500	0.000	
1.500	18.000	15.000	0.000	
1.542	18.500	15.500	0.000	
1.583	19.000	16.000	0.000	
1.625	19.500	16.500	0.000	
1.667	20.000	17.000	0.000	
1.708	20.500	17.500	0.000	
1.750	21.000	18.000	0.000	Emergency Wier
1.792	21.500	18.500	0.211	
1.833	22.000	19.000	0.597	
1.875	22.500	19.500	1.096	
1.917	23.000	20.000	1.687	
1.958	23.500	20.500	2.358	Free Board
2.000	24.000	21.000	3.100	

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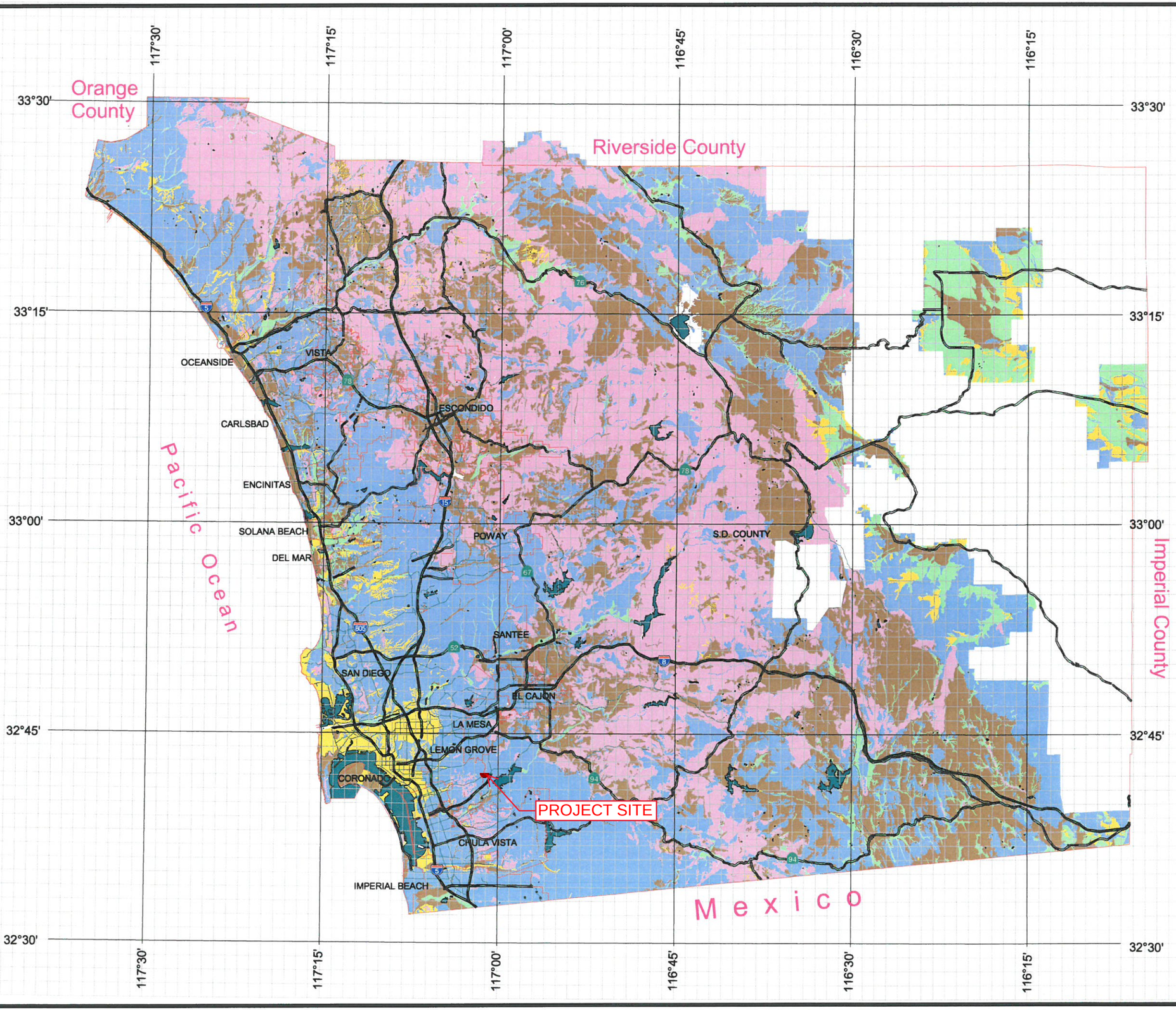
Soil Hydrologic Groups



Legend

Soil Groups

- Group A
- Group B
- Group C
- Group D
- Undetermined
- Data Unavailable

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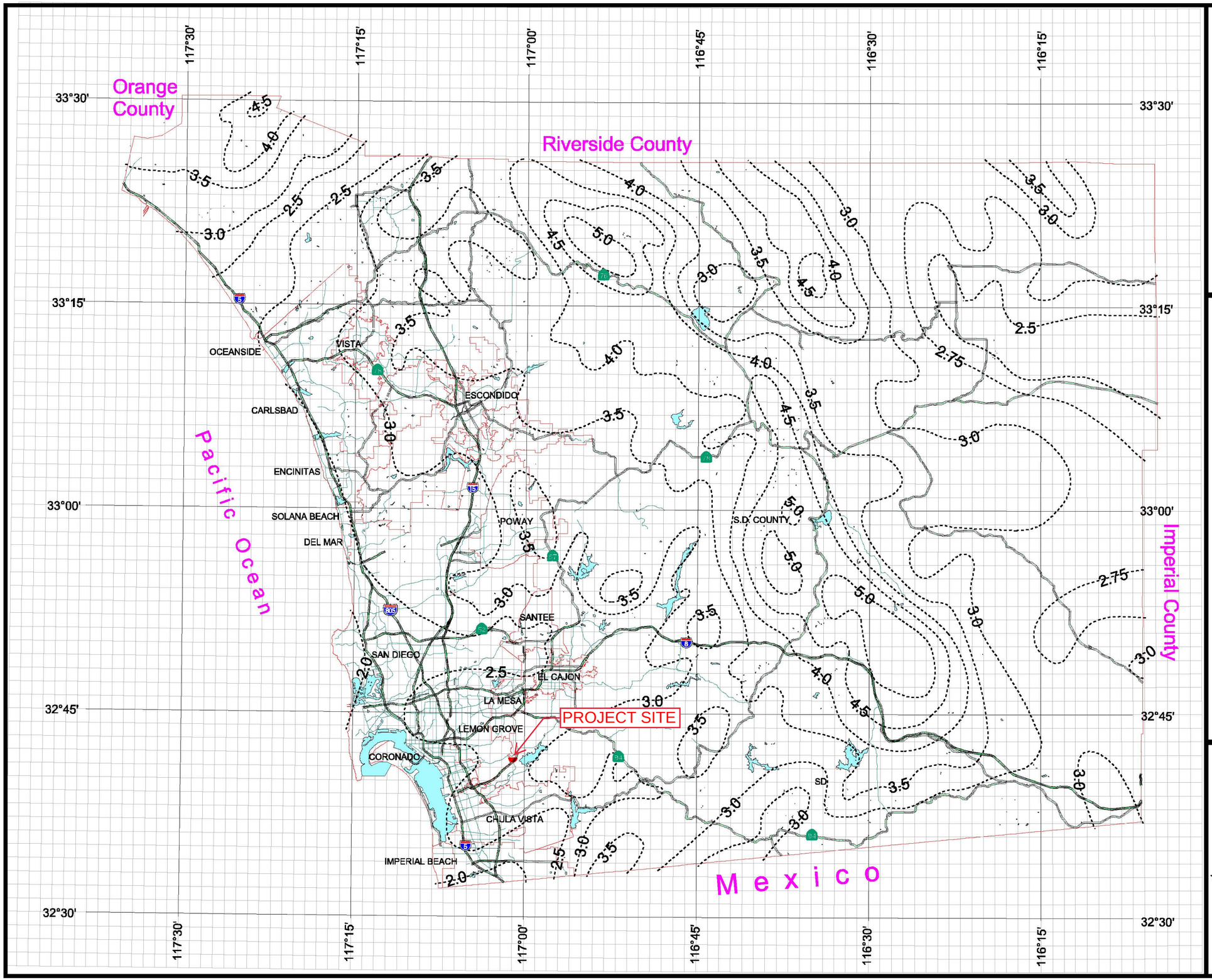
Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)



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3 0 3 Miles

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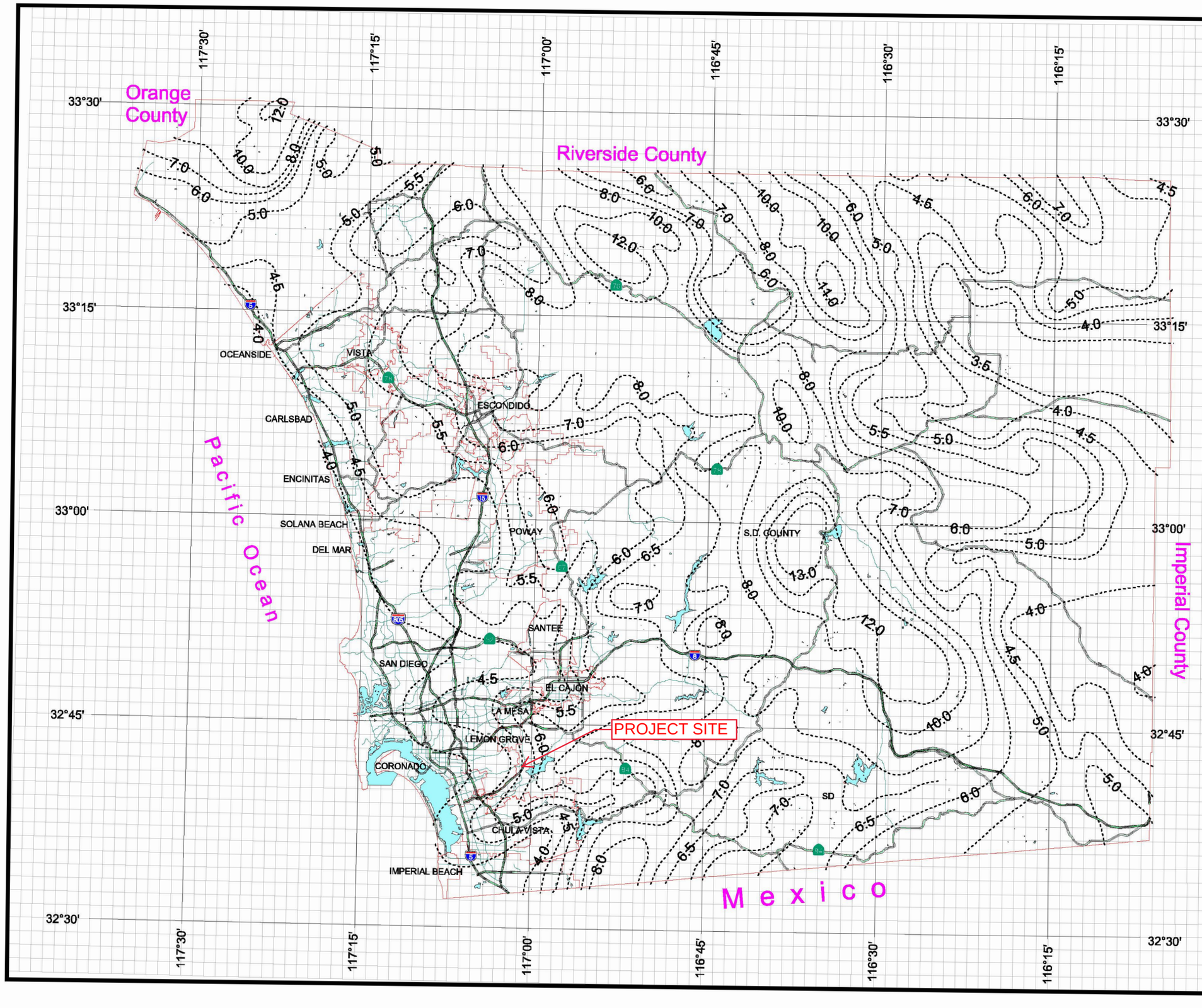
County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)



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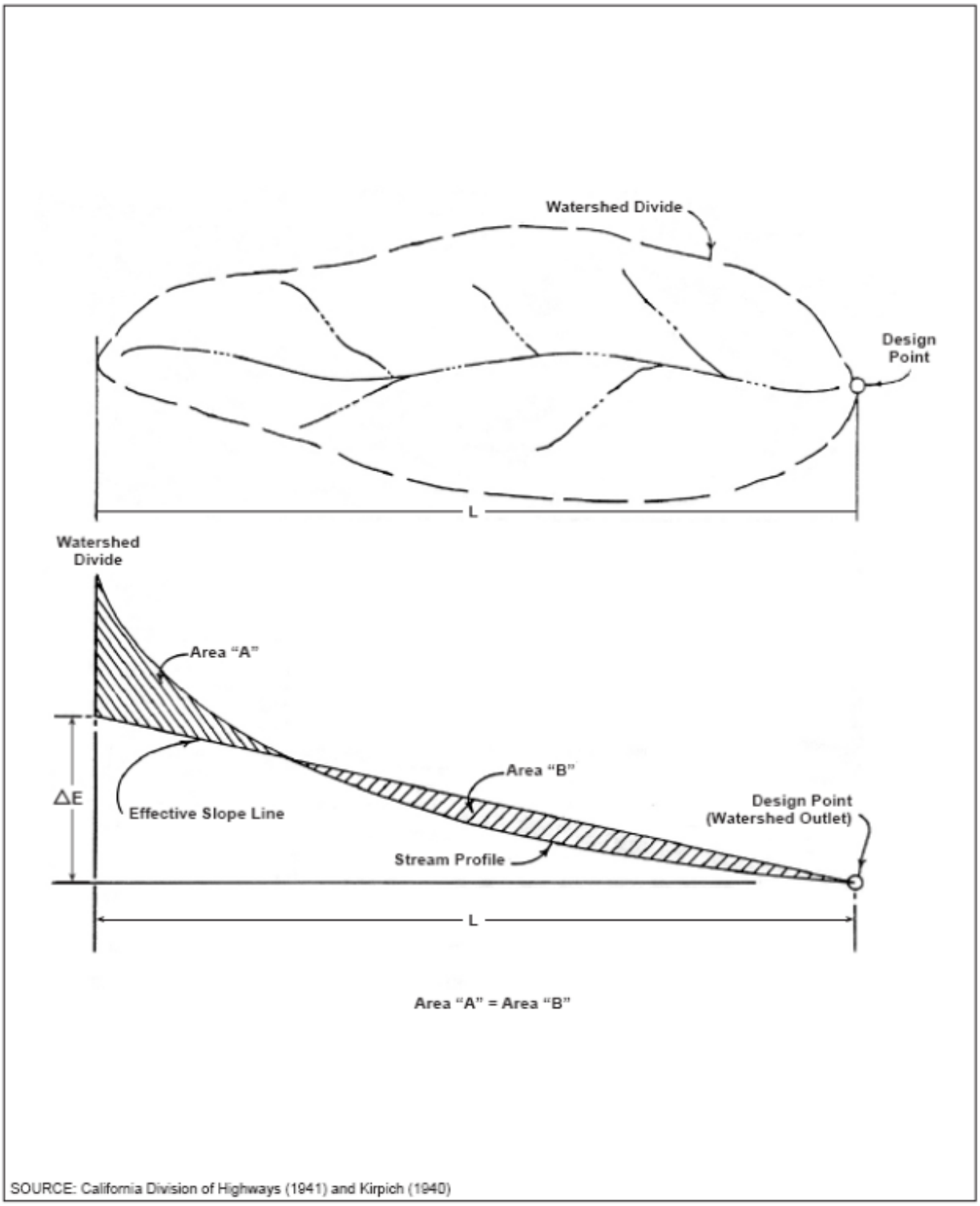
N W E S

3 0 3 Miles



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

FIGURE

Computation of Effective Slope for Natural Watersheds

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3-5

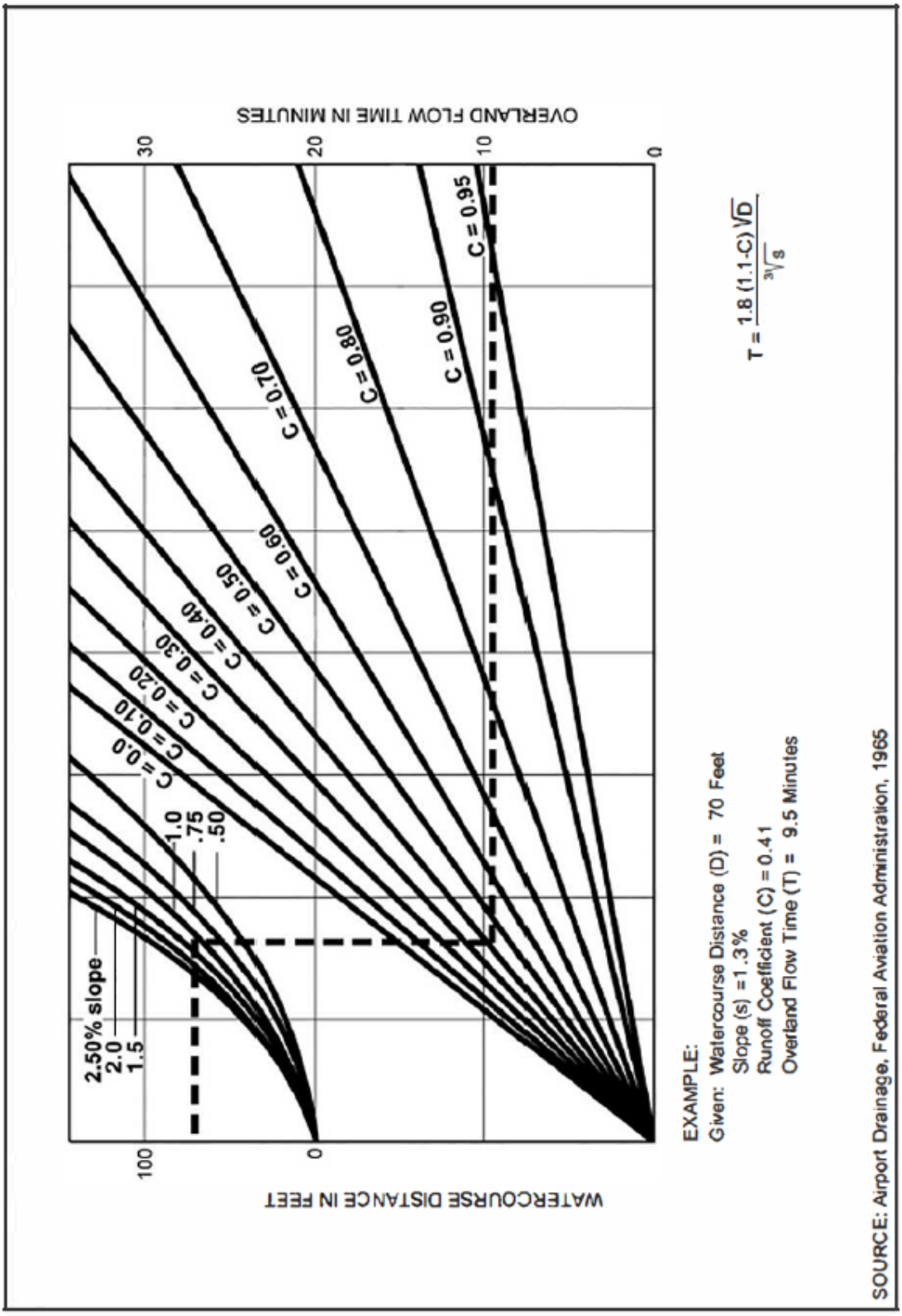

FIGURE 3-3

Rational Formula - Overland Time of Flow Nomograph

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

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

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

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

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

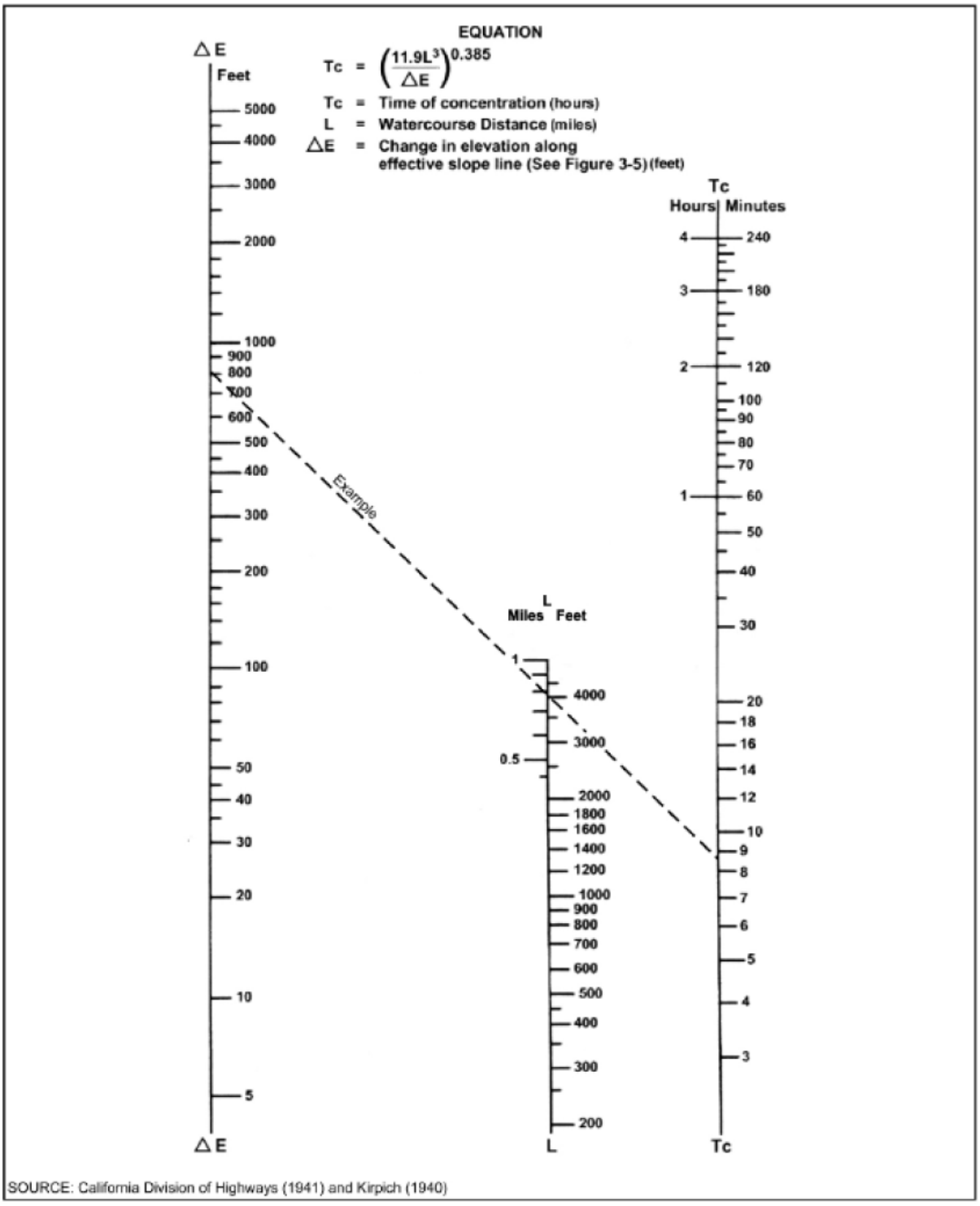

FIGURE 3-4

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

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