COFFEY ENGINEERING, INC.

Drainage Report

1615 Ocean Front
San Diego, CA 92104

APN 539-143-01, 539-143-02

(PTS No. 612237)

Prepared for:

The City of San Diego

September 3, 2021

9666 Businesspark Avenue, Suite 210 San Diego, CA 92131 Phone: (858)831-0111 Fax: (858)831-0179

Table of Contents

1. Existing Conditions 3
2. Proposed Project 3
3. Purpose and Scope of Report 3
4. Method of Calculations 3
5. Results and Conclusions: 4
6. Clean Water Act (CWA) Compliance 4
7. Declaration of Responsible Charge 5

Appendix A –Drainage Maps

- Drainage Map 'A' – Existing Drainage Conditions
- Drainage Map 'B' – Proposed Drainage Conditions

Appendix B – Calculations/Evaluations

- 100 year storm
- Weight Runoff Coefficients

Appendix C – Reference Tables & Figures (City of San Diego Drainage Design Manual 2017)

- Figure A-1– Intensity-Duration Design Chart
- Figure A-4– Rational Formula-Overland Time of Flow
- Table A-1– Runoff coefficients for Rational Method
- Soil Hydrology Groups

1. **Existing Conditions**

In existing conditions, this project site is a residential lot with existing house. The majority of storm water runoff generated from this site (house, carport, front yard hardscape and landscape areas) currently discharges to the alley at the front of the property, where it flows northeasterly to an existing public storm drain system at the intersection of Cable Street and Niagara Avenue, before ultimately discharging to the Pacific Ocean.

See Appendix A- Drainage Map A.

2. **Proposed Project**

In proposed conditions, this project site will remain a residential lot and include a large addition to the house. A new carport will be constructed, along with a covered deck and surrounding hardscape. A below grade car lift will also be installed. The flow patterns will remain relatively the same as pre-construction conditions. Storm water runoff coming into contact with the rooftop and deck cover will reach landscape drains in the front yard and rear courtyard and be routed to a below-ground sump pump system. Sump flows will be pumped to a city-standard D-27 sidewalk underdrain at the northeast corner of the site, which will discharge the flows to the street through 2-3" diameter PVC outlet pipes. The walkway and parking area/lift will sheet flow into Ocean Front Street.

The rear yard bluff will remain untouched, and replicate the pre-construction drainage pattern.

See Appendix A- Drainage Map B.

3. **Purpose and Scope of Report**

This report will evaluate the proposed drainage pipe system and flow rate discharge to the street.

4. **Method of Calculations**

The Rational Method, as defined by *City of San Diego Drainage Design Manual 2017*, will be used to calculate storm water flow rates. Where noted, the following calculations were used to determine flow properties:

<u>Rainfall Characteristics</u>

$Q = C * I * A$, where

Q = Flow rate (ft^3/sec)
C = Runoff coefficient

(Runoff coefficient per *City of San Diego Drainage Design Manual 2017* reproduced in Appendix C. Soil type D determined from the *Soil Hydrologic Groups* map from the County of San Diego Hydrology Manual reproduced in Appendix C also.)
I = Rainfall intensity (in/hr.)
A = Area (acres)

5. **Results and Conclusions:**

Based on the calculations, the site will feature a slightly larger discharge to Ocean Front Street in proposed conditions, from 0.17 cfs to 0.24 cfs. Consequently, there is less runoff directed to the bluffs, from 0.25 cfs to 0.18 cfs. There are no anticipated impacts to adjacent properties as all storm water runoff from the habitable area discharges directly to the frontage street.

In pre-construction conditions, there is a 3" outlet located at the northeast corner of the property. Since it is unknown exactly how much runoff directly reaches this outlet pipe, at max velocity the pipe is expected to discharge to the street at 2.43 FPS.

The proposed D-27 sidewalk underdrain contains 2-3" diameter outlet pipes discharging to Ocean Front Street at a velocity of 2.43 FPS. Therefore, there is no increase or decrease of velocity expected to Ocean Front Street.

The final flow calculations will be submitted during the ministerial review.

6. **Clean Water Act (CWA) Compliance**

The proposed project is exempt from permitting under Federal Clean Water Act section 401 or 404 because it does not directly discharge into navigable waters of the United States.

7. **Declaration of Responsible Charge**

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

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

Michael C. Kinnear
RCE 76785
Exp. 12-31-22

Date

Appendix A –Drainage Map

GRADING TABULATIONS

TOTAL AMOUNT OF SITE TO BE GRADED: 0 S.F.*

AMOUNT OF CUT: 0* CUBIC YARDS
AMOUNT OF FILL: 0 CUBIC YARDS
MAXIMUM HEIGHT OF FILL SLOPE(S): 0 FEET
MAXIMUM HEIGHT OF CUT SLOPE(S): 0 FEET
AMOUNT OF IMPORT/ EXPORT SOIL: 0* CUBIC YARDS
RETAINING/ CRIB WALLS: LENGTH 0 FEET

% OF TOTAL SITE: 0*
MAXIMUM DEPTH OF CUT: 0* FEET
MAXIMUM DEPTH OF FILL: 0 FEET
SLOPE RATIO: N/A
SLOPE RATIO: N/A
MAXIMUM HEIGHT: N/A FEET

*WHEN INCLUDING BUILDING FOOTPRINT EXCAVATION AREA:
TOTAL AMOUNT OF SITE TO BE GRADED: 1,825 S.F.
% OF TOTAL SITE: 24%
AMOUNT OF CUT: 420 CUBIC YARDS
MAXIMUM DEPTH OF CUT: 11 FEET
AMOUNT OF EXPORT SOIL: 420 CUBIC YARDS

DEVELOPMENT PROJECT CATEGORY

STANDARD

CONSTRUCTION SITE PRIORITY

LOW

STORM WATER DOCUMENTATION

WPCP REQUIRED

PROJECT PROPERTY AREA

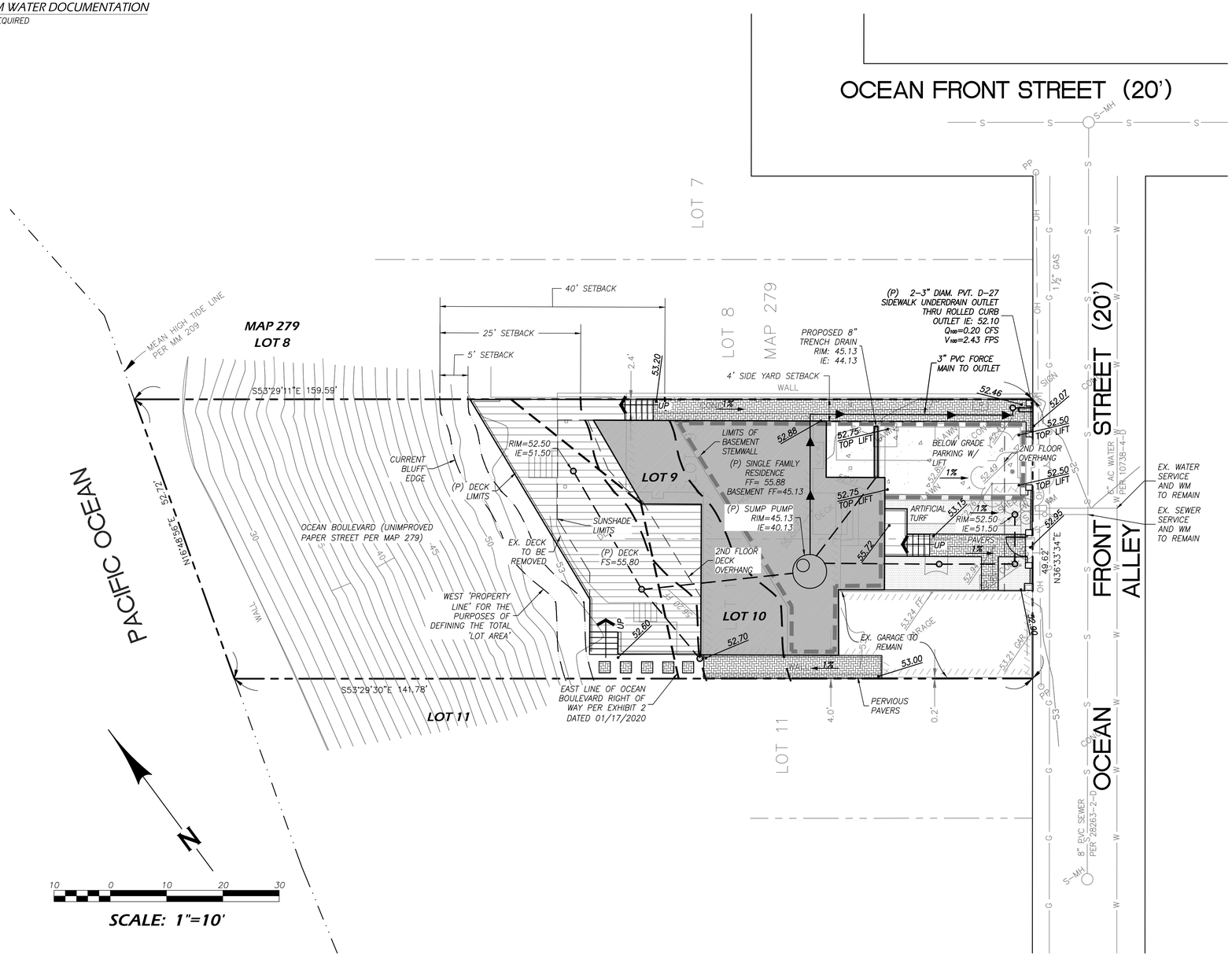
LOT AREA = 7,478 SQ FT (0.17 ACRES)
TOTAL DISTURBANCE AREA = 3,743 SQ FT
EXISTING AMOUNT OF PERVIOUS AREA = 3,909 SQ FT
EXISTING AMOUNT OF IMPERVIOUS AREA = 3,569 SQ FT
PROPOSED AMOUNT OF PERVIOUS AREA = 5,161 SQ FT
PROPOSED AMOUNT OF IMPERVIOUS AREA = 2,.308 SQ FT
IMPERVIOUS % INCREASE = −17%

STORM WATER NOTES

1. ALL PROPOSED DRAINAGE SHALL MAINTAIN EXISTING FLOW PATTERNS TOWARD THE STREET AND TOWARDS THE ALLEY.
2. THIS PROJECT WILL NOT DISCHARGE ANY INCREASE IN STORM WATER RUN-OFF ONTO THE COASTAL BLUFF.

DRAINAGE NOTES

1. ALL MAIN DRAIN LINES SHOWN TO BE 6" PVC @ 1% MINIMUM SLOPE UNLESS OTHERWISE NOTED.
2. ALL CATCH BASIN LEADS TO BE 4" PVC @ 2% MINIMUM SLOPE UNLESS OTHERWISE NOTED.
3. HARDSCAPE GRADES TO BE 1% MINIMUM TO DRAINS AND AWAY FROM STRUCTURE.
4. SOFTSCAPE GRADES TO BE 2% MINIMUM TO DRAINS (1% WHERE FLOW IS CONCENTRATED) AND 2% MINIMUM AWAY FROM STRUCTURE.
5. SOIL COVER ABOVE DRAIN LINES SHALL BE 12" MINIMUM UNLESS OTHERWISE NOTED.
6. NOTIFY CIVIL ENGINEER IF ANY NON-DRAINING SUMP CONDITIONS BECOME APPARENT DURING CONSTRUCTION.



LEGEND

DESCRIPTION	STD DWG	SYMBOL
PROPERTY LINE		N45°45'45"W
STREET CENTERLINE		
(E) CONTOUR		90
(E) SPOT ELEVATION		+100.00
(E) FENCE TO REMAIN		
(E) WATER LINE		W
(E) SEWER LINE		S
(E) WATER SERVICE		W
(E) SEWER SERVICE		S
(E) FIRE HYDRANT		FH
EXISTING TREE		
PVT SPOT ELEVATION		100.00
PVT PVC DRAIN LINE (PER PLAN)	SDR-35 SCH 40	
ROOF DRAIN		DS
PVT FREESTANDING WALL		
PVT BUILDING FOOTPRINT		
PVT FENCE (MAT'L PER ARCHITECT)		
PVT PAVERS		
PVT DECK		
BUILDING FOOTPRINT		
BUILDING STEP (ELEVATION CHANGE)		
BUILDING OVERHANG		

LEGAL DESCRIPTION

LOT 9 & 10 IN BLOCK 66 OF OCEAN BEACH, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 279 FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO, MAY 28, 1987.

APN: 448-161-02

BENCHMARK

CABLE STREET AND DEL MAR AVENUE
N 2103, E 16916, EL=39.021, MSL, SBP
AS PUBLISHED IN THE CITY OF SAN DIEGO VERTICAL CONTROL BENCHBOOK, OCTOBER 2011.

SOURCE OF TOPOGRAPHY

FIELD TOPO BY:
BERGGREN & ASSOCIATES
6046 CORNERSTONE COURT, #116
SAN DIEGO, 92121
DATED: FEBRUARY 2019

EASEMENTS

THIS PLAN WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT. EASEMENTS MAY BE PRESENT ON THE SUBJECT PROPERTY.

ABBREVIATIONS

AC	ASPHALTIC CONCRETE	HP	HIGH POINT
BRW	BOTTOM OF RETAINING WALL GRADE	IE	INVERT ELEVATION
BX	BOX	MIN	MINIMUM
CB	CATCH BASIN	PA	PLANTING AREA
C/L; ℄	CENTERLINE	PCC	PORTLAND CEMENT CONCRETE
CONC	CONCRETE	P.I.P.	PROTECT IN PLACE
D	DRAIN	PNL	PANEL
EB	ELECTRIC BOX	PP	POWER POLE
EL	ELEVATION	(P); PR	PROPOSED
ELEC	ELECTRIC	PVC	POLYVINYLCHLORIDE
ELEV	ELEVATOR	ROW	RIGHT OF WAY
EQ	EQUIPMENT	RP	REDUCED PRESSURE
(E); EX	EXISTING	S; SWR	SEWER
FH	FIRE HYDRANT	SLB	STREET LIGHT BOX
FF	FINISH FLOOR	STD	STANDARD
FL; ℄	FLOWLINE	TC	TOP OF CURB
FS	FINISH SURFACE/SLAB	TE	TRASH ENCLOSURE
GM	GAS METER	TSB	TRAFFIC SIGNAL BOX
GV	GAS VALVE	TRW	TOP OF RETAINING WALL GRADE
GP	GUARD POST	U.N.O.	UNLESS NOTED OTHERWISE
		WM	WATER METER

UTILITY NOTE

1. THE LOCATIONS OF UTILITIES, IF ANY, SHOWN ON THIS PLAN ARE GENERATED FROM RECORDS PROVIDED BY UTILITY/GOVERNING AGENCIES AND/OR FIELD DATA COLLECTED DURING THE SURVEY. THE PLOTTING OF UTILITIES ON THIS PLAN DOES NOT CONSTITUTE A GUARANTEE OF THEIR LOCATION, DEPTH, SIZE, OR TYPE.

COFFEY ENGINEERING, INC.
9666 BUSINESSPARK AVENUE, SUITE 210, SAN DIEGO, CA 92131 PH (858)831-0111 FAX (858)831-0179

REGISTERED PROFESSIONAL ENGINEER
JOHN S. COFFEY
No. C062716
9/3/21
CIVIL
STATE OF CALIFORNIA

OCEAN FRONT RESIDENCE
Remodel & Addition
1615 Ocean Front Street
San Diego, CA 92107

DRAWN BY: DK / MR
CHECKED BY: JC

ORIGINAL	9/3/21
REVISION 1	
REVISION 2	
REVISION 3	
REVISION 4	
REVISION 5	

GRADING and DRAINAGE PLAN

SCALE: 1" = 10'

C.1

SHT 1 OF 1 SHTS

LEGEND

DESCRIPTION	SYMBOL
DIRECTION OF FLOW	
SITE BASIN LIMIT	
DIRECTION OF FLOW	
IMPERVIOUS AREA	

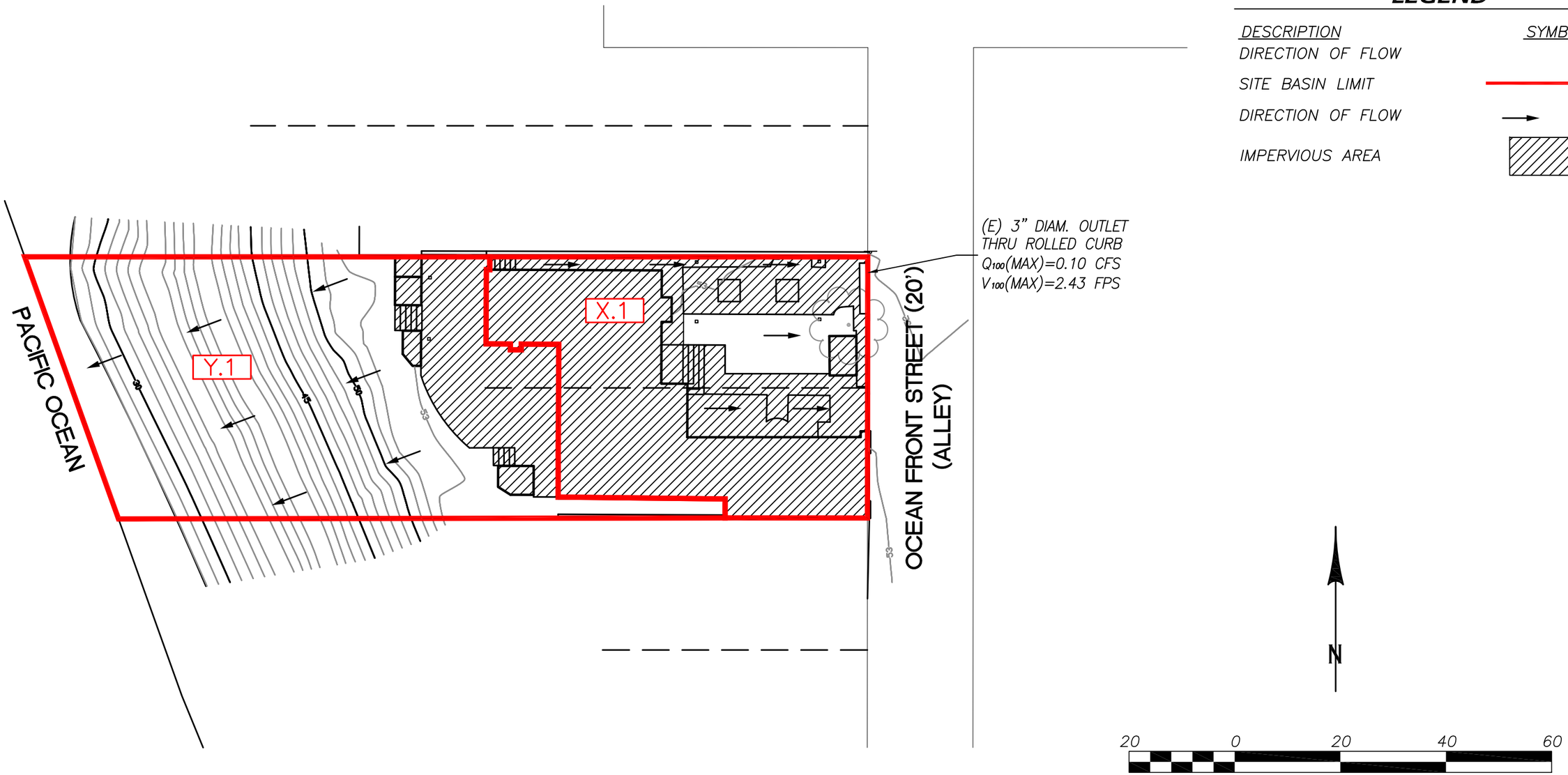


Table A - Pre Construction Flow Conditions						Hydraulics of Existing Structures	
		Summary					
Flow ID (Basin)	Runoff Coefficient, C	(5 min minimum) Total time-of-concentration, T_c (min)	Rainfall Intensity, I (in/hr)	Basin Area, A (acres)	**Q (cfs)**	Flow ID (Basin)	Flow Description
X.1	0.55	5.00	4.40	0.07	**0.17**	X.1	Discharge to Ocean Front Street
Y.1	0.55	5.00	4.40	0.10	**0.25**	Y.1	Bluff to Pacific Ocean
				Sum =	**0.42**		

COFFEY ENGINEERING, INC.

1615 Ocean Front
San Diego CA 92107

DRAINAGE MAP 'A'
EXISTING CONDITIONS

LEGEND

DESCRIPTION	SYMBOL
DIRECTION OF FLOW	
SITE BASIN LIMIT	
DIRECTION OF FLOW	
IMPERVIOUS AREA	

OCEAN FRONT STREET (20')

MAP 279
LOT 8

E. LINE OF 'OCEAN BLVD' PER MAP 279

S53°29'11"E 159.59'

3" PVC FORCE MAIN TO OUTLET

(P) 2-3" DIAM. PVT. D-27 SIDEWALK UNDERDRAIN OUTLET THRU ROLLED CURB
OUTLET IE: 52.10
Q_{100}=0.20 CFS
V_{100}=2.43 FPS

PACIFIC OCEAN

B.1

A.1

A.2

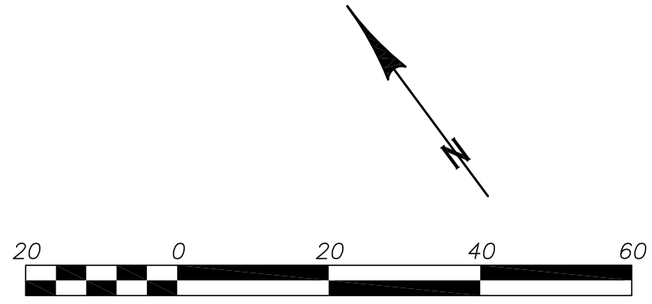
LOT 9

LOT 10

LOT 11

S53°29'30"E 141.78'

OCEAN FRONT STREET (20')
(ALLEY)



Flow ID (Basin)	Runoff Coefficient, C	(5 min minimum) Total time-of-concentration, T_c (min)	Rainfall Intensity, I (in/hr)	Basin Area, A (acres)	**Q (cfs)**	Flow ID (Basin)	Flow Description
A.1	0.55	5.00	4.40	0.08	**0.20**	A.1	Sump pump to Ocean Front Street
A.2	0.55	5.00	4.40	0.01	**0.04**	A.2	Sheet flow to Ocean Front Street
B.1	0.55	5.00	4.40	0.08	**0.18**	B.1	Bluff to Pacific Ocean
				Sum =	**0.42**		

1615 Ocean Front
San Diego CA 92107

DRAINAGE MAP 'B'
PROPOSED CONDITIONS

COFFEY ENGINEERING, INC.

Appendix B –Calculation/Evaluations

100 Year Storm

Table A - Pre Construction Flow Conditions

		Summary				Hydraulics of Existing Structures	
Flow ID (Basin)	Runoff Coefficient, C	(5 min minimum) Total time-of-concentration, T_c (min)	Rainfall Intensity, I (in/hr)	Basin Area, A (acres)	**Q (cfs)**	Flow ID (Basin)	Flow Description
X.1	0.55	5.00	4.40	0.07	**0.17**	X.1	Discharge to Ocean Front Street
Y.1	0.55	5.00	4.40	0.10	**0.25**	Y.1	Bluff to Pacific Ocean
				Sum =	**0.42**		

Table B - Post Construction Flow Conditions

		Summary				Hydraulics of Proposed Structures	
Flow ID (Basin)	Runoff Coefficient, C	(5 min minimum) Total time-of-concentration, T_c (min)	Rainfall Intensity, I (in/hr)	Basin Area, A (acres)	**Q (cfs)**	Flow ID (Basin)	Flow Description
A.1	0.55	5.00	4.40	0.08	**0.20**	A.1	Sump pump to Ocean Front Street
A.2	0.55	5.00	4.40	0.01	**0.04**	A.2	Sheet flow to Ocean Front Street
B.1	0.55	5.00	4.40	0.08	**0.18**	B.1	Bluff to Pacific Ocean
				Sum =	**0.42**		

Weighted Runoff Coefficients

Pre-Construction Conditions

Drainage Basin ID (Type)	Impervious Area (SF)	Pervious Area (SF)	Basin Area (SF)	Total (AC)	C-Value
X.1	2,712	306	3,018	0.07	**0.55**
Y.1	857	3,603	4,460	0.10	**0.55**
Total	**3,569**	**3,909**	**7,478**	**0.17**	

Post-Construction Conditions

Drainage Basin ID (Type)	Impervious Area (SF)	Pervious Area (SF)	Basin Area (SF)	Total (AC)	C-Value
A.1	1,972	1,562	3,534	0.08	**0.55**
A.2	336	294	630	0.01	**0.55**
B.1	0	3,305	3,314	0.08	**0.55**
Total	**2,308**	**5,161**	**7,478**	**0.17**	

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

Pipe Flow

Radius	Arc Length	
0.125	0.545415391	

Theta (Deg)	Theta (Rad)	Perimeter
250	4.36332313	0.075960105

2-3" PVC Discharging to Ocean Front St. (A.1) - 3" Closed Conduit - PVC @ 1%

Diameter (inches)	Manning N
	1.Closed Conduit - PVC
3	0.011

Slope (FT/FT)	Q (CFS)
0.0100	0.100653814030

Depth (feet)	Depth/Diameter
0.19670	78.6788%

Velocity (ft/sec)	Velocity Head (feet)
2.429502155	0.091653427

Area
0.041429811

Appendix C –Reference Tables & Figures (City of San Diego Drainage Manual 2017)

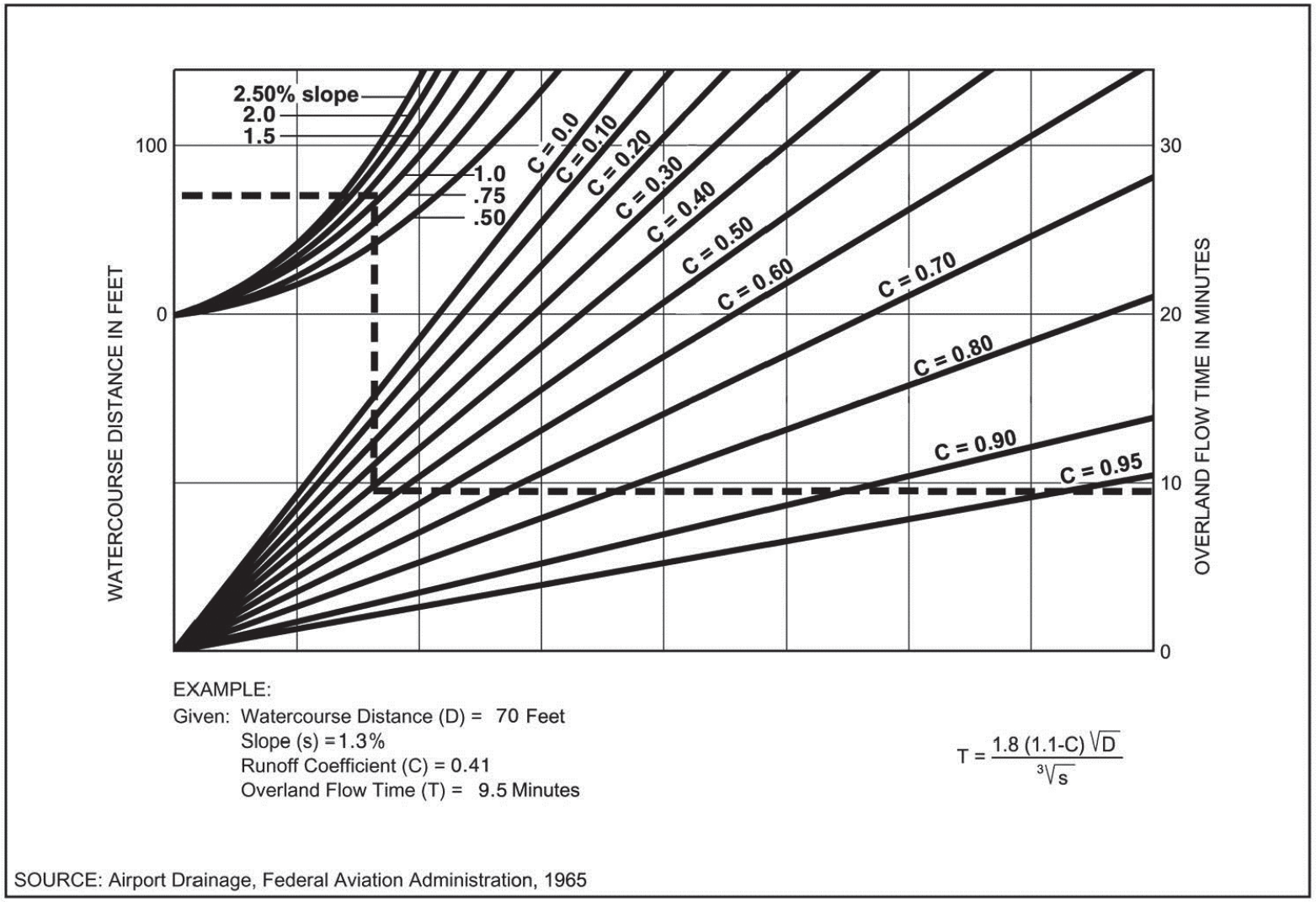


Figure A-4. Rational Formula – Overland Time of Flow Nomograph

Note: Use formula for watercourse distances in excess of 100 feet.

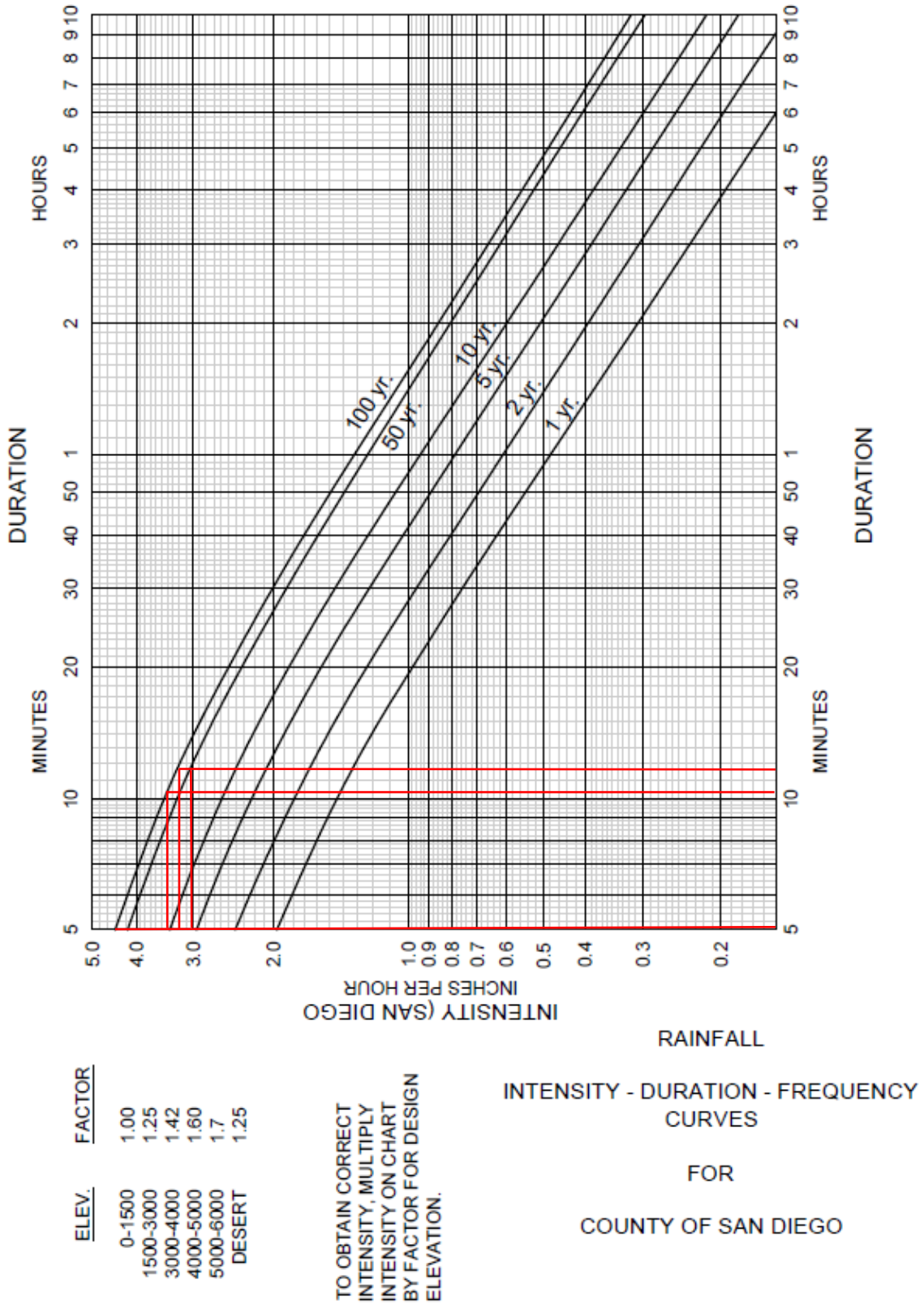


Figure A-1. Intensity-Duration-Frequency Design Chart

Table A-1. Runoff Coefficients for Rational Method

Land Use	Runoff Coefficient (C)
	Soil Type [1]
Residential:	
Single Family	0.55
Multi-Units	0.70
Mobile Homes	0.65
Rural (lots greater than ½ acre)	0.45
Commercial [2]	
80% Impervious	0.85
Industrial [2]	
90% Impervious	0.95

Note:
[1] Type D soil to be used for all areas.
[2] Where actual conditions deviate significantly from the tabulated imperviousness values of 80% or 90%, the values given for coefficient C, may be revised by multiplying 80% or 90% by the ratio of actual imperviousness to the tabulated imperviousness. However, in case shall the final coefficient be less than 0.50. For example: Consider commercial property on D soil.

Actual imperviousness = 50%
Tabulated imperviousness = 80%
Revised C = (50/80) x 0.85 = 0.53

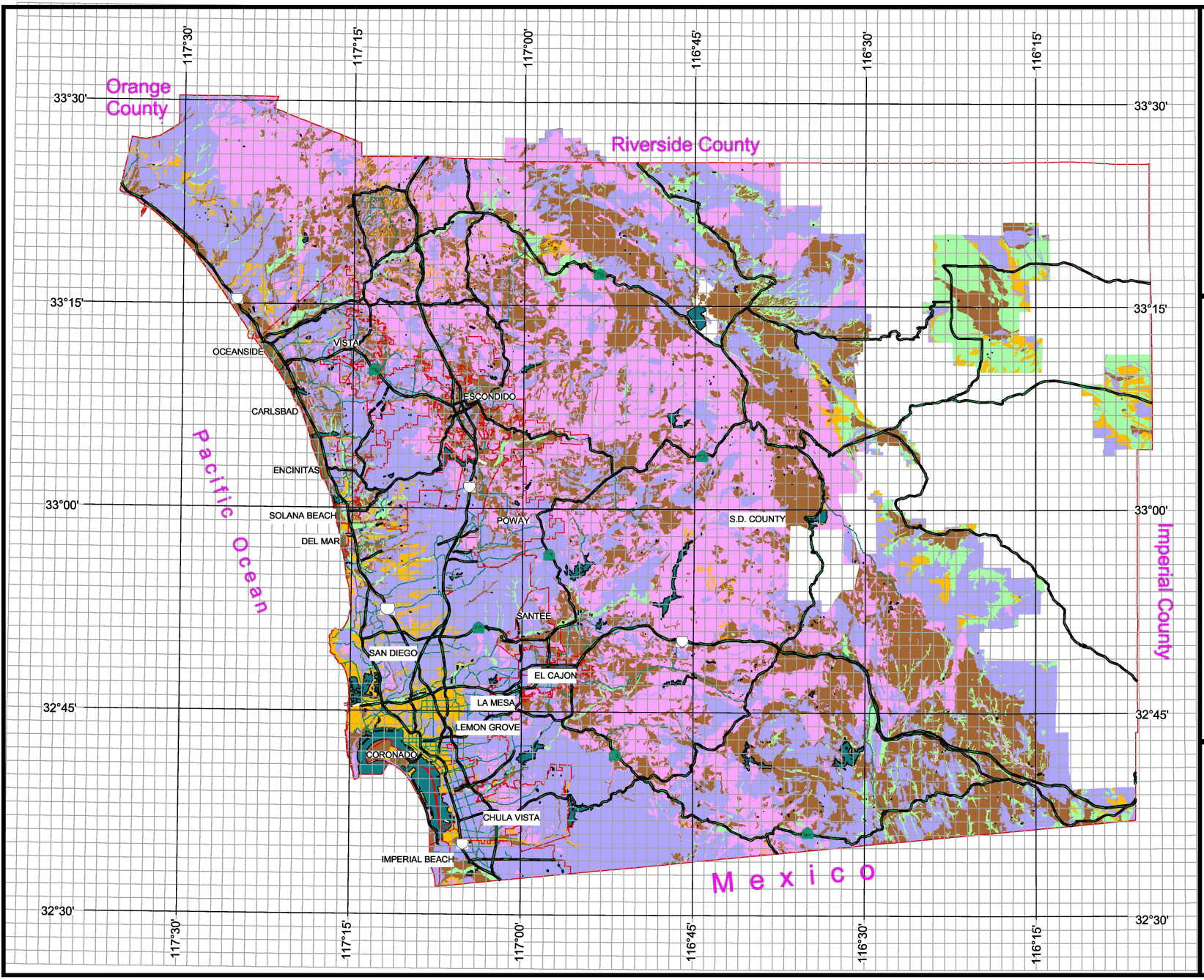
The values in Table A–1 are typical for urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the City.

A.1.3. Rainfall Intensity

The rainfall intensity (I) is the rainfall in inches per hour (in/hr.) for a duration equal to the T_C for a selected storm frequency. Once a particular storm frequency has been selected for design and a T_C calculated for the drainage area, the rainfall intensity can be determined from the Intensity-Duration-Frequency Design Chart (Figure A-1).

County of San Diego Hydrology Manual

Soil Hydrologic Groups



Legend

Soil Groups

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

DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

THIS MAP IS PROVIDED WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
Copyright SanGIS. All Rights Reserved.

This products may contain information from the SANDAG Regional Information System which cannot be reproduced without the written permission of SANDAG.

This product may contain information which has been reproduced with permission granted by Thomas Brothers Maps.

Appendix C –Reference Tables & Figures (City of San Diego Drainage Manual 2017)