

PRELIMINARY HYDROLOGY REPORT

For

Dunslee

City of Scotts Valley,
Santa Cruz County, California

December 2015

Prepared for:

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References

- 1. City of Scotts Valley, *Stormwater Technical Guide, Compliance with Stormwater Post-Construction Requirements in the City of Scotts Valley*. February 2014.
- 2. City of Scotts Valley, *Standard Details*. July 1990
- 3. Haro, Kasunich and Associates, Inc., *Geotechnical Investigation for Commercial Building and Townhomes, Dunslee Way at Scotts Valley Drive*. March 2015.

1 Introduction

C.W. Land Consultants, Inc. (Client) is proposing to construct a mixed residential and commercial development in Scotts Valley, CA, southeast of the Scotts Valley Drive and Dunslee Way intersection (see Figure 1). The Dunslee development is located on a single parcel totaling 10.4 acres, APN 022-451-001. This report documents the preliminary hydrologic analysis performed by Ruggeri-Jensen-Azar & Associates (RJA) to determine a feasible storm water treatment and detention facility size based on the proposed land plan, site features and the City of Scotts Valley design criteria.

1.1 Project Background

The proposed Dunslee project will develop approximately 3.2 acres in the eastern part of the parcel closest to Scotts Valley Drive on the existing undeveloped property. The improvements will increase impervious surface area by approximately 1.5 acres and ultimately generate more storm water runoff. The City of Scotts Valley requires that discharge from new developments not exceed the pre-development rate during the 24 hour, 10-year statistical storm event. Storm water detention facilities are traditionally used to control peak flow during rainfall events. The Dunslee project will incorporate a detention portion to the facility design to meet the City's objective to detain storm water to the maximum extent feasible. The detention basin will also serve as a Low Impact Development (LID) treatment application.

1.2 Existing Conditions

The topography of the project area ranges considerably. The western portion consists of steep slopes (>30%) with vegetation of various trees and shrubs. The western portion of the site is outside of the proposed development boundary. The eastern portion consists of a range of slopes varying from steeper slopes (10%-25%) then transitions to flatter slopes (4-25%) as the project nears Scotts Valley Drive. The proposed development will be located within the eastern portion of the site. Along the northern boundary an existing small and shallow creek runs and connects to the City of Scotts Valley storm drainage system on Scotts Valley Drive. All runoff storm water runoff within this development flows to Scotts Valley Drive, into the City's storm drain system.

Haro, Kasunich and Associated, Inc. conducted a Geotechnical Investigation in March 2015. The soil is classified as Site Class "D".

2 Detention Volume and Biotreatment Areas

2.1 Detention Volume

The City of Scotts Valley requires new development to limit storm water discharge to the pre-development rate during the 24 hour, 2-year storm event through 10-year storm events. The Rational Method is used to estimate the 2-year pre-development flow due to the small drainage size. The

maximum allowable flow rate from the Dunslee project site into the City storm drain system is 0.6 cubic feet per second (cfs) bases on criteria and information (see Appendix A).

The City of Scotts Valley uses the 24 hour, 10-year storm for design of detention facilities.

Based on the preliminary site layout the detention facility utilizes 310-linear feet of a 4-foot diameter pipe. The pipe used for volume control and will contain a metering device limiting flows to a maximum rate of 0.6 cfs during the 24 hour, 2-year through 10-year storm events. For a 24 hour, 10-year storm event the detention facility must provide approximately 3,600 cubic-feet of storage. The proposed facility is capable of handling approximately 3,900 cubic-feet of storage.

2.2 Biotreatment Areas

The City of Scotts Valley requires new development to storm water treat runoff as set forth in the Stormwater Technical Guide for Compliance with Stormwater Post-Construction Requirements in the City of Scotts Valley. The project is classified as a Tier 3 and requires offsite discharge from storm events up to the 95th percentile rainfall event using Stormwater Control Measures. The 95th percentile rainfall event value is located on the Central Coast Water Board website.

Based on preliminary site layout and grading the project has divided into two (2) drainage areas. The smaller of the treatment areas will treat runoff from the additional improvements on Dunslee Way within the right-of-way and some on-site improvements that runoff onto Dunslee Way. The larger of the treatment areas will treat runoff from the townhomes and the majority of the Commercial Development. See Table 2.1 below for areas and treatment facility requirements and full calculations in Appendix A.

DMA	Area (ac)	Percent Impervious	Required Area (sf)	Provided Area (sf)	Drawdown Time (hr)
A	0.26	43%	236	630	83.9
B	1.87	66%	2,361	4,990	103.5
C	0.28	42%	226	430	125.2

The treatment areas will consist of 6-inch to 12-inch of ponding depths, an 18-inch section of soil media, a 12-inch section of gravel with a 4-inch perforated subdrain. Refer to Stormwater Control Plan in Appendix B.

APPENDIX A

Project Name: Dunslee
Project Location: Scotts Valley, CA
Date: 12/8/2015

Project Information

Area =	100,350 ft ²	<i>Total project area</i>
Existing Impervious Area =	0 ft ²	
	0%	<i>Existing Percent impervious area</i>
Ex Imperv Area To Remain =	0 ft ²	<i>Total existing impervious surface to remain</i>
Replaced Imperv Area =	0 ft ²	<i>Total existing impervious surface to be replaced as part of project</i>
New Imperv Area =	66,590 ft ²	<i>Total new impervious surface to be installed as part of project</i>
Total Impervious Area =	66,590 ft ²	<i>Total project impervious area</i>
	66%	<i>Percent impervious area</i>
Water Management Zone =	1	

Performance Requirements

- No. 1 = Implement site design and runoff reduction strategies
- No. 2 = Provide water quality treatment for 85% storm event
- No. 3 = Prevent offsite discharge from events up to the 95th% storm event via optimizing infiltration
- No. 4 = Reduce peak flows to pre-project levels for 2-yr through 10-yr storm events
- No. 5 = N/A

Rainfall Design Information

MAP =	30.0 in	<i>Mean Annual Precipitation</i>
P _{85%} =	1.5 in	<i>85th% 24-hr rainfall depth</i>
P _{95%} =	2.6 in	<i>95th% 24-hr rainfall depth</i>

Soil Type Design Information

Site HSG =	D	<i>NRCS Hydrologic Soil Group Classification</i>
Infiltration Rate =	0.25 in/hr	<i>Describe source for infiltration rate</i>
Safety Factor =	1	
Design Infiltration Rate =	0.3 in/hr	

Project Name: Dunslee
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DMA Breakdown

		Pervious Surface Correction Factor										
		0.20	0.10	0.60	0.15	0.10						
		Impervious Surface (SF)				Pervious Surface (SF)						
DMA	Area (SF)	Roof	Street/ Parking Lot	Hardscape	Total	Managed Turf	Landscape/Grass	Pervious Concrete	Turf Block	Pavers	Total	SCM Description
A	11,410	0	4,430	850	5,280		6,130			1,960	8,090	Bioretention
B	81,650	26,230	20,540	9,740	56,510		25,140			2,070	27,210	Bioretention
C	12,220	2,450	630	1,840	4,920		7,300			0	7,300	Bioretention
Total	105,280	28,680	25,600	12,430	66,710	0	38,570	0	0	4,030	42,600	

Governing Equations:

$$SCM A_f = A_T \times 0.2/5$$

A_T = Tributary Impervious Area

5 = 5 in/hr percolation through BMP Media

0.2 = Rainfall intensity of 0.2 in/hr

Central Coast Region Stormwater Control Measure Sizing Calculator

Version: 2/26/2014

1. Project Information

Project name:	Dunslee Way	
Project location:	Scotts Valley Dr & Dunslee Way	
Tier 2/Tier 3:	Tier 2 - Treatment	
Design rainfall depth (in):	2.6	
Total project area (ft2):	100350	
Total new impervious area (ft2):	66590	
Total replaced impervious in a USA (ft2):	0	
Total replaced impervious not in a USA (ft2):	0	
Total pervious/landscape area (ft2):	33760	

2. DMA Characterization

Name	DMA Type	Area (ft2)	Surface Type	New, Replaced?	Connection
A	Drains to SCM	0	Roof	New	TA-1
	Drains to SCM	5280	Concrete or asphalt	New	TA-1
	Drains to SCM	6130	Landscape	New	TA-1
	Drains to SCM	1960	Open/porous pavers	New	TA-1
B	Drains to SCM	26230	Roof	New	TA-2
	Drains to SCM	30280	Concrete or asphalt	New	TA-2
	Drains to SCM	25140	Landscape	New	TA-2
	Drains to SCM	2070	Open/porous pavers	New	TA-2
C	Drains to SCM	2450	Roof	New	TA-3
	Drains to SCM	2470	Concrete or asphalt	New	TA-3
	Drains to SCM	7300	Landscape	New	TA-3

DMA Summary Area

Total project impervious area (ft2):	66710
New impervious area (ft2):	66710
Replaced impervious within a USA (ft2):	0
Replaced impervious not in a USA (ft2):	0
Total pervious/landscape area (ft2):	42600

3. SCM Characterization

Name	SCM Type	Safety Factor	SCM Soil Type	Infiltr. Rate (in/hr)	Area (ft2)
TA-1	Bioretention	1	HSG C/D	0.25	630
TA-2	Bioretention	1	HSG C/D	0.25	4990
TA-3	Bioretention	1	HSG C/D	0.25	430

4. Run SBUH Model

5. SCM Minimum Sizing Requirements

SCM Name	Minimum SCM Area (ft2)
TA-1	236
TA-2	2361
TA-3	226

6. Self-Retaining Area Sizing Checks

Self-Retaining DMA Name	Self-Retaining DMA Area (ft2)	Tributary DMA Name	Tributary DMA Area (ft2)	Tributary / SRA Area Ratio

Central Coast Region Stormwater Control Measure Sizing Calculator

Version: 2/26/2014

1. Project Information

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Project location:	Scotts Valley Dr & Dunslee Way
Tier 2/Tier 3:	Tier 3 - Retention
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	Drains to SCM	30280	Concrete or asphalt	New	TA-2
	Drains to SCM	25140	Landscape	New	TA-2
	Drains to SCM	2070	Open/porous pavers	New	TA-2
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	Drains to SCM	2470	Concrete or asphalt	New	TA-3
	Drains to SCM	7300	Landscape	New	TA-3

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TA-3	Bioretention	1	HSG C/D	0.25	430

4. Run SBUH Model

5. SCM Minimum Sizing Requirements

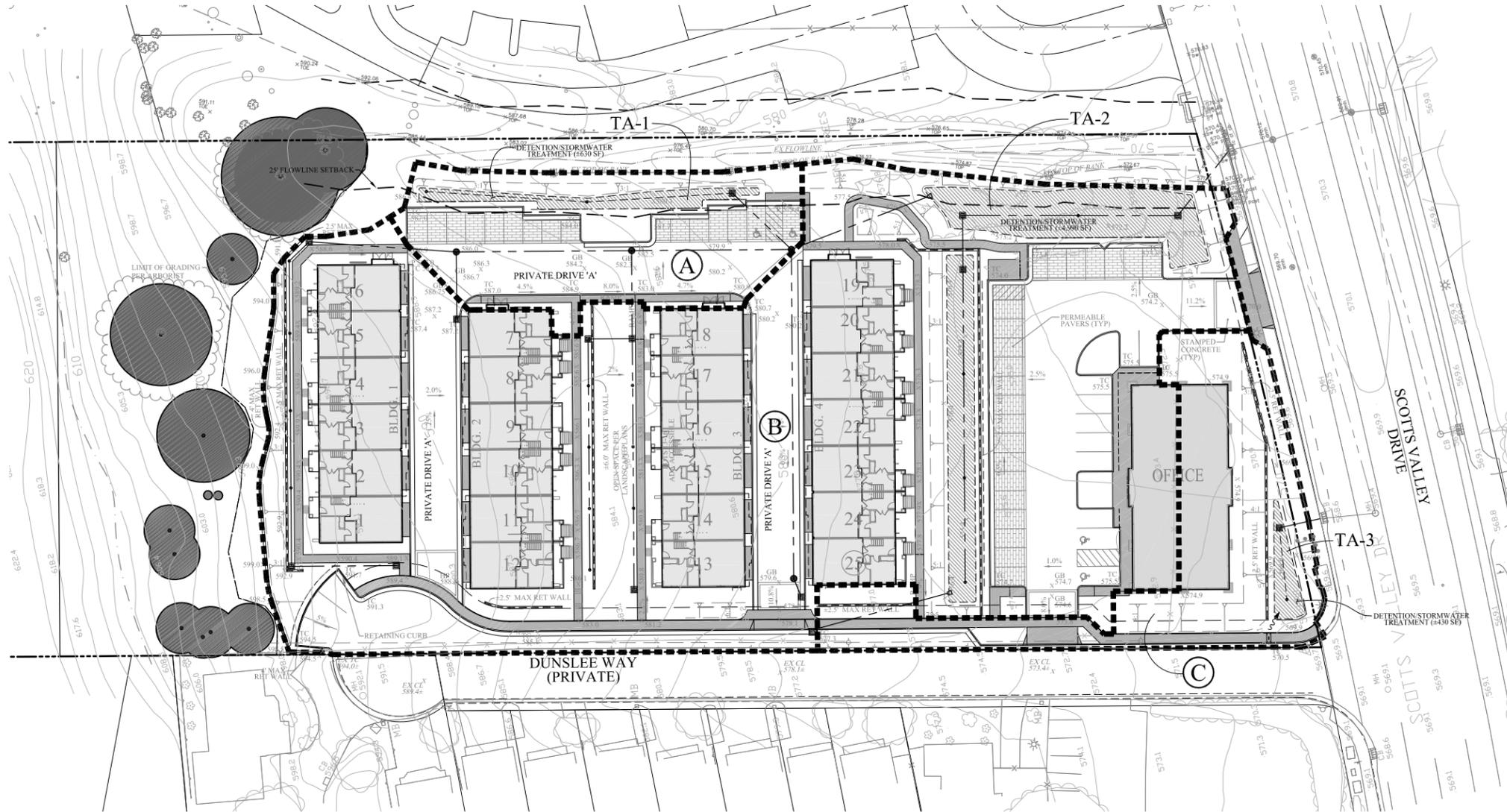
SCM Name	Min. Required Storage Vol. (ft3)	Depth Below Underdrain (ft)	Drain Time (hours)
TA-1	1322	5.24	83.9
TA-2	12918	6.47	103.5
TA-3	1347	7.83	125.2

6. Self-Retaining Area Sizing Checks

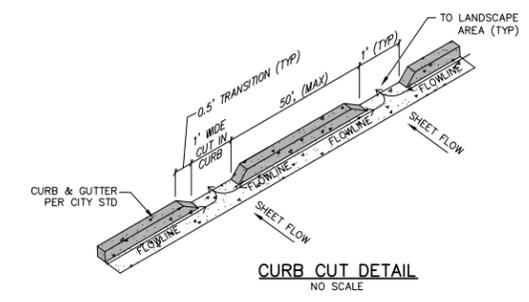
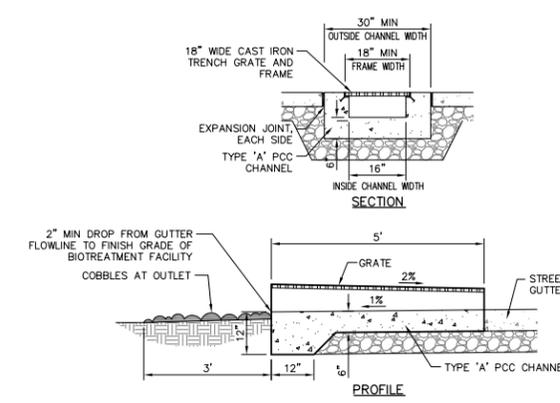
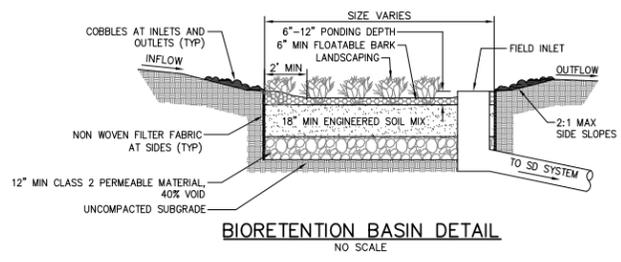
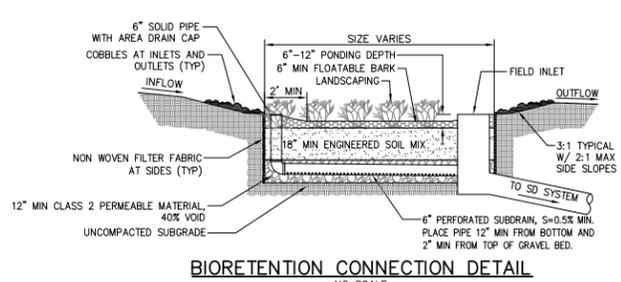
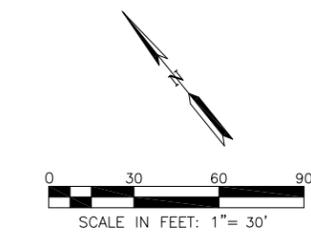
Self-Retaining DMA Name	Self-Retaining DMA Area (ft2)	Tributary DMA Name	Tributary DMA Area (ft2)	Tributary / SRA Area Ratio

APPENDIX B

PLOT DATE: December 9, 2015
 FILE PATH: W:\Jobs\092037-1001\Drawings\Prelim\Applications\Tentative Map 2015\TM-08 STORMWATER MANAGEMENT PLAN.dwg



PROPOSED	DESCRIPTION	EXISTING
---	BOUNDARY	---
---	CENTERLINE	---
---	EASEMENT	---
---	LOT LINE	---
---	RIGHT-OF-WAY/FACE OF CURB	---
---	STORM DRAIN	---
---	SANITARY SEWER	---
---	WATER	---
---	RECYCLED WATER	---
---	RETAINING WALL	---
---	SIDEWALK THRU CURB DRAIN	---
---	SIDEWALK	---
---	FIRE HYDRANT	---
---	STORM DRAIN INLET	---
---	LOT NUMBER	---
---	SPOT ELEVATION	---
---	STORMWATER TREATMENT AREA (BMP)	---
---	GRADE SLOPE	---
---	TREATMENT AREA	---
---	STORMWATER DRAINAGE MANAGEMENT AREA (DMA)	---





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VESTING TENTATIVE MAP
STORMWATER MANAGEMENT PLAN
DUNSLIE WAY
 SCOTT VALLEY, CALIFORNIA

DATE	BY	CHK	SCALE	DATE
12/23/15	ALL	ALL	AS SHOWN	JULY 23, 2015
12/24/15	REVISION PER CLIENT, CITY DIRECTION	ALL	AS SHOWN	
	REVISION PER CLIENT, CITY DIRECTION	ALL	AS SHOWN	

SHEET
VTM-08
 OF 8 SHEETS
 JOB NO.
 092037-1001