Goodman
&ASSOCIATES

Hydrology-Hydraulics Study

For

Seaton Avenue Warehouses

Unincorporated Perris, County of Riverside, CA

APN 0314-091-005

Prepared For:

Dedeaux Properties
1430 S. Eastman Avenue
Los Angeles, CA 90023
(909) 730-0186

June 18, 2021

Douglas L. Goodman

2079 Sky View Drive ● Colton, Ca 92324 ● (909) 824-2775 ● FAX (909) 824-2807
email ● doug@goodman-assoc.com

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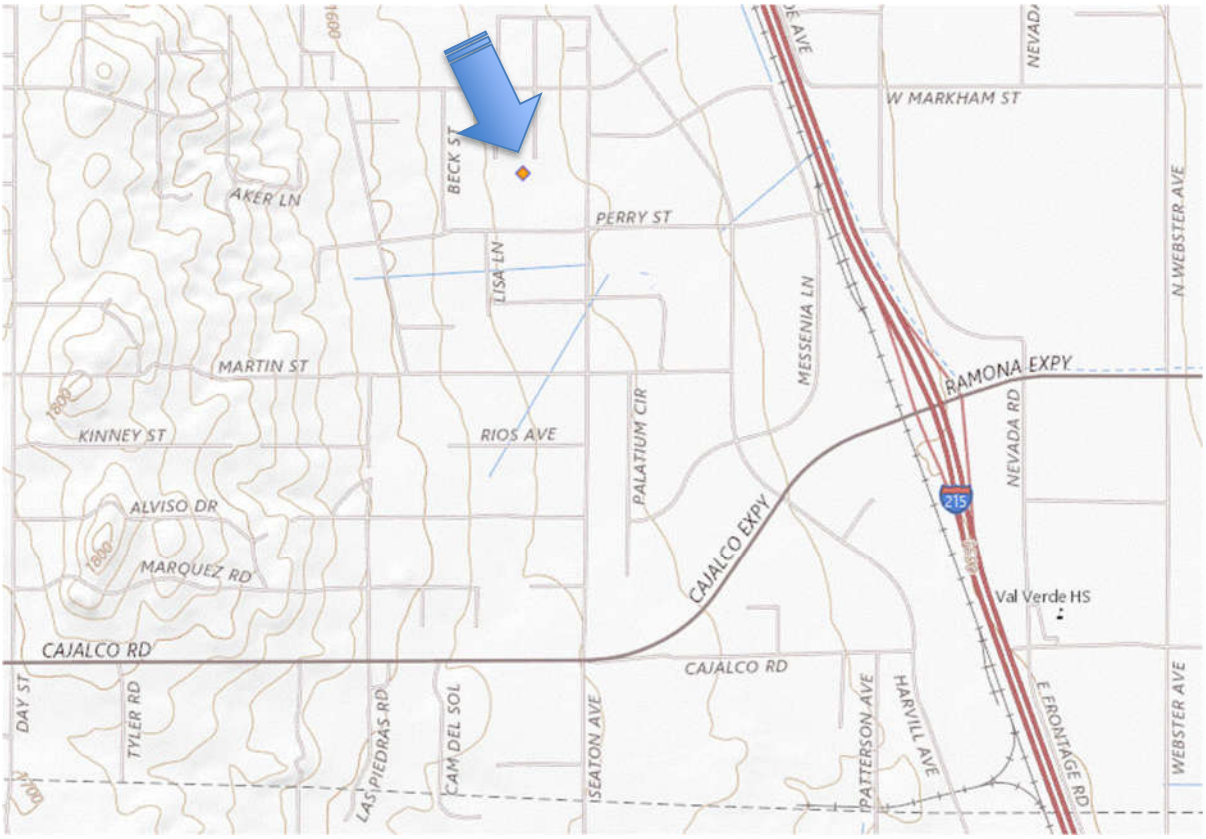
1. INTRODUCTION

1.1. Project Description

The proposed project is for the construction of two warehouse buildings with truck loading docks and associated parking on 9 acres. The project is located on Seaton Avenue, extending westerly to Beck Street, between Perry Street and Markham Street, in the unincorporated Perris Area, County of Riverside. Access to the proposed site building will be from two driveway entrances off of Seaton Avenue on the east side of the site.

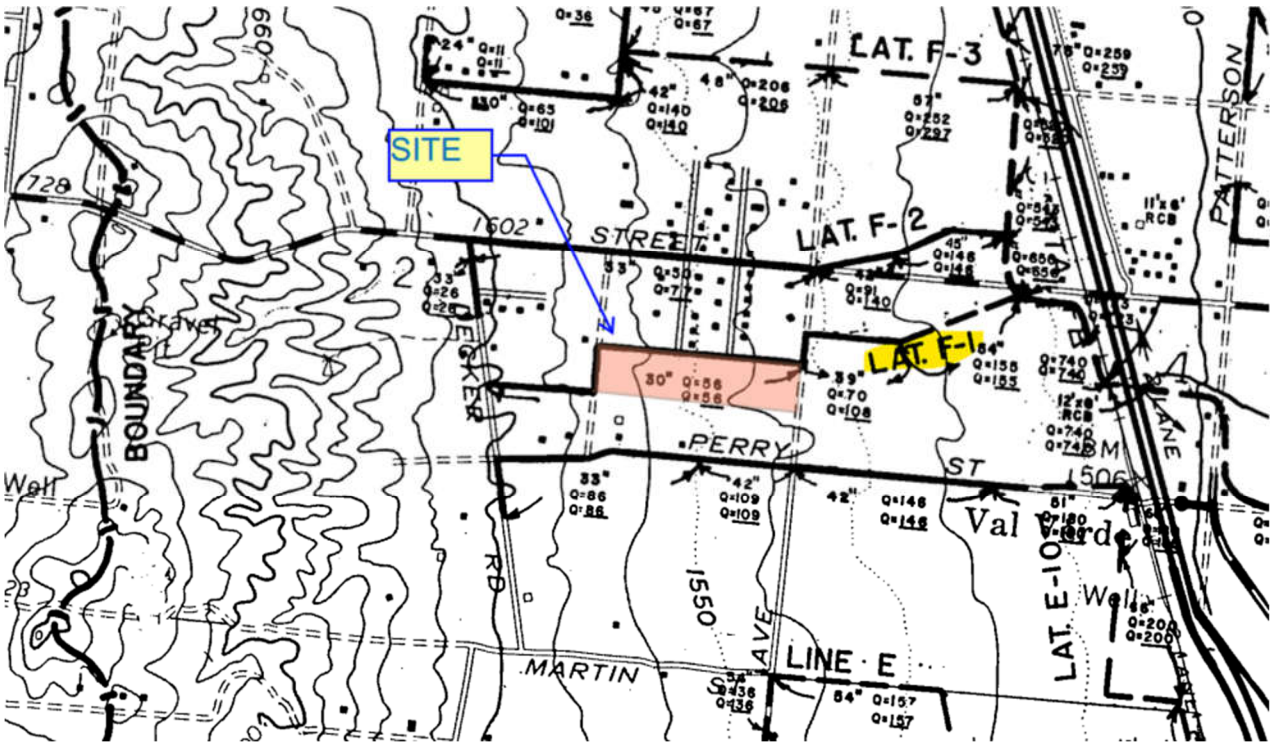


1.2. Purpose of the Study

This drainage report is for assessing the drainage facility requirements for the proposed development as shown on the grading plan. Goodman & Associates shall not be held responsible for any unauthorized application of this report and the contents herein. The opinions expressed in this report have been derived in accordance with current standards of civil engineering practice. No other warranty is expressed or implied.

2. PRE-DEVELOPMENT CONDITION

The existing vacant property generally slopes from west to east at approximately 3%. Per the County's Perris Valley Area Drainage Plan, the site is part of the area tributary to Lateral F-1, with approximately 60 acres of upstream off-site area that is tributary to the site. Existing drainage sheet flows through and across the site, discharging to an existing inlet structure at the northeast corner of the site. There is an existing 48" storm drain pipe in Seaton Avenue, constituting the current upstream end of Lateral F-1.



3. POST-DEVELOPMENT CONDITION HYDROLOGY

3.1. Post-Development Conditions

The proposed project will consist of two buildings, each on a dedicated parcel. Each parcel will have a dedicated LID BMP, proposed to be a CDS clarifier for pre-treatment ahead of an underground infiltration system. Each system is proposed to be situated to the east of each building. Over-flows in excess of water quality capture volume requirements will be directed to the aforementioned Lateral F-1 for conveyance off-site. Please see separate Project-Specific Water Quality Management Plan (WQMP) for more information.

The project will be required to extend Lateral F-1 to the west side in order to collect off-site runoff. There is also existing runoff from properties to the south that will be collected by a proposed on-site system and conveyed directly to Lateral F-1. No run-on from off-site areas will surface drain through the site.

3.2. Methodology of Hydrology Study

To obtain peak flow rates, the hydrologic conditions of the site for the 100-year storm was analyzed using the Rational Method as described in Section D of the *County of Riverside Hydrology Manual*, using the following parameters:

3.3. Hydrology Calculations

AMC II
Soil Group: A, C, D
Storm Drain designed per GP/Zoning usage (commercial)
Pct. Pervious Cover, Ap (Proposed Condition): 10%
100-year, 1-hour rainfall: 1.12 inches (RCFC&WCD Hydrology Manual)
Log-Log Slope: 0.49

3.4. Result of Post-Development Hydrology Calculations

Per the ADP, 100-year peak flows at the downstream end of the project were calculated to be 107.7 cfs. Contained herein are “duplicate” master plan calculations, with a peak flow of 106.9 cfs in order to ensure the revised calculations are appropriately calibrated. This calculation was then adjusted to reflect the proposed change in land use for the subject site, calculated per the ADP as half-acre single-family residential, and now industrial, and the peak flow increased to 109.1 cfs.

4. COMPARISON OF POST-DEVELOPMENT AND PRE-DEVELOPMENT HYDROLOGIC CONDITIONS

Because there is a master-planned storm drain serving the site, developed runoff does not need to be mitigated down to the existing condition. Instead, a comparison between the master-planned condition and the proposed condition is necessary. As shown in Section 3.4 above, the increase in the proposed condition over the master plan is 2.2 cfs, or about 2%. Therefore it is our opinion that mitigation beyond what is proposed in the WQMP is not warranted.

5. HYDRAULICS CALCULATIONS

5.1. Hydraulic Calculations Methodology

Pipe hydraulic calculations for the extension of Lateral F-1 utilizing the WSPGW computer program will be provided during final engineering. Private and on-site pipe hydraulic calculations utilizing normal depth flow analyzed utilizing standard engineering formulas will also be provided during final engineering.

5.2. Results of Hydraulic Calculations

Hydraulic calculations will be provided during final engineering. For the purpose of sizing the storm drains that will intercept off-site runoff, see the included hydrology calculations for peak flows. Runoff to the proposed inlet on Beck Street will include the first to subareas, plus a split of the southerly subarea.

For the inlet on Beck Street, the 10-year storm is (35.5+25.13/2) 48 cfs, and for the 100 year storm, (54.8+38.3/2) 74 cfs.

For the southerly v-gutter, the 10-year storm is (25.13/2) 12.6 cfs, and for the 100-year storm (38.3/2) 19.2 cfs

6. CONCLUSIONS

The calculations above, and in the appendix, show that runoff from the site will be adequately collected and conveyed through the site to the existing master plan storm drain facility.

The results above are derived from standard hydraulic models and calculation methods, and are subject to the limitations of those methods.

7. EXHIBITS

Exhibit A Location Map

Source: GoogleEarth

Exhibit B Hydrologic Soil Group

Exhibit C Precipitation Maps

RAINFALL INTENSITY—INCHES PER HOUR

MIRA LOMA			MURRIETA - TEMECULA & RANCHO CALIFORNIA			NORCO			PALM SPRINGS			PERRIS VALLEY		
DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY		DURATION MINUTES	FREQUENCY	
	10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR		10 YEAR	100 YEAR
5	2.84	4.48	5	3.45	5.10	5	2.77	4.16	5	4.23	6.76	5	2.64	3.78
6	2.58	4.07	6	3.12	4.61	6	2.53	3.79	6	3.80	6.08	6	2.41	3.46
7	2.37	3.75	7	2.87	4.24	7	2.34	3.51	7	3.48	5.56	7	2.24	3.21
8	2.21	3.49	8	2.67	3.94	8	2.19	3.29	8	3.22	5.15	8	2.09	3.01
9	2.08	3.28	9	2.50	3.69	9	2.07	3.10	9	3.01	4.81	9	1.98	2.84
10	1.96	3.10	10	2.36	3.48	10	1.96	2.94	10	2.83	4.52	10	1.88	2.69
11	1.87	2.95	11	2.24	3.30	11	1.87	2.80	11	2.67	4.28	11	1.79	2.57
12	1.78	2.82	12	2.13	3.15	12	1.79	2.68	12	2.54	4.07	12	1.72	2.46
13	1.71	2.70	13	2.04	3.01	13	1.72	2.58	13	2.43	3.88	13	1.65	2.37
14	1.64	2.60	14	1.96	2.89	14	1.66	2.48	14	2.33	3.72	14	1.59	2.29
15	1.58	2.50	15	1.89	2.79	15	1.60	2.40	15	2.23	3.58	15	1.54	2.21
16	1.53	2.42	16	1.82	2.69	16	1.55	2.32	16	2.15	3.44	16	1.49	2.14
17	1.48	2.34	17	1.76	2.60	17	1.50	2.25	17	2.08	3.32	17	1.45	2.08
18	1.44	2.27	18	1.71	2.52	18	1.46	2.19	18	2.01	3.22	18	1.41	2.02
19	1.40	2.21	19	1.66	2.45	19	1.42	2.13	19	1.95	3.12	19	1.37	1.97
20	1.36	2.15	20	1.61	2.38	20	1.39	2.08	20	1.89	3.03	20	1.34	1.92
22	1.29	2.04	22	1.53	2.26	22	1.32	1.98	22	1.79	2.86	22	1.28	1.83
24	1.24	1.95	24	1.46	2.15	24	1.26	1.90	24	1.70	2.72	24	1.22	1.75
26	1.18	1.87	26	1.39	2.06	26	1.22	1.82	26	1.62	2.60	26	1.18	1.69
28	1.14	1.80	28	1.34	1.98	28	1.17	1.76	28	1.56	2.49	28	1.13	1.63
30	1.10	1.73	30	1.29	1.90	30	1.13	1.70	30	1.49	2.39	30	1.10	1.57
32	1.06	1.67	32	1.24	1.84	32	1.10	1.64	32	1.44	2.30	32	1.06	1.52
34	1.03	1.62	34	1.20	1.78	34	1.06	1.59	34	1.39	2.22	34	1.03	1.48
36	1.00	1.57	36	1.17	1.72	36	1.03	1.55	36	1.34	2.15	36	1.00	1.44
38	.97	1.53	38	1.13	1.67	38	1.01	1.51	38	1.30	2.09	38	.98	1.40
40	.94	1.49	40	1.10	1.62	40	.98	1.47	40	1.27	2.02	40	.95	1.37
45	.89	1.40	45	1.03	1.52	45	.92	1.39	45	1.18	1.89	45	.90	1.29
50	.84	1.32	50	.97	1.44	50	.88	1.31	50	1.11	1.78	50	.85	1.22
55	.80	1.26	55	.92	1.36	55	.84	1.25	55	1.05	1.68	55	.81	1.17
60	.76	1.20	60	.88	1.30	60	.80	1.20	60	1.00	1.60	60	.78	1.12
65	.73	1.15	65	.84	1.24	65	.77	1.15	65	.95	1.53	65	.75	1.08
70	.70	1.11	70	.81	1.19	70	.74	1.11	70	.91	1.46	70	.72	1.04
75	.68	1.07	75	.78	1.15	75	.72	1.07	75	.88	1.41	75	.70	1.00
80	.65	1.03	80	.75	1.11	80	.69	1.04	80	.85	1.35	80	.68	.97
85	.63	1.00	85	.73	1.07	85	.67	1.01	85	.82	1.31	85	.66	.94
SLOPE = .530			SLOPE = .550			SLOPE = .500			SLOPE = .580			SLOPE = .490		

RCFC & WCD

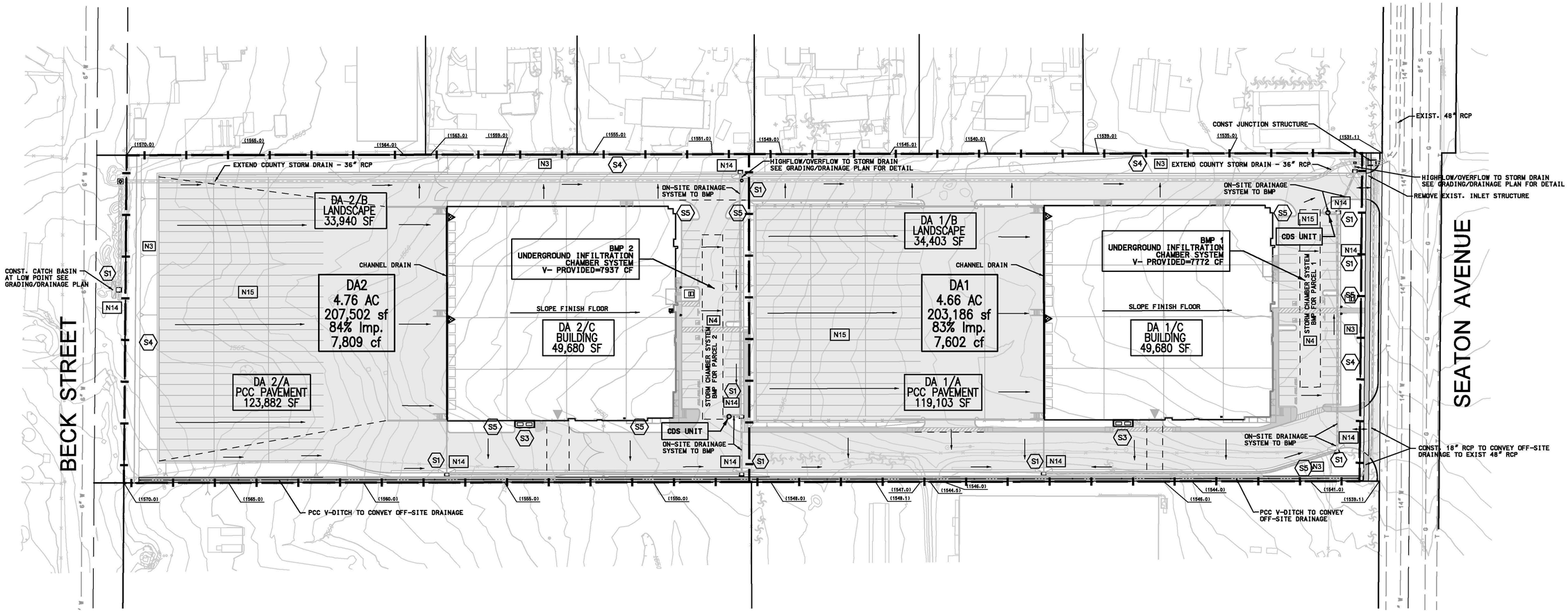
HYDROLOGY MANUAL

STANDARD INTENSITY-DURATION CURVES DATA

PLATE D-4.1 (4 of 6)

Exhibit D Post-Development Hydrology Map

P-WQMP PLAN



NON-STRUCTURAL SOURCE CONTROL BMPS

- N1 – EDUCATION
- N2 – ACTIVITY RESTRICTIONS
- N3 – LANDSCAPE MANAGEMENT
- N4 – BMP MAINTENANCE
- N6 – LOCAL WATER QUALITY ORDINANCES
- N7 – SPILL CONTINGENCY PLAN
- N8 – UNDERGROUND STORAGE TANK COMPLIANCE
- N9 – HAZARDOUS MATERIALS DISCLOSURE COMPLIANCE
- N10 – UNIFORM FIRE CODE IMPLEMENTATION
- N11 – LITTER/DEBRIS CONTROL PROGRAM
- N12 – EMPLOYEE TRAINING
- N14 – CATCH BASIN INSPECTION PROGRAM
- N15 – VACUUM SWEEPING OF PARKING LOT
- N17 – COMPLIANCE WITH ALL OTHER APPLICABLE NPDES STANDARDS

STRUCTURAL SOURCE CONTROL BMPS

- S1 STORM DRAIN STENCILING
- S3 TRASH STORAGE AREAS, SD–32
- S4 EFFICIENT IRRIGATION, SD–12 TYPICAL ALL LANDSCAPING
- S5 FG OF LANDSCAPE AREAS A MINIMUM OF 1" TO 2" BELOW TC, SIDEWALK, OR PAVEMENT. TYPICAL ALL LANDSCAPE AREAS.

LEGEND

DRAINAGE AREA DATA

DA1	DRAINAGE AREA
15.4 AC	DMA AREA (ACRES)
671,973 sf	DMA AREA (SF)
90% Imp.	DMA PERCENT IMPERVIOUS
65,534 cf	DMA TREATMENT VOLUME (Vbmp)

DRAINAGE AREA (DA) BOUNDARY

WQMP BMP SUMMARY

- 410,688 SF / 83% IMPERVIOUS
- DCV = 15,411 CF
- PROVIDE 2 UNDERGROUND INFILTRATION SYSTEMS
- V–PROVIDED = 15,709 CF

N

SCALE 1"= 50'

50 0 50 100 150

REV.	REVISION DESCRIPTION	DATE	ENGR.	CITY	DATE

BENCHMARK:
RIV CO B.M. 600-40-68 RESET 1988

ALUMINUM DISC IN CONC 7' N'LY OF VALVERDE AND EAST SIDE OF R/R & 1900' N'LY OF CAJALCO EXPRESSWAY

ELEVATION 1505.07

REGISTERED PROFESSIONAL ENGINEER DOUGLAS L. GOODMAN No. 28500 CIVIL Date 3-31-22 STATE OF CALIFORNIA

Goodman & ASSOCIATES
2079 SKY VIEW DRIVE
COLTON, CA 92324
(909) 824-2775

DOUGLAS L. GOODMAN
RCE 28500, 3-31-2022
DATE

COUNTY OF RIVERSIDE, PERRIS AREA

PRELIMINARY WQMP PLAN

PREPARED FOR DEDEAUX PROPERTIES

SEATON AVENUE AND N/O PERRY STREET
PPT210022
PERRIS, CA
APN 314-091-005

SCALE: AS SHOWN
DATE: 6/18/2021
G&A JOB NO.: 1/1

8. APPENDICES

Appendix 1 County Master Plan Excerpts

RIVERSIDE COUNTY
CALIFORNIA

PERRIS VALLEY AREA DRAINAGE PLAN

JULY 1987
REVISED JUNE 1991

LEGEND
FEE BOUNDARY
UNDER 48", TO BE BUILT BY OTHERS
OPEN CHANNEL -(CONC. TRAPEZOIDAL CHANNEL, SS = 1.5:1 ; UNLESS OTHERWISE NOTED)
48" & OVER, ADP FACILITIES
250 or 250 250=DESIGN Q ; 250=100YR Q IN CFS
1"=1200'
N
CURRENT FEE $6875/AC.
PLAN COST $142,527,000
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
PERRIS VALLEY
AREA DRAINAGE PLAN
JULY 1987 (REVISED JUNE 1991)
March Field
Arnold Heights
RIVERSIDE NATIONAL CEMETERY
MARCH AIR FORCE BASE
MORENO VALLEY
NUEVO
SAN JACINTO
PERRIS
Perris
FUTURE FACILITIES BY OTHERS.
TO BE BUILT BY OTHERS COST NOT A PART OF THIS AREA DRAINAGE PLAN

SITE

PERRIS VALLEY LINE F @ I-215 100-YR

Site is a portion of this area

FOR OFFICIAL USE ONLY - Riverside County Offices - S/N 433

Project: PVLFOY.rrv Page 1 Calculated By:

Study Date: 03/04/91 Moisture Condition(AMC): 2 Checked By:

100.0 Year Storm 1 hour rainfall = 1.12 (In.) Intensity Slope = 0.490

********** R A T I O N A L H Y D R O L O G Y - R I V E R S I D E C O **********

Station/ Point No.	Soil Type A,B,C,D	Devel. Type	Area (Acres)	I in/h	C	L Elev	Q (sub)	Q Total	Slope v/hz	Section	V Fps	L ft.	T min.	Tc min.	Hydraulics or notes
2.00	C-100%	SF 1ac	8.2	2.39	0.7557	1700.0	14.8							12.8	
Natural Channel travel time + subarea flow addition								14.80	0.051	Nat Ch	8.1	2000	4.1		qavg= 38.46
3.00	C-100%	SF 1ac	26.2	2.08	0.7393	1598.0	40.4							16.9	
No. Pipes = 1 Pipe flow travel time --- 'N' = 0.013								55.2	0.027	d= 30	15.2	2550	2.8	19.7	hgl= 1.7(Ft.)
4.00	A 0 B20 C79 D 1	SF 1/2	35.7	1.93	0.7606	1530.0	52.5							19.7	
No. Pipes = 1 Pipe flow travel time --- 'N' = 0.013								107.7	0.008	d= 45	10.8	800	1.2	20.9	hgl= 3.2(Ft.)
5.00	C-100%	Comm	28.6	1.88	0.8782	1524.0	47.1							20.9	
No. Pipes = 1 Pipe flow travel time --- 'N' = 0.013								154.8	0.025	d= 42	18.7	650	0.6	21.5	hgl= 2.8(Ft.)
********** CONFLUENCE OF MAIN STREAMS **********															
6.00			98.7	1.85			154.8							21.5	Stream Summary
11.00	C-100%	SF 1ac	2.8	2.70	0.7692	1652.0	5.8							10.0	
Natural Channel travel time + subarea flow addition								5.81	0.047	Nat Ch	6.2	1000	2.7		qavg= 16.82
12.00	C-100%	SF 1ac	10.6	2.40	0.7562	1605.3	19.2							12.7	
No. Pipes = 1 Pipe flow travel time --- 'N' = 0.013								25.1	0.003	d= 33	5.7	400	1.2	13.8	hgl= 1.9(Ft.)
9.00			13.4	2.30			25.1							13.8	Stream Summary
8.00	C-100%	SF 1ac	7.6	2.35	0.7535	1720.0	13.4							13.3	

LAT. F-1

LAT. F-2

Version 2.6 Copyright (c) CivilCADD/CivilDESIGN, 1990

Appendix 3 Hydrology Calculations

Time of Concentration Calculation

Per Riverside County FC&WCD Hydrology Manual

Slope of Intensity Line 0.49

Subbasin	Area (AC)	HP (ft)	LP (ft)	L (ft)	Lca (ft)	Basin Factor	S-Curve	Cover type	Hydrologic Soil Group	RI	Ap	Tc (min)
2	8.2	1765	1700	1000	500		Valley	1du/ac	C	68	80%	12.8
3	26.2	1700	1598	2000	1000		Valley	1du/ac	C	68	80%	17.8
4 (Site)	9.43	1598	1530	2550	1275		Valley	Com	C	66	10%	14.4
4 (S'ly)	26.27	1598	1530	2550	1275		Valley	2du/ac	C	66	60%	20.8

Encompass Associates, Inc.

Civil Engineers

5699 Cousins Place

Rancho Cucamonga, CA 91737

(909) 684-0093 Fax 586-6979

Job DP Seaton Ave Perris/RivCo

Sheet No. 1 of 1

Calculated by: ats Date 3/20/21

Checked by: Date

Scale nts

Calibration Hydrology (duplicate hydrology from MDP)

RATIONAL METHOD CALCULATION FORM (Plate D-2 RCFC&WCD Manual)

Drainage Area	Soil & Development	A Acres	I in/hr	C	DQ CFS	SQ CFS	Slope	Section inches	v FPS	L FT.	T Min.	ST Min.	Remarks and Hydraulic Calculation Ref.
Initial->2	C-1du/ac	8.2	2.39	0.7534	14.77						12.8	12.8	
						14.77	0.05	nat	8.10	2000	4.1		
Node 2->3	C-1du/ac	26.2	2.08	0.7348	40.04							16.9	
						54.81	0.027	30	15.22	2550	2.8		Section: pipe size (inches)
Node 3->4	C-2du/ac	35.7	1.93	0.7558	52.08							19.7	
						106.88							

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Job DP Seaton Ave Perris/RivCo

Sheet No. 1 of 1

Calculated by: ats Date 3/20/21

Checked by: Date

Scale nts

10-year
Proposed Condition

RATIONAL METHOD CALCULATION FORM (Plate D-2 RCFC&WCD Manual)

Drainage Area	Soil & Development	A Acres	I in/hr	C	DQ CFS	SQ CFS	Slope	Section inches	v FPS	L FT.	T Min.	ST Min.	Remarks and Hydraulic Calculation Ref.
Initial->2*	C-1du/ac	8.2	1.66	0.7028	9.57						12.8	12.8	
						9.57	0.05	nat	8.10	2000	4.1		
Node 2->3*	C-1du/ac	26.2	1.45	0.683	25.95							16.9	
						35.51	0.027	30	13.90	2550	3.1		Section: pipe size (inches)
Node 3->4 (Site)	C-Com	9.43	1.34	0.8668	10.95							20	
Node 3->4 (S'ly)**	C-2du/ac	26.27	1.34	0.714	25.13							20	
						71.60							

* Runoff that is tributary to proposed inlet on Beck Street

** Runoff that is split between Beck Street and v-gutter along the south side of the proposed project

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5699 Cousins Place

Rancho Cucamonga, CA 91737

(909) 684-0093 Fax 586-6979

Job DP Seaton Ave Perris/RivCo

Sheet No. 1 of 1

Calculated by: ats Date 3/20/21

Checked by: Date

Scale nts

100-year
Proposed Condition

RATIONAL METHOD CALCULATION FORM (Plate D-2 RCFC&WCD Manual)

Drainage Area	Soil & Development	A Acres	I in/hr	C	DQ CFS	SQ CFS	Slope	Section inches	v FPS	L FT.	T Min.	ST Min.	Remarks and Hydraulic Calculation Ref.
Initial->2*	C-1du/ac	8.2	2.39	0.7534	14.77						12.8	12.8	
						14.77	0.05	nat	8.10	2000	4.1		
Node 2->3*	C-1du/ac	26.2	2.08	0.7348	40.04							16.9	
						54.81	0.027	30	15.22	2550	2.8		Section: pipe size (inches)
Node 3->4 (Site)	C-Com	9.43	1.93	0.8786	15.99							19.7	
Node 3->4 (S'ly)**	C-2du/ac	26.27	1.93	0.7558	38.32							19.7	
						109.12							

* Runoff that is tributary to proposed inlet on Beck Street

** Runoff that is split between Beck Street and v-gutter along the south side of the proposed project

Appendix 3 Hydraulic Calculations

(Pending, final engineering)