

**Carkel San Marcos Commercial
Technical Appendices**

**Appendix G
Drainage Report**

Drainage Report

for
Coffee Drive-Thru @ San Marcos Blvd. & Bent Ave.
City of San Marcos, San Diego County, CA

Prepared for:

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Prepared by:

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Prepared on:

December 22, 2020

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R.C.E. 45005



TORY R. WALKER ENGINEERING

RELIABLE SOLUTIONS IN WATER RESOURCES

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1. Introduction

This drainage report provides preliminary 100-year runoff flows for the existing and developed conditions, for the proposed coffee drive-thru site at the intersection of San Marcos Blvd. and Bent Ave. Separate companion reports prepared for this proposed project include the project Storm Water Quality Management Plan (SWQMP) and a floodplain analysis. The SWQMP has extensive data and sizing for the biotreatment (Modular Wetlands) and hydromodification storage with underground storage chambers. A Technical Memorandum dated Sept. 20, 2019 was also prepared for site floodplain impacts/considerations. That memorandum included a no-rise certification, stating the proposed project design would result in no negative impacts to the FEMA water surface elevations and floodway.

2. Project Description

The proposed project includes a 2,033 square foot coffee store, parking lot, drive-through lane, outdoor patio, and perimeter landscaping. A location map is included in the report attachments. The site is bounded by San Marcos Blvd. on the north and Bent Ave. on the west. Adjacent properties to the east and south are commercial or industrial use. The existing site is made up of entirely pervious material and developed conditions will result in an impervious ratio of 77%.

Soils

The site soils are made up almost entirely of Placentia sandy loam, categorized as Hydrologic Soil Group C (see HSG map/data from the NRCS soil database in the report attachments). The site geotechnical report indicates there is a thin layer of artificial fill at the surface with silty sand (alluvium) below. For the purpose of this drainage report, we have assumed soils are uniformly Soil Group C.

Existing Conditions

The 0.55-acre site is currently undeveloped with nearly bare ground. Runoff at the site sheet flows generally south and west to the southwest corner of the site. Offsite flows on San Marcos Blvd. and Bent Ave. do not enter the site; nor is there any run-on from the east or south.

Developed Conditions

The proposed drainage pattern results in the majority of the site runoff being conveyed westerly in a concrete gutter, which will turn south and join a grate inlet near the SW corner of the site. From there flows are piped to the project treatment BMP (Modular Wetlands) and then to underground storage/flow control vault/chambers. There is a small area of runoff captured on the east side of the project and piped to the treatment area. As there are no storm drains adjacent to Bent Ave., flow leaving the storage vault will be pumped to the surface perimeter landscaping, where flow will spread as sheet-flow toward Bent Ave., mimicking the current drainage pattern.



3. Hydrologic Analysis

San Diego County Hydrology Manual methodology was used for site Rational Method hydrology calculations. Rational Method calculations found in the report attachments are provided with a node-to-node analysis. The hydrologic Soil Group C for the site is factored into the C-values.

4. Conclusions

The development of this site as a drive-thru coffee store with parking will result in an increase in impervious area; increased runoff will be mitigated through hydromodification/storage.

Table 1: Site Runoff Flows (Unmitigated)

Method	Existing Conditions		Developed Conditions*	
	Drainage Area (ac)	Q ₁₀₀ (cfs)	Drainage Area (ac)	Q ₁₀₀ (cfs)
Rational Method	0.55	1.1	0.55	3.4

*The underground storage vault will provide some detention volume, to be calculated at final engineering. Approximate detained Q = 1.8 cfs.

REFERENCES

1. San Diego County, 2003 *Hydrology Manual*

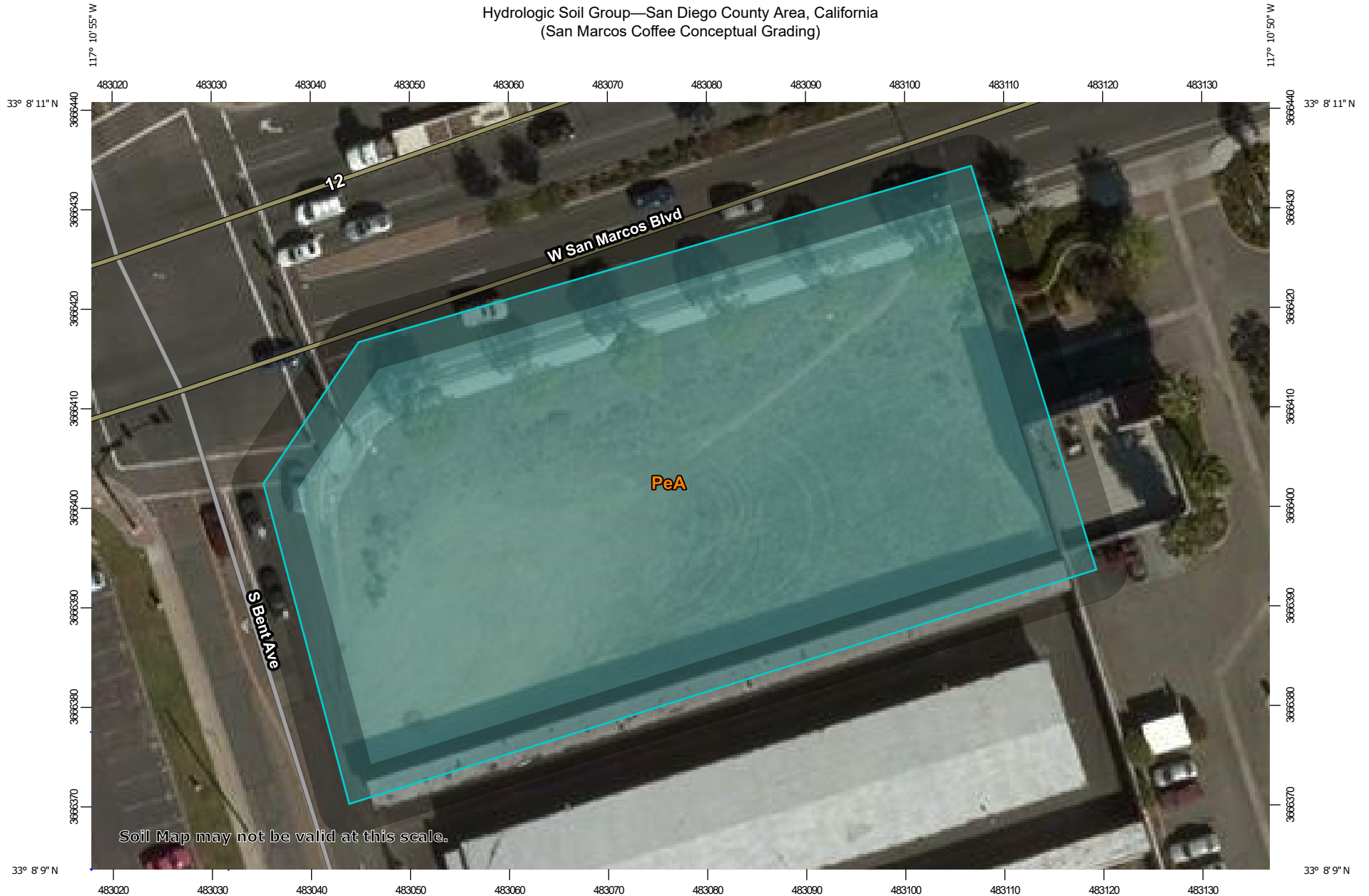
A. Location Map



Location Map

B. NRCS Soil Data/Map

Hydrologic Soil Group—San Diego County Area, California
(San Marcos Coffee Conceptual Grading)



Soil Map may not be valid at this scale.

Map Scale: 1:544 if printed on A landscape (11" x 8.5") sheet.

0 5 10 20 30 Meters

0 25 50 100 150 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84



MAP LEGEND

Area of Interest (AOI)









 Area of Interest (AOI)

Soils

Soil Rating Polygons





 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Lines


 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available

Soil Rating Points






 A
 A/D
 B
 B/D

 C
 C/D
 D
 Not rated or not available


Water Features

 Streams and Canals

Transportation

 Rails
 Interstate Highways
 US Routes
 Major Roads
 Local Roads

Background

 Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
 Survey Area Data: Version 13, Sep 12, 2018

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

Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
PeA	Placentia sandy loam, 0 to 2 percent slopes, warm MAAT, MLRA 19	C	0.8	100.0%
Totals for Area of Interest			0.8	100.0%

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

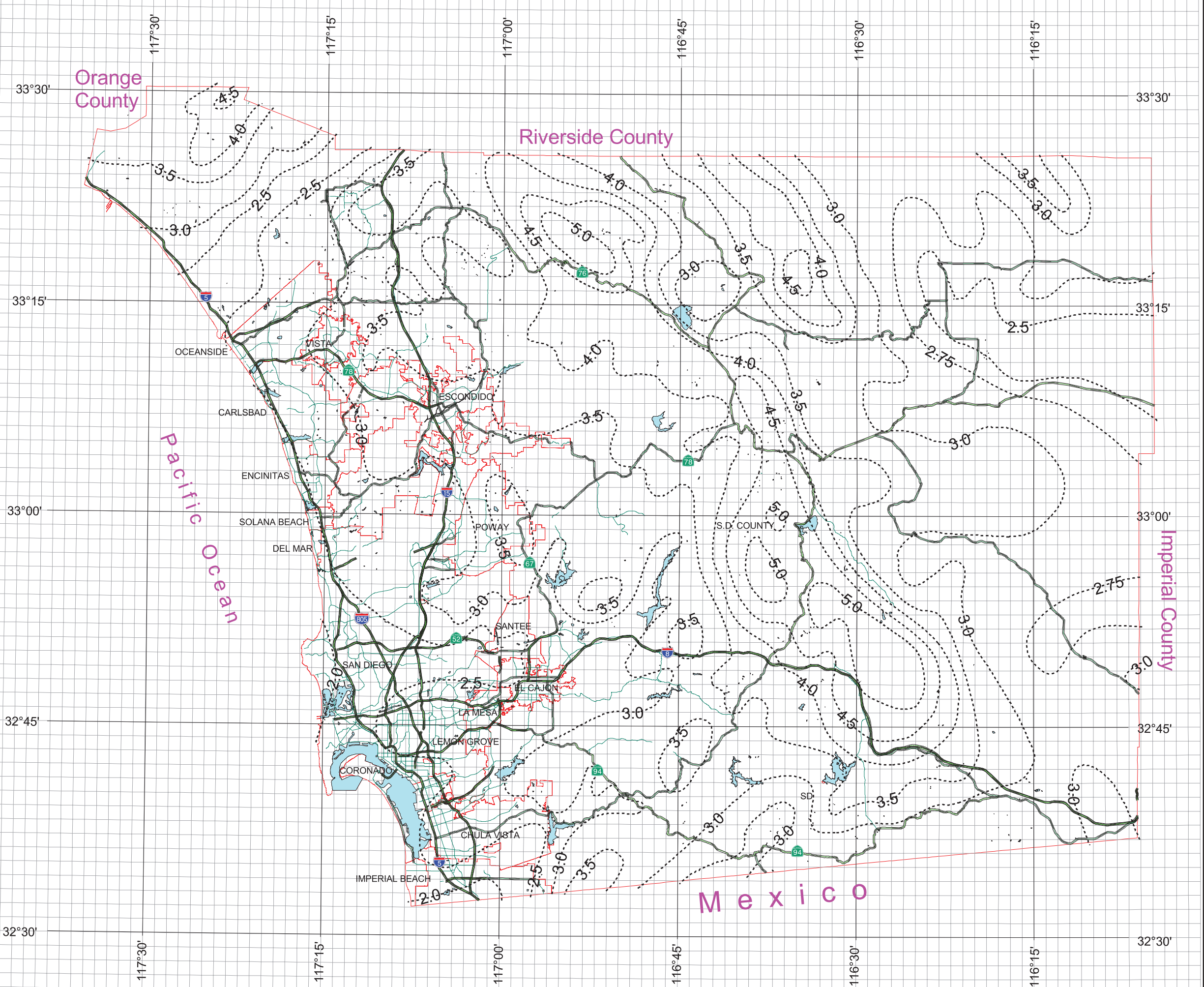
C. San Diego County Charts

County of San Diego Hydrology Manual



Rainfall Isophuvials

100 Year Rainfall Event - 6 Hours



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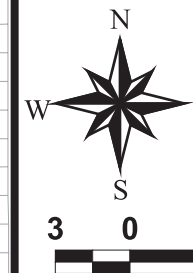
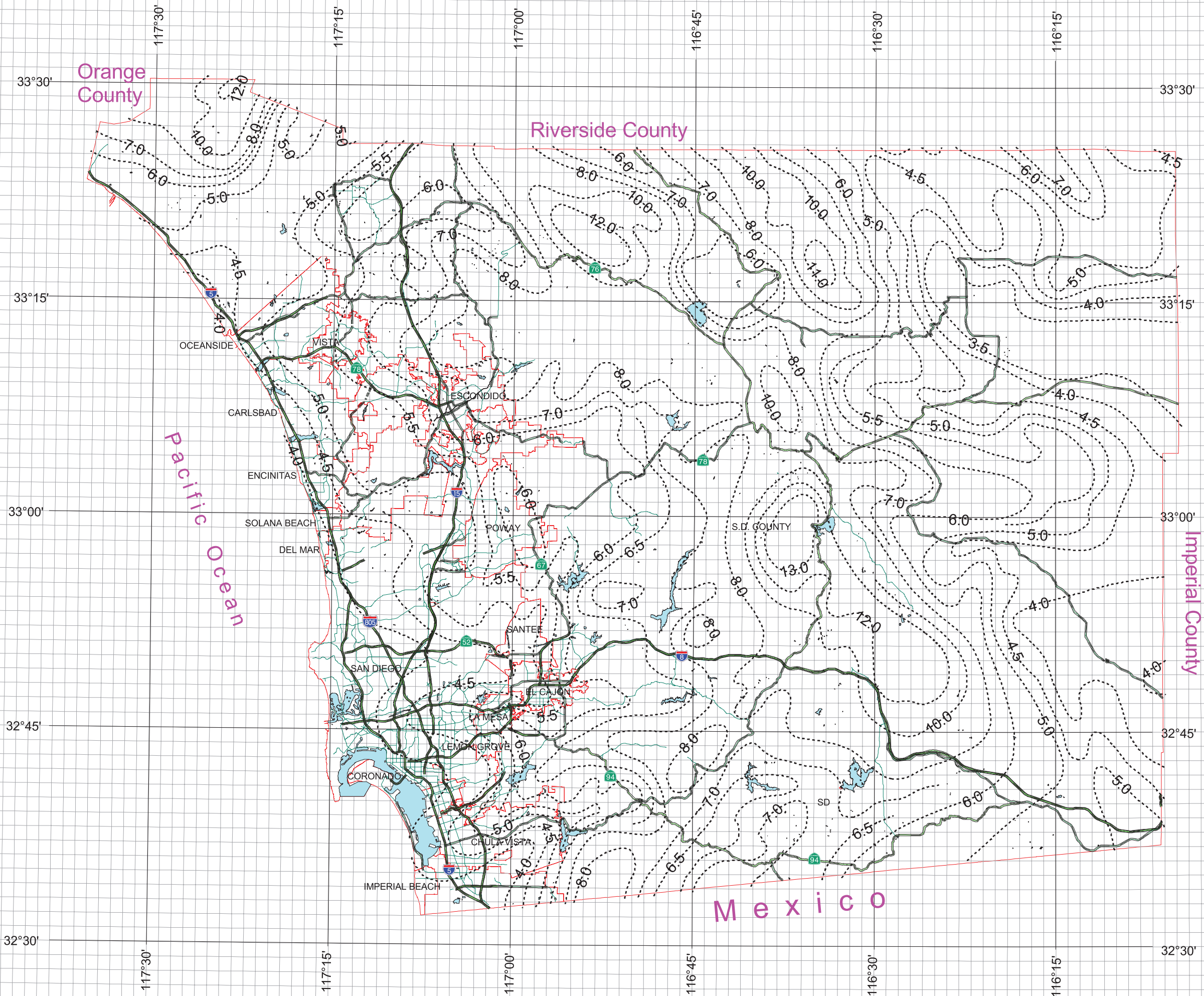
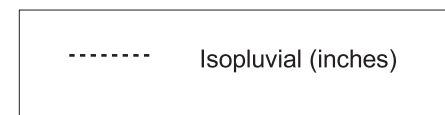
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County of San Diego Hydrology Manual



Rainfall Isopluvials

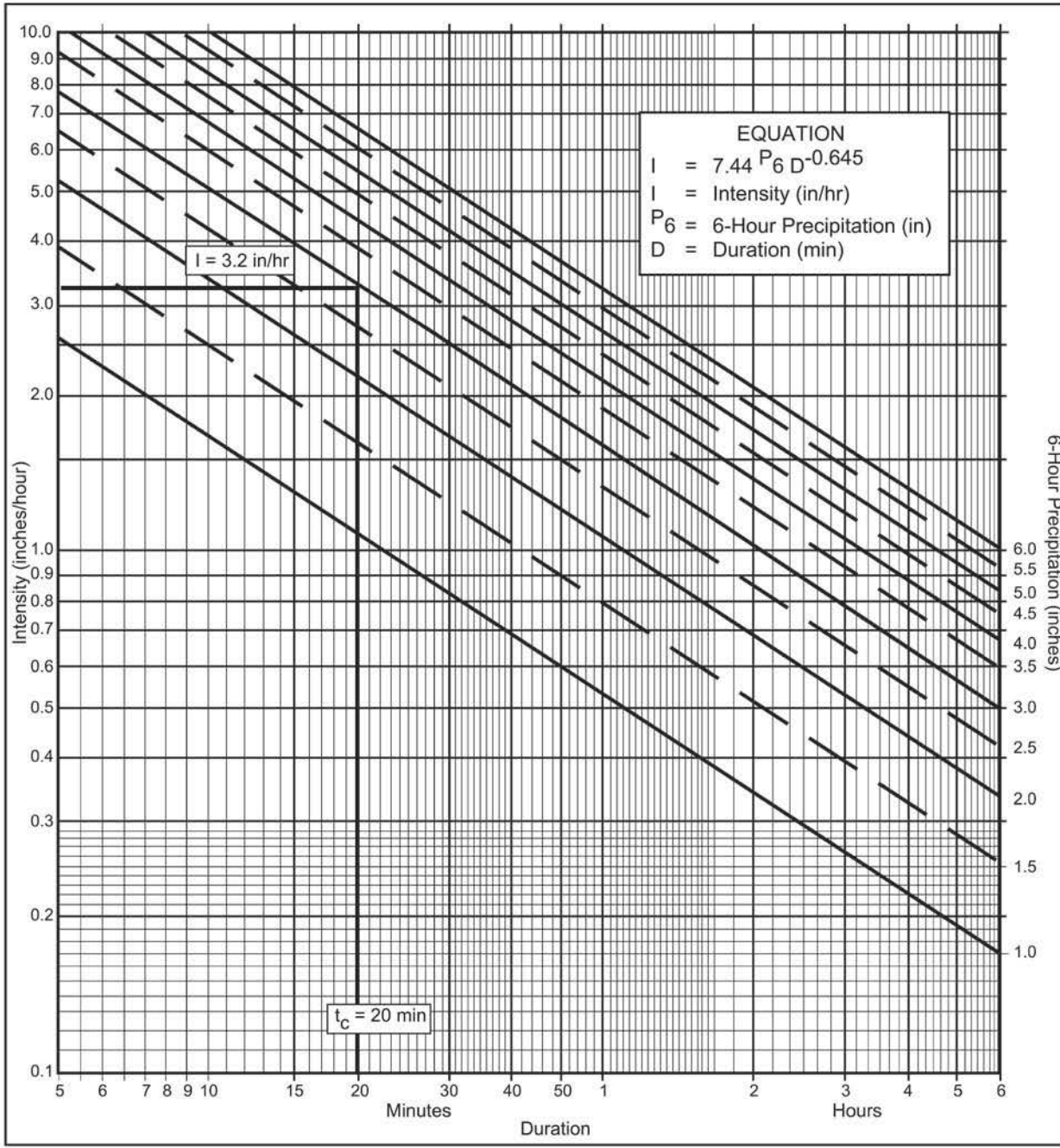
100 Year Rainfall Event - 24 Hours



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Directions for Application:

- (1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).
- (2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicable to Desert).
- (3) Plot 6 hr precipitation on the right side of the chart.
- (4) Draw a line through the point parallel to the plotted lines.
- (5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

- (a) Selected frequency 50 year
- (b) $P_6 = 3$ in., $P_{24} = 5.5$, $\frac{P_6}{P_{24}} = 54.5$ %⁽²⁾
- (c) Adjusted $P_6^{(2)} = 3$ in.
- (d) $t_x = 20$ min.
- (e) $I = 3.2$ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Example

FIGURE

3-2

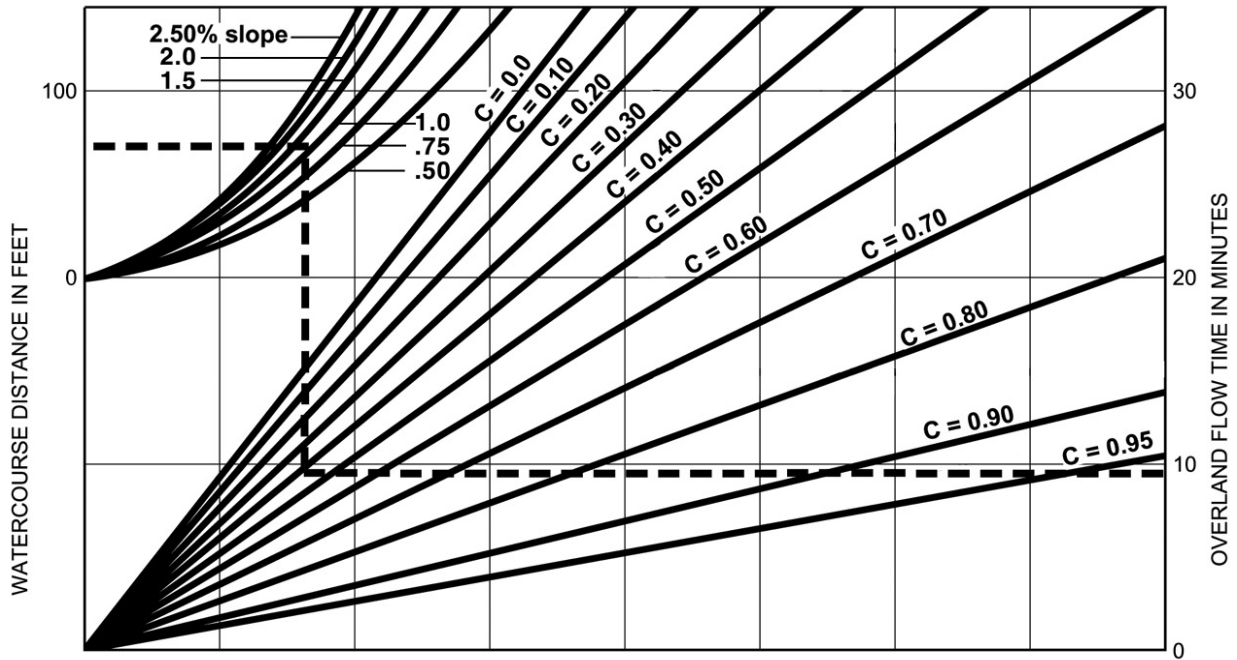
**Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS**

Land Use		Runoff Coefficient "C"				
		Soil Type				
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, C_p , for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).

DU/A = dwelling units per acre

NRCS = National Resources Conservation Service



EXAMPLE:

Given: Watercourse Distance (D) = 70 Feet
 Slope (s) = 1.3%
 Runoff Coefficient (C) = 0.41
 Overland Flow Time (T) = 9.5 Minutes

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

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

F I G U R E

Rational Formula - Overland Time of Flow Nomograph

D. Rational Method Calculations
Existing Conditions
Developed Conditions

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
2003,1985,1981 HYDROLOGY MANUAL
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Ver. 23.0 Release Date: 07/01/2016 License ID 1532

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* EXISTING CONDITIONS HYDROLOGY *
* 100-YEAR STORM *
* NOVEMBER 14, 2019 *

FILE NAME: CE100.DAT
TIME/DATE OF STUDY: 10:43 11/14/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT (YEAR) = 100.00
6-HOUR DURATION PRECIPITATION (INCHES) = 3.300
SPECIFIED MINIMUM PIPE SIZE (INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

Table with 10 columns: NO., WIDTH (FT), CROSSFALL (FT), SIDE / IN- / OUT- / PARK- / SIDE / WAY, HEIGHT (FT), CURB GUTTER-GEOMETRIES: WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n). Row 1: 1, 30.0, 20.0, 0.018/0.018/0.020, 0.67, 2.00, 0.0313, 0.167, 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====

*USER SPECIFIED (SUBAREA) :
USER-SPECIFIED RUNOFF COEFFICIENT = .3500
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH (FEET) = 220.00
UPSTREAM ELEVATION (FEET) = 546.10
DOWNSTREAM ELEVATION (FEET) = 543.00
ELEVATION DIFFERENCE (FEET) = 3.10
SUBAREA OVERLAND TIME OF FLOW (MIN.) = 9.793
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN

THE MAXIMUM OVERLAND FLOW LENGTH = 66.14

(Reference: Table 3-1B of Hydrology Manual)

THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 5.636

SUBAREA RUNOFF (CFS) = 1.08

TOTAL AREA (ACRES) = 0.55 TOTAL RUNOFF (CFS) = 1.08

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 0.6 TC (MIN.) = 9.79

PEAK FLOW RATE (CFS) = 1.08

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
2003,1985,1981 HYDROLOGY MANUAL
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* DEVELOPED CONDITIONS HYDROLOGY *
* 100-YEAR STORM *
* NOVEMBER 14, 2019 *

FILE NAME: CDEV100.DAT
TIME/DATE OF STUDY: 10:27 11/14/2019

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT (YEAR) = 100.00
6-HOUR DURATION PRECIPITATION (INCHES) = 3.300
SPECIFIED MINIMUM PIPE SIZE (INCH) = 12.00
SPECIFIED PERCENT OF GRADIENTS (DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL
Table with 9 columns: NO., WIDTH (FT), CROSSFALL (FT), SIDE / SIDE / WAY, HEIGHT (FT), CURB GUTTER-GEOMETRIES: WIDTH (FT), LIP (FT), HIKE (FT), MANNING FACTOR (n). Row 1: 1, 30.0, 20.0, 0.018/0.018/0.020, 0.67, 2.00, 0.0313, 0.167, 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
1. Relative Flow-Depth = 0.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
=====

*USER SPECIFIED (SUBAREA) :
USER-SPECIFIED RUNOFF COEFFICIENT = .8000
S.C.S. CURVE NUMBER (AMC II) = 0
INITIAL SUBAREA FLOW-LENGTH (FEET) = 110.00
UPSTREAM ELEVATION (FEET) = 545.10
DOWNSTREAM ELEVATION (FEET) = 544.40
ELEVATION DIFFERENCE (FEET) = 0.70
SUBAREA OVERLAND TIME OF FLOW (MIN.) = 4.559
WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN

THE MAXIMUM OVERLAND FLOW LENGTH = 52.73

(Reference: Table 3-1B of Hydrology Manual)

THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.695

NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.

SUBAREA RUNOFF (CFS) = 1.04

TOTAL AREA (ACRES) = 0.15 TOTAL RUNOFF (CFS) = 1.04

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 541.50 DOWNSTREAM (FEET) = 539.00

FLOW LENGTH (FEET) = 205.00 MANNING'S N = 0.011

ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 12.000

DEPTH OF FLOW IN 12.0 INCH PIPE IS 4.0 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.61

ESTIMATED PIPE DIAMETER (INCH) = 12.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 1.04

PIPE TRAVEL TIME (MIN.) = 0.74 Tc (MIN.) = 5.30

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 315.00 FEET.

FLOW PROCESS FROM NODE 102.10 TO NODE 102.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

100 YEAR RAINFALL INTENSITY (INCH/HOUR) = 8.373

*USER SPECIFIED (SUBAREA):

USER-SPECIFIED RUNOFF COEFFICIENT = .7000

S.C.S. CURVE NUMBER (AMC II) = 0

AREA-AVERAGE RUNOFF COEFFICIENT = 0.7273

SUBAREA AREA (ACRES) = 0.40 SUBAREA RUNOFF (CFS) = 2.34

TOTAL AREA (ACRES) = 0.6 TOTAL RUNOFF (CFS) = 3.35

TC (MIN.) = 5.30

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 7

>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<

USER-SPECIFIED VALUES ARE AS FOLLOWS:

TC (MIN) = 14.00 RAIN INTENSITY (INCH/HOUR) = 4.48

TOTAL AREA (ACRES) = 0.55 TOTAL RUNOFF (CFS) = 1.80

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 0.6 TC (MIN.) = 14.00

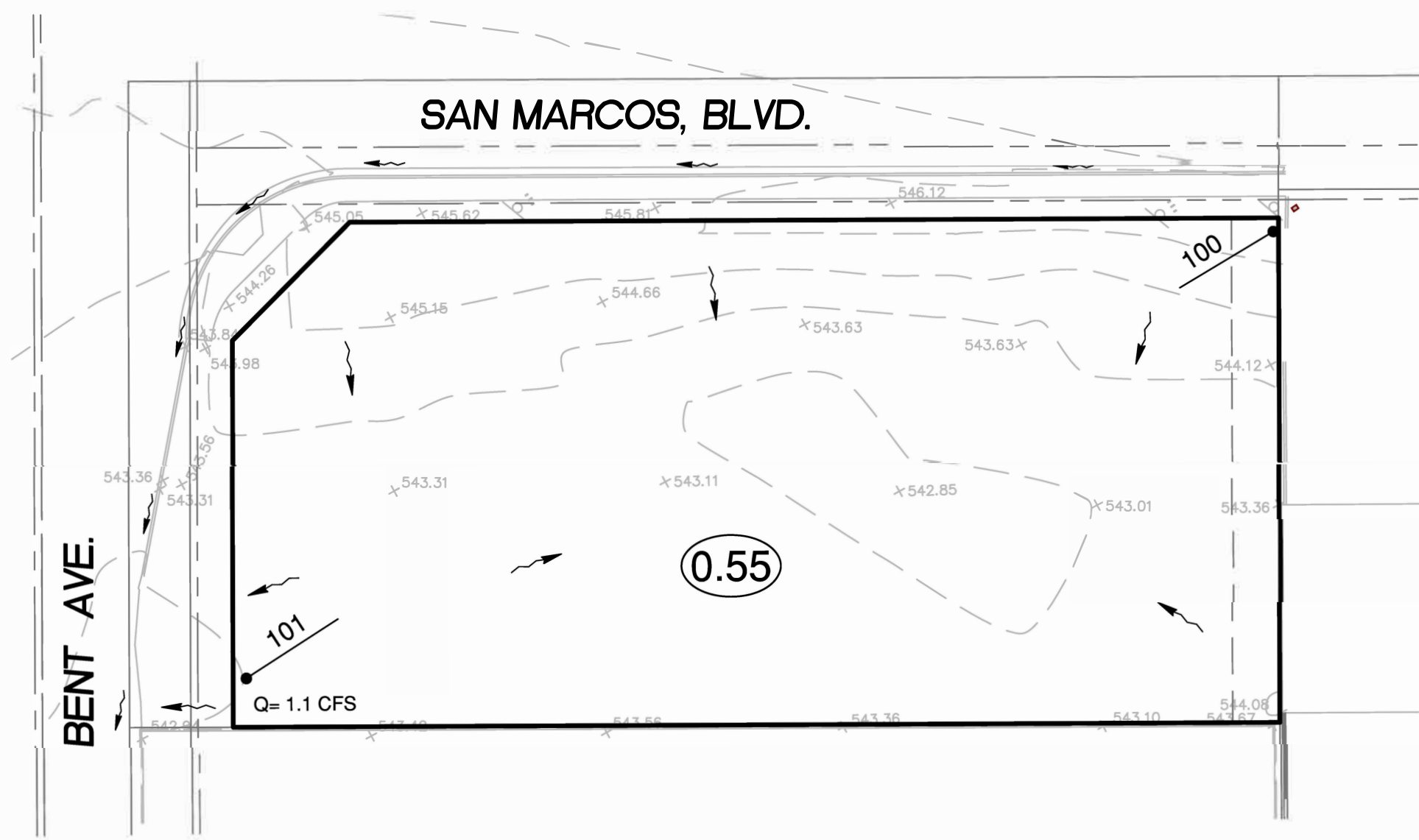
PEAK FLOW RATE (CFS) = 1.80

END OF RATIONAL METHOD ANALYSIS


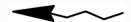


E. Drainage Maps

- Existing Condition Hydrology Map
- Developed Condition Hydrology Map

DRIVE-THRU COFFEE STORE
 SAN MARCOS BLVD. • BENT AVE
 SAN MARCOS, CA



LEGEND

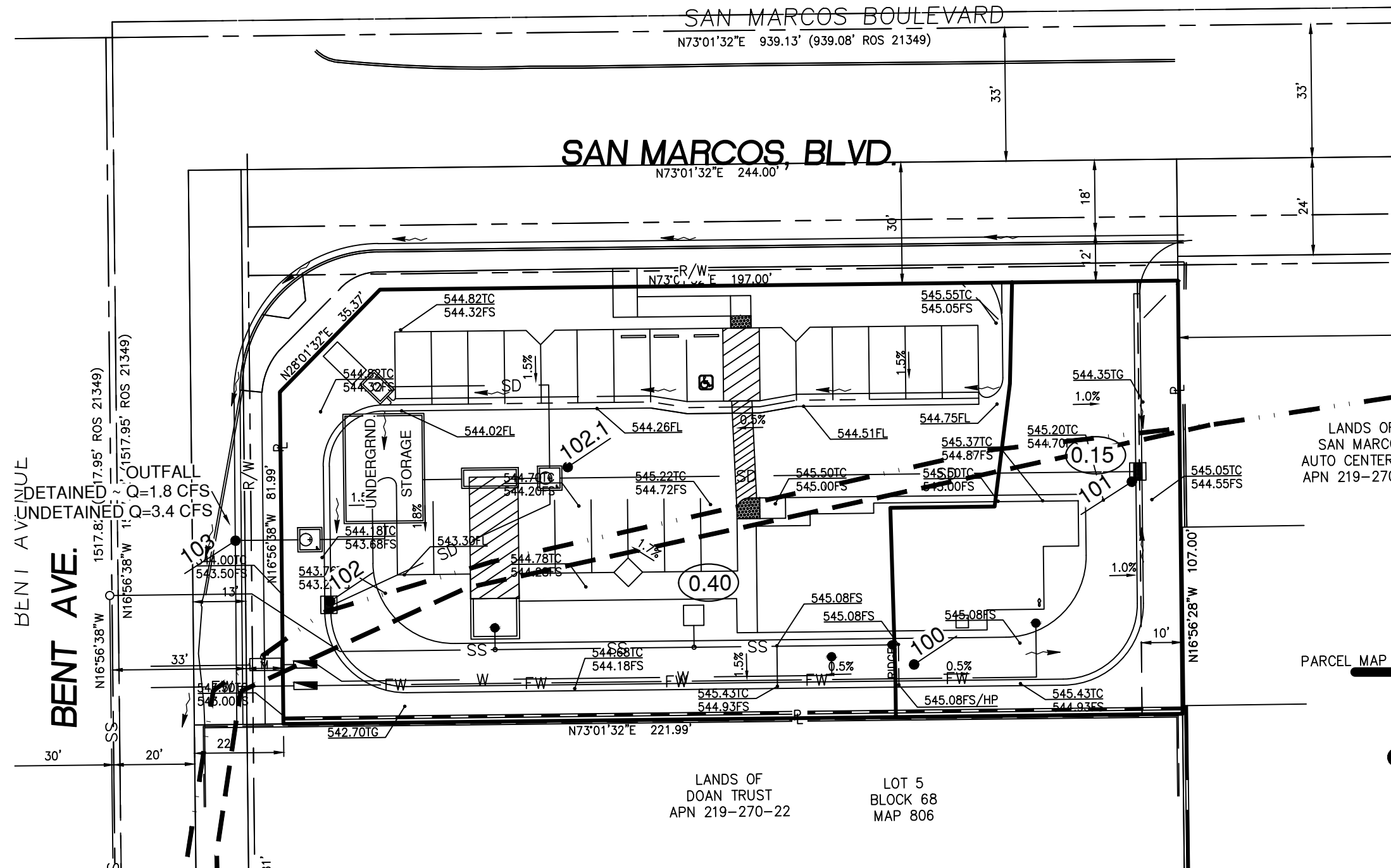
-  SUBAREA BASIN BOUNDARY
-  FLOW DIRECTION
-  100.0 RATIONAL METHOD NODE
-  0.08 AREA (AC)

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**EXISTING CONDITION
 HYDROLOGY MAP**





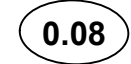
DATE: DECEMBER 18, 2019

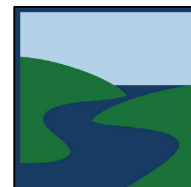
**DRIVE-THRU COFFEE STORE
SAN MARCOS BLVD. @ BENT AVE
SAN MARCOS, CA**



SCALE: 1"=30'

LEGEND

-  PARCEL MAP
-  SUBAREA BASIN BOUNDARY
-  FLOW DIRECTION
-  100.0 RATIONAL METHOD NODE
-  0.08 AREA (AC)



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**DEVELOPED CONDITIONS
HYDROLOGY MAP**

DATE: NOVEMBER 14, 2019
REVISED: December 22, 2020