



COFFEY ENGINEERING, INC.

Drainage Study

Secret Hills Ranch

Via Viejas Oeste

Alpine, CA 91901

APN: 520-060-18

Grading Plan No. PDS 2020-LDGRMJ-30253

Prepared For:

Stanley & Betty Boney

and

The County of San Diego



June 30, 2020

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1. Existing Conditions

The existing condition of the 77 lot is an undeveloped vacant lot. There are currently no existing impervious areas. The topography of the lot can be described as semi-mountainous including two ridgelines originating at a point north of the midpoint of the northern property line. One ridgeline extends from this point southeasterly with the other ridgeline extending southwesterly through the site. There are several natural drainage courses descending from these ridgelines with the drainage courses in the southwest portion of the property being classified as blue-line *Riverine* drainage courses. There are blue-line drainage courses to the northeast however those do not lie within the subject property.

There are no existing man-made storm drain facilities within the site. There is however an existing brow ditch adjacent to and along the easterly property line. This ditch intercepts runoff from the subject property and routes it around the developed properties east of the site.

All drainage courses from the site ultimately drain to the south to the Loveland Reservoir approximately 4,700 ft. from the site.

Refer to Drainage Map 'A.1' found in Appendix A of this report for a site map of the existing conditions. A complete tabulation of the existing tributary areas evaluated are found in Table A of Appendix B. Full runoff calculations for the existing conditions are provided in Table B of Appendix B.

2. Proposed Project

The proposed construction will occupy (disturb) a 13.6 acre in the northeast corner of the site, sitting atop the existing ridgeline in the northeast corner of the site that runs from the northwest to the southeast. The proposed development consists of a new single family residence, detached cabana structure near a pool, two separate farm employee housing structures, a detached garage (near a farm employee house), a large equestrian area with nearby barn, and a paved driveway through the center of the development providing access to all areas of the development. Significant landscaping will also be installed throughout the site.

The topography slopes away from the ridgeline central to the development to the northeast and southwest. The developed portions of the site are tributary to seven different drainage courses within the site. Four of these points lie to the southwest of the development with the remaining three lying to the northeast.

The proposed development will utilize fine grading and small area drains to collect runoff from the site. Storm water collected by the drainage system will discharge to one of twelve biofiltration areas located throughout the site. Each biofiltration area will then discharge to riprap energy dissipaters before discharging runoff to the natural drainage courses on the site.

All proposed development has been sited to avoid disturbing the blue-line streams on the property.

Refer to Drainage Map 'B.1' found in Appendix A for a site map of the proposed drainage conditions. A complete tabulation of the proposed tributary areas evaluated are found in Table A of Appendix B. Full runoff calculations for the existing conditions are provided in Table C of Appendix B.

3. Purpose and Scope of Report

This report will evaluate the pre-construction hydrologic conditions as well as the post-construction conditions to quantify increases or decreases in runoff from the project and for the design of drainage system components for a 100-yr design storm for flood control purposes.

4. Method of Calculations

The Rational Method, as defined by the *County of San Diego Hydrology Manual (2003)*, will be used to calculate storm water flow rates. Detention routing analysis performed utilizing the methods outlined in the County of San Diego Hydraulic Design Manual Section 6.3 with hydrographs generated by *HydroCAD* software. Where noted, the following calculations were used to determine flow properties:

Rainfall Characteristics

$Q = C * I * A$, where

Q = Flow rate (ft³/sec)

C = Runoff coefficient

(Runoff coefficient per County of San Diego Hydrology Manual Table 3-1 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)

Rainfall Intensity (per County of San Diego Hydrology Manual Figure 3-1 reproduced in Appendix C)

$I = 7.44 * P_6 * D^{-0.645}$, where

I = Rainfall intensity (in/hr)

P₆ = Adjusted 6-hour precipitation (inches)

D = Storm duration (min), equal to T_c for time-of-concentration storms

T_c = T_i+T_t+T_p (time-of-concentration), where

T_i=Over land initial time.

T_t=Travel time on natural watersheds.

T_p=Travel time on drainage structures (pipes, brow ditch, gutter etc.)

Overland Time of Flow (per County of San Diego Hydrology Manual Figure 3-3 reproduced in Appendix C)

$$T_i = 1.8(1.1 - C) D^{0.50} / (s^{0.33}) \quad (\text{Overland initial time of concentration formula), where}$$

D = Watercourse Distance (feet)(see table 3-2 for the max. overland flow length)

s = Slope (%)

C = Runoff Coefficient

T_i = Initial time of concentration (min.)

Time of Concentration (T_c) or Travel Time (T_t) for Natural Watersheds (per County of San Diego Hydrology Manual Figure 3-4 reproduced in Appendix C)

$$T_t = (11.9 * L^3 / \Delta H)^{0.385} \quad (\text{formula for travel time for natural watersheds), where}$$

T_c = Time of Concentration or Travel time (hours)

L = Length of watercourse (miles)

ΔH = Change in effective slope height (ft)

Pipe and Open Channel Flow Characteristics

$$V = 1.49/n * R^{2/3} * S^{1/2} \quad (\text{from Manning), where}$$

V = Average cross-sectional velocity (ft/sec)

n = Manning roughness coefficient

R = Hydraulic radius (ft)

S = Slope of water surface (ft height/ft length)

$$p/\gamma + V^2/2g + z_1 + h_L = p/\gamma + V^2/2g + z_2 \quad (\text{from Bernoulli), where}$$

p = pressure (lbs/ft²)

γ = density (lbs/ft³)

V = velocity (ft/sec)

g = gravity (ft/sec/sec)

z = height of fluid (ft)

h_L = head loss (ft)

5. Results and Conclusions:

The installation of nearly 170,000 ft² of new impervious surfaces on the currently vacant site would result in an increase in runoff from a 100-year storm event to Drainage Areas ‘D’, ‘E’, and ‘F’ and ‘G’ (see Drainage Maps A.1 and B.1 in Appendix B). Runoff from Drainage Areas ‘A’, ‘B’ and ‘C’ were shown to have reductions in runoff in the developed conditions. This is due to significantly longer times-of-concentration resulting from grading large areas with slopes 5% or less. It should also be noted that in the cases of Areas ‘A’ and ‘B’ that the detention effects of the biofiltration areas in these areas was not considered in this report. If the biofiltration areas were to be included in the analysis, further reductions in runoff would be seen. Conversely, the detention capabilities of the proposed biofiltration areas within areas ‘D’ thru ‘G’ were evaluated and were shown to reduce runoff discharging from the site to levels below even the existing conditions. The runoff from each of the seven drainage basins tributary to the proposed development has been summarized in the table below.

Point of Compliance	Existing Q ₁₀₀ (ft ³ /sec) (Unmitigated)	Proposed- Unmitigated Q ₁₀₀ (ft ³ /sec) (Unmitigated)	Proposed- Mitigated Q ₁₀₀ (ft ³ /sec) (Unmitigated)	Existing Tributary Area Acres	Proposed Tributary Area Acres	Weighted Runoff Coeff. (Pre)	Weighted Runoff Coeff. (Post)
POC-1 (Area A)	26.09	20.79	20.79	11.38	12.10	0.30	0.36
POC-2 (Area B)	15.36	9.34	9.34	6.70	6.77	0.30	0.33
POC-3 (Area C)	17.07	9.88	9.88	7.45	7.01	0.30	0.31
POC-4 (Area D)	8.69	9.32	4.02	3.80	3.39	0.30	0.44
POC-5 (Area E)	8.27	10.01	6.99	3.75	4.40	0.30	0.39
POC-6 (Area F)	2.45	2.90	1.96	1.07	1.02	0.30	0.37
POC-7 (Area G)	9.12	10.65	8.35	3.98	4.09	0.30	0.34

Since all increases in runoff from the site have been eliminated in the developed condition, the project will not substantially alter the existing drainage patterns of the site. In the absence of runoff increases any substantial erosion or siltation on- or off-site caused by the project is not anticipated. Onsite landscaping will also prevent erosion and/or siltation on-site.

Review of FEMA flood map # 06073C1695G shows that the site and surrounding area is in “an area of minimal flood hazard” (Zone X). The site (and surrounding area) does not show as being within a county mapped flood way or county mapped flood plain. Therefore the project will not place housing within these mapped flood hazard areas nor would the proposed project place structures within a 100-year flood hazard area which would impede or redirect flood flows.

All proposed development has been sited to avoid disturbing the blue-line streams on the property.

Full runoff calculations as are included in Appendix B of this report.

I certify that the proposed improvements will not increase the volume or velocity of surface flows to the detriment of downstream landowners & facilities

6. 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 County of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for project design.

Daniel Valdez
RCE 76074
Exp. 06-30-22



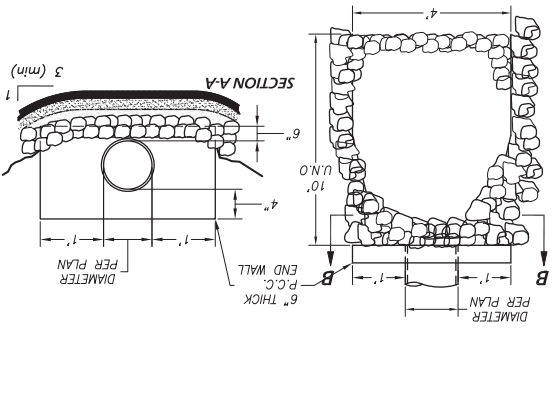
Date

Bibliography

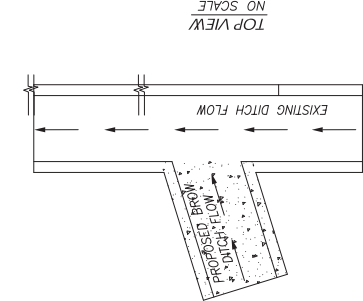
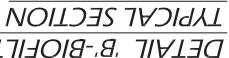
- County of San Diego. 2005. *Drainage Design Manual*
<http://www.sdcountry.ca.gov/dpw/floodcontrol/drainage.html>
- County of San Diego. 2003. *Hydrology Manual*
<http://www.sdcountry.ca.gov/dpw/floodcontrol/hydrologymanual.html>

Appendix A – Referenced Plans & Drainage Maps

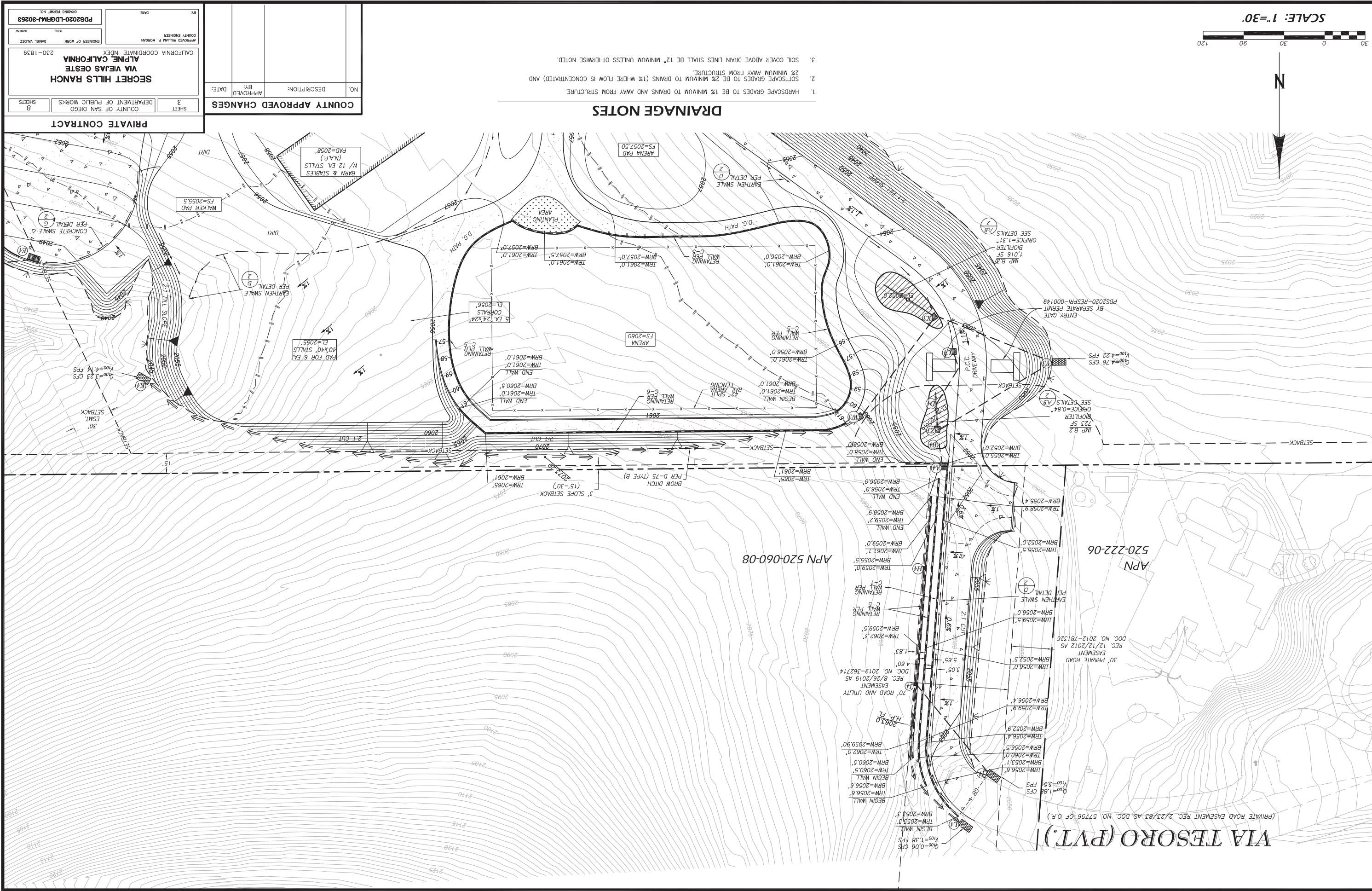
PIPE TABLE				PIPE TABLE				PIPE TABLE				PIPE TABLE			
PIPE	SIZE/TYPE	LENGTH	SLOPE	PIPE	SIZE/TYPE	LENGTH	SLOPE	PIPE	SIZE/TYPE	LENGTH	SLOPE	PIPE	SIZE/TYPE	LENGTH	SLOPE
A - B	6" PVC	18.78	1.00%	A1 - B1	6" PVC	136.56	13.13%	A - B	6" PVC	18.78	1.00%	A1 - B1	6" PVC	136.56	13.13%
A3 - B3	6" PVC	24.91	1.00%	A3 - B3	6" PVC	24.91	1.00%	A3 - B3	6" PVC	24.91	1.00%	A3 - B3	6" PVC	24.91	1.00%
A4 - B4	6" PVC	17.33	1.93%	A4 - B4	6" PVC	17.33	1.93%	A4 - B4	6" PVC	20.73	1.00%	A4 - B4	6" PVC	20.73	1.00%
B - C	6" PVC	31.83	1.00%	B - C	6" PVC	31.83	1.00%	B - C	6" PVC	21.58	1.00%	B - C	6" PVC	21.58	1.00%
B2 - C2	6" PVC	15.88	17.04%	B2 - C2	6" PVC	15.88	17.04%	B2 - C2	6" PVC	21.58	1.00%	B2 - C2	6" PVC	21.58	1.00%
B3 - C3	6" PVC	26.88	1.00%	B3 - C3	6" PVC	26.88	1.00%	B3 - C3	6" PVC	21.58	1.00%	B3 - C3	6" PVC	21.58	1.00%
C - D	6" PVC	29.48	1.00%	C - D	6" PVC	29.48	1.00%	C - D	6" PVC	21.58	1.00%	C - D	6" PVC	21.58	1.00%
C1 - A1	6" PVC	49.45	0.88%	C1 - A1	6" PVC	49.45	0.88%	C1 - A1	6" PVC	21.58	1.00%	C1 - A1	6" PVC	21.58	1.00%
C1 - D1	6" PVC	21.00	1.00%	C1 - D1	6" PVC	21.00	1.00%	C1 - D1	6" PVC	21.58	1.00%	C1 - D1	6" PVC	21.58	1.00%
C3 - D3	6" PVC	24.55	1.00%	C3 - D3	6" PVC	24.55	1.00%	C3 - D3	6" PVC	21.58	1.00%	C3 - D3	6" PVC	21.58	1.00%
C4 - D4	6" PVC	44.53	1.00%	C4 - D4	6" PVC	44.53	1.00%	C4 - D4	6" PVC	21.58	1.00%	C4 - D4	6" PVC	21.58	1.00%
D - E	6" PVC	38.74	1.00%	D - E	6" PVC	38.74	1.00%	D - E	6" PVC	21.58	1.00%	D - E	6" PVC	21.58	1.00%
D1 - E1	6" PVC	15.59	1.00%	D1 - E1	6" PVC	15.59	1.00%	D1 - E1	6" PVC	21.58	1.00%	D1 - E1	6" PVC	21.58	1.00%
D2 - E2	8" PVC	19.51	30.28%	D2 - E2	8" PVC	19.51	30.28%	D2 - E2	8" PVC	21.58	1.00%	D2 - E2	8" PVC	21.58	1.00%
D3 E3	6" PVC	58.87	12.88%	D3 E3	6" PVC	58.87	12.88%	D3 E3	6" PVC	21.58	1.00%	D3 E3	6" PVC	21.58	1.00%
E - F	6" PVC	86.84	18.73%	E - F	6" PVC	86.84	18.73%	E - F	6" PVC	21.58	1.00%	E - F	6" PVC	21.58	1.00%
E4 - F4	12" PVC	206.57	5.23%	E4 - F4	12" PVC	206.57	5.23%	E4 - F4	12" PVC	21.58	1.00%	E4 - F4	12" PVC	21.58	1.00%
F - G	6" PVC	37.27	1.00%	F - G	6" PVC	37.27	1.00%	F - G	6" PVC	21.58	1.00%	F - G	6" PVC	21.58	1.00%
F2 - G2	6" PVC	26.32	0.95%	F2 - G2	6" PVC	26.32	0.95%	F2 - G2	6" PVC	21.58	1.00%	F2 - G2	6" PVC	21.58	1.00%
F3 - G3	6" PVC	45.79	4.08%	F3 - G3	6" PVC	45.79	4.08%	F3 - G3	6" PVC	21.58	1.00%	F3 - G3	6" PVC	21.58	1.00%
G - H	6" PVC	25.29	1.00%	G - H	6" PVC	25.29	1.00%	G - H	6" PVC	21.58	1.00%	G - H	6" PVC	21.58	1.00%
G1 - H1	6" PVC	37.27	1.00%	G1 - H1	6" PVC	37.27	1.00%	G1 - H1	6" PVC	21.58	1.00%	G1 - H1	6" PVC	21.58	1.00%



DETAIL 'H' - RIP RAP ENERGY DISSIPATOR (D-40)

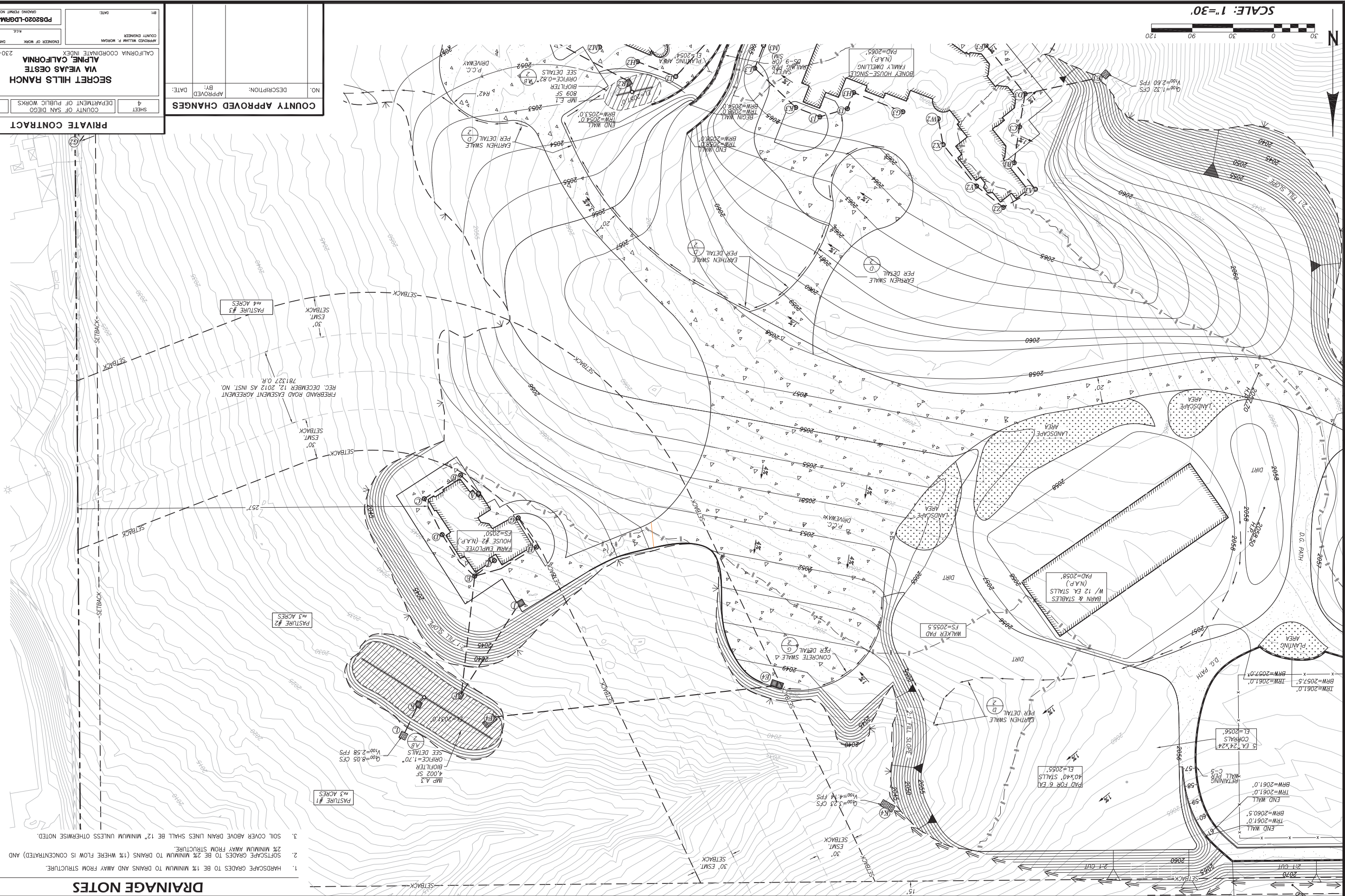


COUNTY APPROVED CHANGES APPROVED BY: DATE:		NO. DESCRIPTION:		BY: DATE:	
SHEET 2 COUNTY OF SAN DIEGO DEPARTMENT OF PUBLIC WORKS		DETAILS FOR:		SECRET HILLS RANCH VIA ALPINE, CALIFORNIA CALIFORNIA COORDINATE INDEX 2330-1839	
PRIVATE CONTRACT		COUNTY ENGINEER APPROVED WILLIAM P. MORGAN COUNTY ENGINEER DATE:		DESIGNER OF WORK DANIEL J. VALDEZ R.C.E. PDS2020-LDGMJ-30268 DRAWING PERMIT NO:	



DRAINAGE NOTES

1. HARDSCAPE GRADES TO BE 1% MINIMUM TO DRAINS AND AWAY FROM STRUCTURE.
2. SOFTSCAPE GRADES TO BE 2% MINIMUM TO DRAINS (1% WHERE FLOW IS CONCENTRATED) AND 2% MINIMUM AWAY FROM STRUCTURE.
3. SOIL COVER ABOVE DRAIN LINES SHALL BE 12" MINIMUM UNLESS OTHERWISE NOTED.



PRIVATE CONTRACT

COUNTY OF SAN DIEGO

SECRET HILLS RANCH

ALPINE, CALIFORNIA
ORDINATE INDEX
23

DANIEL VALDEZ
ENGINEER OF WORK

FD32020-LDGHMM-30263
GRADING PERMIT NO:

COUNTY APPROVED CHANGES

NO.	DESCRIPTION:	APPROVED BY:	DATE:
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PRIVATE CONTRACT

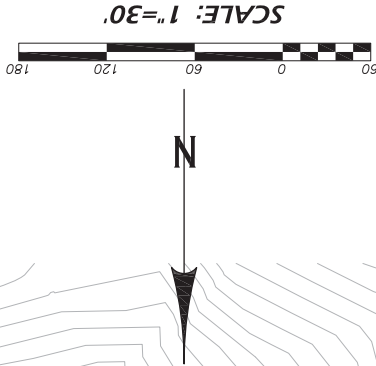
COUNTY OF SAN DIEGO

SECRET HILLS RANCH

ALPINE, CALIFORNIA
ORDINATE INDEX
23

DANIEL VALDEZ
ENGINEER OF WORK

FD32020-LDGHMM-30263
GRADING PERMIT NO:

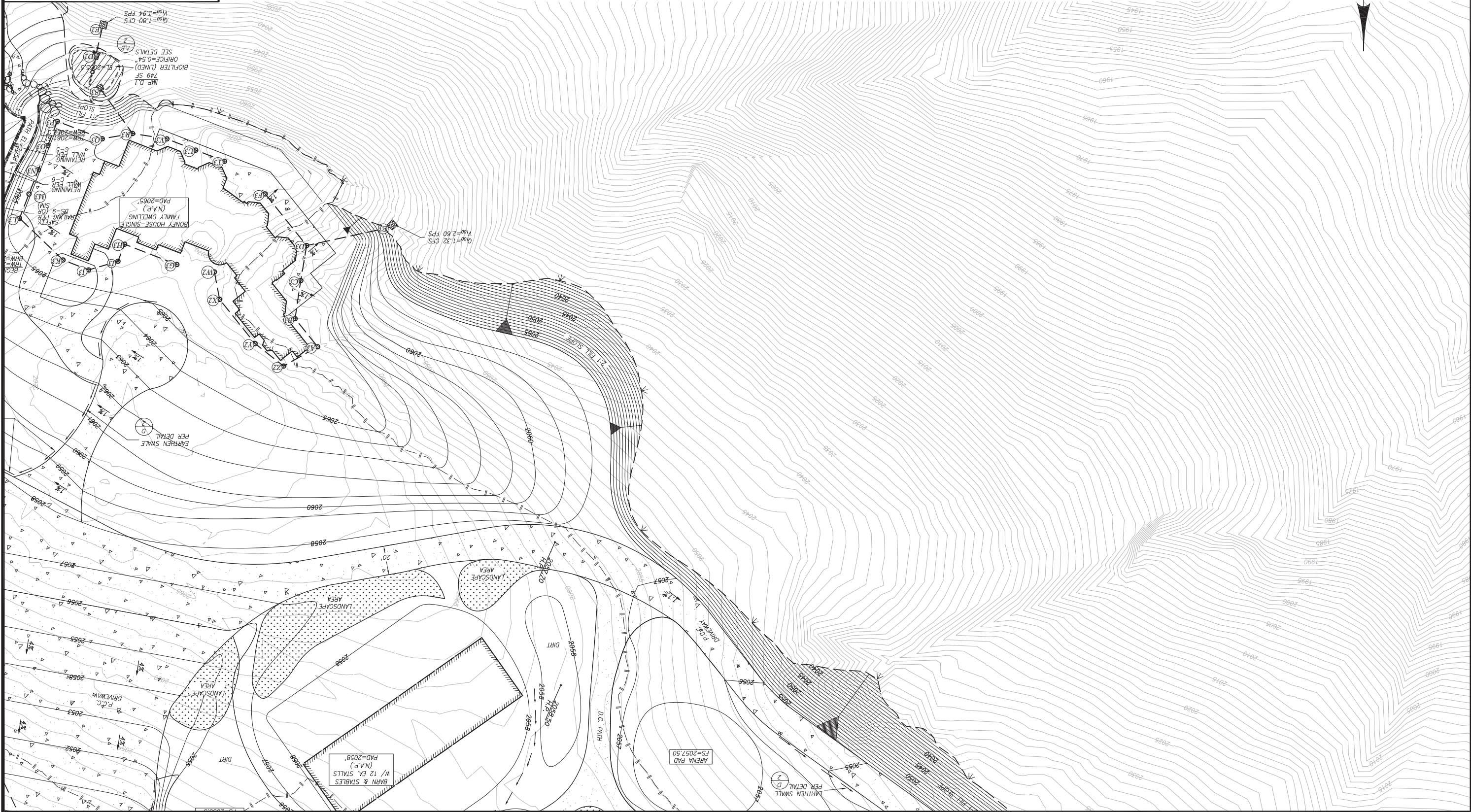


1. HARDSCAPE GRADES TO BE 1% MINIMUM TO DRAINS AND AWAY FROM STRUCTURE.
2. SOTSCAPE GRADES TO BE 2% MINIMUM TO DRAINS (1% WHERE FLOW IS CONCENTRATED) AND 2% MINIMUM AWAY FROM STRUCTURE.
3. SOIL COVER ABOVE DRAIN LINES SHALL BE 12" MINIMUM UNLESS OTHERWISE NOTED.

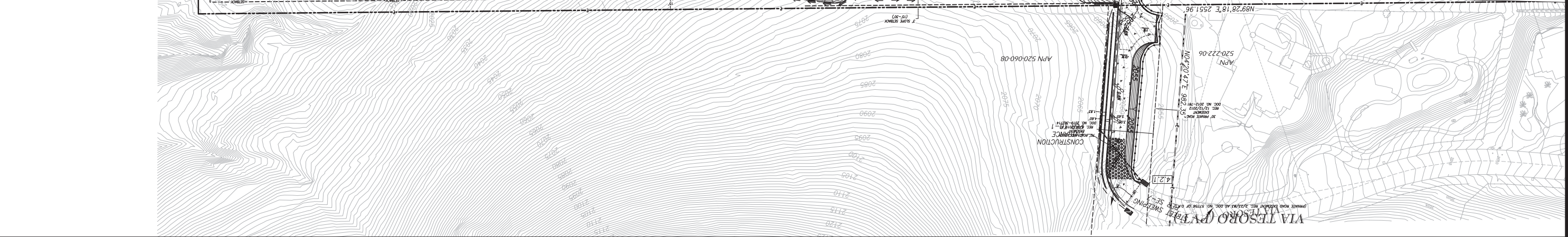
DRAINAGE NOTES

NO.	DESCRIPTION:	APPROVED BY:	DATE:
COUNTY APPROVED CHANGES			

PROJECT NO. PD82020-LDGRM-J-30268		DATE:	
SHEET 8		COUNTY ENGINEER: DANIEL WALKER	
ENGINEER OF WORK: DANIEL WALKER		APPROVED: COUNTY WILLIAM P. MORGAN	
CALIFORNIA COORDINATE INDEX: 230-1839		COUNTY OF SAN DIEGO	
SECRET HILLS RANCH		DEPARTMENT OF PUBLIC WORKS	
VIA VIEJAS OESTE		SHEET 5	
ALPINE CALIFORNIA		COUNTY OF SAN DIEGO	
PRIVATE CONTRACT		SHEETS 8	



GRADING PLANS(S)



EROSION CONTROL NOTES

1. ALL BUILDING PADS TO BE DIKED AND THE DIKES MAINTAINED TO PREVENT WATER FLOW FROM FLOWING FROM THE PADS WITHOUT CAUSING EROSION.

2. TOPS OF ALL SLOPES TO BE DIKED OR TRENCHED TO PREVENT WATER FLOW FROM FLOWING OVER THE CREST OF SLOPES.

3. MANUFACTURED SLOPES AND PADS SHALL BE ROUNDED VERTICALLY AND HORIZONTALLY AS APPROPRIATE TO BLEND WITH THE SURROUNDING TOPOGRAPHY.

4. AS SOON AS CUTS OR EMBANKMENTS ARE COMPLETED, BUT NOT LATER THAN OCTOBER 1, ALL CUT APPROVED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS BETWEEN OCTOBER 1 AND APRIL 15.

5. APPROVED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS IMMEDIATELY BEHIND THE EXPOSURE OF CUT SLOPES AND/OR THE CREATION OF EMBANKMENT SLOPES.

6. CATCH BASINS, DESILTING BASINS AND STORM DRAIN SYSTEMS SHALL BE INSTALLED TO THE SATISFACTION OF THE COUNTY DEPARTMENT OF PUBLIC WORKS.

7. SAND BAG CHECK DAMS TO BE PLACED IN A MANNER APPROVED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS IN UNPAVED STREETS WITH GRADIENTS IN EXCESS OF 2% AND ON OR IN OTHER GRADED OR EXCAVATED AREAS AS REQUIRED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.

8. THE DEVELOPER TO MAINTAIN THE PLANTING AND EROSION CONTROL MEASURES DESCRIBED ABOVE UNTIL RELIEF OF THE SAME BY THE COUNTY DEPARTMENT OF PUBLIC WORKS. THE DEVELOPER TO REMOVE ALL SOIL INTERCEPTED BY THE SAND BAGS, CATCH BASINS AND DESILTING BASINS AND KEEP THESE FACILITIES CLEAN AND FREE OF SILT AND SAND AS DIRECTED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.

9. COUNTY DEPARTMENT OF PUBLIC WORKS. THE DEVELOPER SHALL REPAIR ANY ERODED SLOPES AS DIRECTED BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.

10. AREA BEING DISTURBED SHALL EXCEED 50 ACRES AT ANY GIVEN TIME WITHOUT DEMONSTRATING NO AREA BEING DISTURBED SHALL EXCEED 50 ACRES AT ANY GIVEN TIME WITHOUT DEMONSTRATING

STORMWATER MANAGEMENT NOTES

1. DURING THE RAINY SEASON THE AMOUNT OF EXPOSED SOIL ALLOWED AT ONE TIME SHALL NOT EXCEED THAT WHICH CAN BE ADEQUATELY PROTECTED BY THE PROPERTY OWNER IN THE EVENT OF A RAINSTORM 1.25% OF ALL SUPPLIES NEEDED FOR BMP DEPLOYMENT AND COMPLETE INSTALLATION IN 48 HOURS OR LESS OF A FORECAST RAIN.

2. NO AREA BEING DISTURBED SHALL EXCEED 50 ACRES AT ANY GIVEN TIME WITHOUT DEMONSTRATING

3. THE PROPERTY OWNER IS OBLIGATED TO ENSURE COMPLIANCE WITH ALL APPLICABLE STORMWATER REGULATIONS AT ALL TIMES. THE BMP'S (BEST MANAGEMENT PRACTICES) THAT HAVE BEEN INCORPORATED INTO THIS PLAN SHALL BE IMPLEMENTED AND MAINTAINED TO EFFECTIVELY PREVENT

4. THE POTENTIALLY NEGATIVE IMPACTS OF THIS PROJECT'S CONSTRUCTION ACTIVITIES ON STORMWATER QUALITY. THE MAINTENANCE OF THE BMP'S IS THE PERMITTEE'S RESPONSIBILITY, AND FAILURE TO PROPERLY INSTALL OR MAINTAIN THE BMP'S MAY RESULT IN ENFORCEMENT ACTION BY THE COUNTY OF SAN DIEGO OR OTHERS. IF INSTALLED BMP'S FAIL, THEY MUST BE REPAIRED OR REPLACED WITH AN ACCEPTABLE ALTERNATE WITHIN 24 HOURS, OR AS SOON AS SAFE TO DO SO.

5. THE PROPERTY OWNER IS OBLIGATED TO ENSURE COMPLIANCE WITH ALL APPLICABLE STORMWATER REGULATIONS AT ALL TIMES. THE BMP'S (BEST MANAGEMENT PRACTICES) THAT HAVE BEEN INCORPORATED INTO THIS PLAN SHALL BE IMPLEMENTED AND MAINTAINED TO EFFECTIVELY PREVENT

6. THAT A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) HAS BEEN OR WILL BE PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF CALIFORNIA GENERAL PERMIT FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY (PERMIT NO. CAS000002) FOR ALL OPERATIONS ASSOCIATED WITH THESE PLANS. THE NOI NUMBER ASSIGNED BY SWRCB FOR THIS PRODUCT IS [Wpid#] [ALTERNATIVE: NOT YET ASSIGNED, BUT WILL BE PROVIDED BEFORE A PERMIT IS ISSUED]. THE PERMITTEE SHALL KEEP A COPY OF THE SWPPP ON SITE AND AVAILABLE FOR REVIEW BY COUNTY.

BMP LEGEND

- WM-1 MATERIAL DELIVERY & STORAGE

- WM-4 SPILL PREVENTION AND CONTROL

- WM-8 CONCRETE WASTE MANAGEMENT

- WM-9 SOLID WASTE MANAGEMENT

- WM-9 SANITARY WASTE MANAGEMENT

- SC-1 SILT FENCE

- SC-9 FIBER ROLLS

- SC-8 GRAVEL OR SAND BAGS

- SC-7 STREET SWEEPING AND VACUUMING

- TC-1 STABILIZED CONSTRUCTION ENTRANCE

- 4.2.1 PERMANENT SOURCE CONTROL BMPs

- 4.2.3 PROTECT OUTDOOR MATERIAL STORAGE AREAS

- 4.2.4 WORK AREAS

- 4.2.5 PROTECT TRASH STORAGE AREAS

- 4.2.6E LANDSCAPE/OUTDOOR

- 4.2.6F PESTICIDE USE

- 4.2.6H POOLS, SPAS, PONDS, FOUNTAINS, AND OTHER WATER FEATURES

- 4.2.6P FIRE SPRINKLER

- 4.2.6Q MISCELLANEOUS DRAIN OR WASH WATER

- 4.2.6R PLAZAS, SIDEWALKS, AND PARKING LOTS

- 4.3.2 CONSERVATION/RESTORATION OF NATURAL AREAS, SOILS, AND VEGETATION

- 4.3.3 MINIMIZE IMPERVIOUS AREA

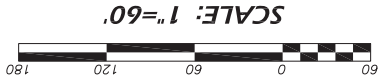
- 4.3.4 MINIMIZE SOIL COMPACTION

- 4.3.5 IMPERVIOUS AREA DISPERSION

- 4.3.7 TOLERANT VEGETATION

DISTURBED AREA

TOTAL DISTURBED AREA = 502,000 FT² (11.52 AC)



PRIVATE CONTRACT

- SHEET 7

- DEPARTMENT OF PUBLIC WORKS

- EROSION CONTROL PLAN FOR:

- SECRET HILLS RANCH

- VIA VIEJAS OESTE

- ALPINE, CALIFORNIA

- DESIGNER OF WORK

- DATE: 10/20/2020

- PROJECT NO: PD82020-LDGRM-30268

REPLACE WITH POCKET

Appendix B – Calculations/Evaluations

Table A - Area Tabulations & Runoff Coefficients ('C')

	Drainage Management Area	Impervious Area - ft ²	Pervious Area - ft ²	Permeable Paving - ft ²	Biofiltration Area - ft ²	Pool/Water Feature - ft ²	Total (SF)	Total (AC)	Runoff Coefficient (C)	Percent Impervious	DMA Type	Drains to POC
Existing Conditions	A.0		495,884				495,884	11.3839	0.30	0.00%	Existing	POC-1
	B.0		291,972				291,972	6.7028	0.30	0.00%	Existing	POC-2
	C.0		324,445				324,445	7.4482	0.30	0.00%	Existing	POC-3
	D.0		165,317				165,317	3.7952	0.30	0.00%	Existing	POC-4
	E.0		163,200				163,200	3.7466	0.30	0.00%	Existing	POC-5
	F.0		46,628				46,628	1.0704	0.30	0.00%	Existing	POC-6
	G.0		173,372				173,372	3.9801	0.30	0.00%	Existing	POC-7
	Z.1 - Offsite area near entry (Bypass project)		35,730				35,730	0.8202	0.30	0.00%	Existing	N/A
Proposed Conditions	A.2 - Stalls & 1/2 of Barn	3,072	121,039				124,111	2.8492	0.31	2.48%	Self Mitigating	POC-1
	A.3 - S. 1/2 of Barn and Large Por. Of DW	45,203	55,885		4,002		105,090	2.4125	0.55	43.01%	Drains to BMP	POC-1
	A.4 - Natural Slope E. of Stalls		81,282				81,282	1.8660	0.30	0.00%	Self Mitigating	POC-1
	A.5 - Caretakers Quarters	8,219	21,631				29,850	0.6853	0.46	27.53%	Drains to BMP	POC-1
	A.6 - Natural Slope		186,538				186,538	4.2823	0.30	0.00%	Self Mitigating	POC-1
	Total Basin A (POC-1)	56,494	466,375	0	4,002	0	526,871	12.0953	0.36	10.72%		
	B.1 - Nat. Slope above arena		21,283				21,283	0.4886	0.30	0.00%	Bypass	POC-2
	B.2 - Driveway Section Near Entrance	8,735	23,155		723		32,613	0.7487	0.45	26.78%	Drains to BMP	POC-2
	B.3 - Por of DW near Arena	8,422	71,147		1,016		80,585	1.8500	0.36	10.45%	Drains to BMP	POC-2
	B.4 - Slope below Por of DW near ent.		160,250				160,250	3.6788	0.30	0.00%	Self Mitigating	POC-2
	Total Basin B (POC-2)	17,157	275,835	0	1,739	0	294,731	6.7661	0.33	5.82%		
	C.1 - West 1/2 of Main House	6,772	298,557				305,329	7.0094	0.31	2.22%	Self Mitigating	POC-3
	D.1 - East 1/2 of Main House	10,305	3,594		749		14,648	0.3363	0.70	70.35%	Drains to BMP	POC-4
	D.2 - Cabana and Pool	17,932	5,002		1,206	1,094	25,234	0.5793	0.69	71.06%	Drains to BMP	POC-4
	D.3 - West 1/2 of Emp #1	9,639	4,137		658		14,434	0.3314	0.68	66.78%	Drains to BMP	POC-4
	D.4 - Slope Below Pool & Main House		93,415				93,415	2.1445	0.30	0.00%	Self Mitigating	POC-4
	Total Basin D (POC-4)	37,876	106,148	0	2,613	1,094	147,731	3.3914	0.44	25.64%		
	E.1 - Driveway to Main house	10,349	20,137		809		31,295	0.7184	0.49	33.07%	Drains to BMP	POC-5
	E.2 - Bottom of DW near cabana	8,267	4,270		569		13,106	0.3009	0.66	63.08%	Drains to BMP	POC-5
	E.3 - Portion of house #1 & Shop	10,092	4,276		737		15,105	0.3468	0.68	66.81%	Drains to BMP	POC-5
	E.4 - Pasture area north of Emp #1		132,306				132,306	3.0373	0.30	0.00%	Self Mitigating	POC-5
	Total Basin E (POC-5)	28,708	160,989	0	2,115	0	191,812	4.4034	0.39	14.97%		
	F.1 - S. Central Section of Emp #1	5,661	1,292		380		7,333	0.1683	0.74	77.20%	Drains to BMP	POC-6
	F.2 - Slope below S. Central Sec. of Emp #1		37,245				37,245	0.8550	0.30	0.00%	Self Mitigating	POC-6
	Total Basin F (POC-6)	5,661	38,537	0	380	0	44,578	1.0234	0.37	12.70%		
	G.1 - SW Quadrant of Emp House #1	12,955	5,572		884		19,411	0.4456	0.68	66.74%	Drains to BMP	POC-7
	G.2 - Slope Below SW Quad of Emp House #1		158,648				158,648	3.6421	0.30	0.00%	Self Mitigating	POC-7
	Total Basin G (POC-7)	12,955	164,220	0	884	0	178,059	4.0877	0.34	7.28%		

Table B - Pre Construction Flow Characteristics

		Urban Overland (Sheet) Flow (per Fig. 3-3)										Pipe/Channel Flow										Summary									
Flow ID (Basin)	Element & Dwelling	Unit/Acre	Watercourse distance, L (ft)	Elev. 1	Elev. 2	Change in Elevation, H (ft)	Natural watercourse duration, D _n (min)	Urban watercourse distance, D _u (ft) (< Length	Maximum Overland Flow	Watercourse slope, s (%)	Runoff Coefficient, C	Initial Time of Concentration (per Fig. 3-2)	T _o (min)	Pipe Length, L _p (ft)	Average velocity, V (fps)	Pipe travel time, T _p (min)	Total time-of-concentration, T _c (min) - (min) -	Runoff Coefficient, C	Rainfall Intensity, I (in/hr)	Basin Area, A (acres)	Q (cfs) = C*I*A	Q (cfs) Mitigated									
A.0	Natural		1126	2072	1994	75	4.88						0.00	0	0	0	0.00	5.00	0.30	7.64	11.38	26.09									
B.0	Natural		1168	2180	1964	218	3.44						0.00	0	0	0	0.00	5.00	0.30	7.64	6.70	15.36									
C.0	Natural		1155	2072	1902	170	3.73						0.00	0	0	0	0.00	5.00	0.30	7.64	7.45	17.07									
D.0	Natural		640	2071	1971	100	2.31						0.00	0	0	0	0.00	5.00	0.30	7.64	3.80	8.69									
E.0	Natural		1024	2071	2011	60	4.84						0.00	382	14.0	0	0.45	5.30	0.30	7.36	3.75	8.27									
F.0	Natural		500	2068	1993	75	1.94						0.00	0	0	0	0.00	5.00	0.30	7.64	1.07	2.45									
G.0	Natural		532	2052	1949	103	1.85						0.00		0	0	0.00	5.00	0.30	7.64	3.98	9.12									

Table C - Post Construction Flow Characteristics

Natural Watercourse (per Fig. 3-4)										Urban Overland (Sheet) Flow (per Fig. 3-3)										Pipe/Channel Flow										Summary									
Flow ID (Basin)	Element & Dwelling	Unit/Acre	Watercourse distance, L (ft)	Elev. 1	Elev. 2	Change in Elevation, H (ft)	Natural watercourse duration, D _n (min)	Urban watercourse distance, D _u (ft) (< Length	Maximum Overland Flow	Watercourse slope, s (%)	Runoff Coefficient, C	Initial Time of Concentration (per Fig. 3-2)	T _t (min)	Overland Flow Time, T _t (min)	Pipe Length, L _p (ft)	Average velocity, V (fps)	Pipe travel time, T _p (min)	T _c (min) - Total time-of-concentration, T _c (min)	Runoff Coefficient, C	Rainfall Intensity, I (in/hr)	Basin Area, A (acres)	Q (cfs) = C*I*A	Q (cfs) Mitigated																
Z.1 - Offsite area near entry (Bypass project)	Natural		620	2140	2063	77	2.46						0.00					0.00	5.00	0.30	7.64	0.82	1.88																
A.2 - Stalls & 1/2 of Barn	Natural					0	0.00	377	70	1.00	0.31	12.56	15.99					0.00	15.99	0.31	3.61	2.85	3.33																
A.3 - S. 1/2 of Barn and Large Por. Of DW	LDR - 1					0	0.00	404	100	5.00	0.55	8.00	9.81					0.00	9.81	0.55	4.95	2.41	6.50	0.13															
A.4 - Natural Slope E. of Stalls	Natural		643	2190	2023	167	1.91						0.00					0.00	5.00	0.30	7.64	1.87	4.27																
A.5 - Caretakers Quarters	LDR - 1		232	2058	2051	7	1.99						0.00		84	3.0	0.47	5.00	0.46	7.64	0.69	2.39																	
A.6 - Natural Slope	Natural		900	2190	1994	196	2.64						0.00					0.00	5.00	0.30	7.64	4.28	9.81																
B.1 - Nat. Slope above arena	LDR - 1		537	2140	2060	80	2.06						0.00					0.00	5.00	0.30	7.64	0.49	1.11																
B.2 - Driveway Section Near Entrance	LDR - 1		320	2088	2053	35	1.55						0.00					0.00	5.00	0.45	7.64	0.75	2.58																
B.3 - Por of DW near Arena	LDR - 1					0	0.00	425	85	2.00	0.36	10.06	12.87					0.00	12.87	0.36	4.15	1.85	2.76																
B.4 - Slope below Por of DW near ent.	LDR - 1		440	2052	1964	88	1.57						0.00					0.00	5.00	0.30	7.64	3.68	8.43																
C.1 - West 1/2 of Main House	LDR - 1		887	2057	1896	161	2.80						8.00					0.00	11.31	0.31	4.51	7.01	9.88																
D.1 - East 1/2 of Main House	LDR - 1					0	0.00						0.00					0.00	5.00	0.70	7.64	0.34	1.80	0.01															
D.2 - Cabana and Pool	LDR - 1					0	0.00						0.00					0.00	5.00	0.69	7.64	0.58	3.06	0.02															
D.3 - West 1/2 of Emp #1	LDR - 1					0	0.00	52	70	1.00	0.68	0.00	5.44	265	3.0	1.47	6.92	0.68	6.20	0.33	1.39	0.01																	
D.4 - Slope Below Pool & Main House	Natural		490	2048	1970	78	1.87						0.00					0.00	5.00	0.30	7.64	2.14	4.91																
E.1 - Driveway to Main house	LDR - 1		360	2065	2053	12	2.69						0.00					0.00	5.00	0.49	7.64	0.72	2.68	0.03															
E.2 - Bottom of DW near cabana	LDR - 1					0	0.00	130	100	3.00	0.66	9.56	9.74					0.00	9.74	0.66	4.97	0.30	0.98	0.01															
E.3 - Portion of house #1 & Shop	LDR - 1					0	0.00	187	70	1.00	0.68	11.56	13.00					0.00	13.00	0.68	4.13	0.35	0.97	0.01															
E.4 - Pasture area north of Emp #1	Natural		422	2057	2017	40	2.03						0.00					0.00	5.00	0.30	7.64	3.04	6.96																
F.1 - S. Central Section of Emp #1	LDR - 1					0	0.00						0.00		299	5.0	1.00	5.00	0.74	7.64	0.17	0.95	0.01																
F.2 - Slope below S. Central Sec. of Emp #1	LDR - 1		400	2048	1993	55	1.69						0.00					0.00	5.00	0.30	7.64	0.86	1.95																
G.1 - SW Quadrant of Emp House #1	LDR - 1		182	2051	2034	17	1.07						0.00					0.00	5.00	0.68	7.64	0.45	2.31																
G.2 - Slope Below SW Quad of Emp House #1	LDR - 1		460	2062	1951	111	1.52						0.00					0.00	5.00	0.30	7.64	3.64	8.34																

Peak Flows at Junctions

(Per Section 3.4.2 of County Hydrology Manual, 2003)

Peak Flows at Junctions

	Tx	Ix	Qx	A.4 - Natural Slope E. of Stalls	5.00	7.64	Q2	4.27
				A.5 - Caretakers Quarters	5.00	7.64	Q2	2.39
				A.6 - Natural Slope	5.00	7.64	Q2	9.81
				A.3 - S. 1/2 of Barn and Large Por. Of DW	9.81	4.95	Q2	6.50
				A.2 - Stalls & 1/2 of Barn	15.99	3.61	Q2	3.23

		Q			Q
Qt1	5.00	20.79	Q	Tc	
Qt2	5.00	20.79			
Qt3	9.81	20.79			
Qt4	9.81	19.14			
Qt5	15.99	15.75			
		20.79			5.00

	Tx	Ix	Qx	D.1 - East 1/2 of Main House	5.00	7.64	Q1	1.80
				D.2 - Cabana and Pool	5.00	7.64	Q2	3.06
				D.4 - Slope Below Pool & Main House	5.00	7.64	Q2	4.91
				D.3 - West 1/2 of Emp #1	6.92	6.20	Q2	1.39

		Q			Q
Qt1	5.00	5.86	Q	Tc	
Qt2	5.00	5.86			
Qt3	5.00	6.25			
Qt4	6.92	9.32			
		9.32			6.92

	Tx	Ix	Qx	F.1 - S. Central Section of Emp #1	5.00	7.64	Q1	0.95
				F.2 - Slope below S. Central Sec. of Emp #1	5.00	7.64	Q1	1.95

		Q			Q
Qt1	5.00	2.90	Q	Tc	
Qt2	5.00	2.90			
		2.90			5.00

		Q			Q
Qt1	5.00	5.70	Q	Tc	
Qt2	9.81	8.05			
		8.05			9.81

	Tx	Ix	Qx	B.1 - Nat. Slope ab	5.00	7.64	Q2	1.11
				B.2 - Driveway Se	5.00	7.64	Q2	2.58
				B.4 - Slope below	5.00	7.64	Q2	8.43
				B.3 - Por of DW ne	12.87	4.15	Q2	2.76

		Q			Q
Qt1	5.00	4.76	Q	Tc	
Qt2	5.00	4.76			
Qt3	5.00	6.45			
Qt4	12.87	9.34			
		9.34			12.87

	Tx	Ix	Qx	E.1 - Driveway to	5.00	7.64	Q2	2.68
				E.4 - Pasture area	5.00	7.64	Q2	6.96
				E.2 - Bottom of Dv	9.74	4.97	Q2	0.98
				E.3 - Portion of hc	13.00	4.13	Q2	0.97

		Q			Q
Qt1	5.00	10.01	Q	Tc	
Qt2	5.00	10.01			
Qt3	9.74	7.24			
Qt4	13.00	6.99			
		10.01			5.00

	Tx	Ix	Qx	G.1 - SW Quadran	5.00	7.64	Q1	2.31
				G.2 - Slope Below	5.00	7.64	Q1	8.34

		Q			Q
Qt1	5.00	10.65	Q	Tc	
Qt2	5.00	10.65			
		10.65			5.00

	Tx	Ix	Qx	A.5 - Caretakers Q	5.00	7.64	Q1	2.39
				A.3 - S. 1/2 of Barn	9.81	4.95	Q1	6.50

		Q			Q
Qt1	5.00	5.70	Q	Tc	
Qt2	9.81	8.05			
		8.05			9.81

$$Q_{T1} - Q_1 + \frac{I_1}{T_1} Q_1 + \frac{I_2}{T_2} Q_2$$

$$Q_{T1} - Q_1 + \frac{I_1}{T_1} Q_1 + \frac{I_2}{T_2} Q_2$$

$$Q_{T1} - Q_1 + \frac{I_1}{T_1} Q_1 + \frac{I_2}{T_2} Q_2$$

inappropriate fluctuation in downstream flows in some cases.

This equation is from $Q = \pi(CA)I = \pi(CA)(7.44 P/T_{c_{645}})$ and solving for T_c . The advantage in this option is that the T_c is consistent with the peak flow Q , and avoids

Note #3: . An optional method of determining the T_c is to use the equation $T_c = [(\pi(CA)(7.44 P)/Q)]^{1.35}$

Note #2: . In the upstream part of a watershed, a conservative computation is acceptable. When the times of concentration (T_c 's) are relatively close in magnitude (within 10%), use the shorter T_c for the intensity and the equation $Q = \pi(CA)I$.

This can be verified by using the junction equation above. Let Q_1 , T_1 , and $I_1 = 0$. When T_1 and T_2 are the same, I_1 and I_2 are also the same, and T_1/T_2 and I_1/I_2 are 1. T_1/T_2 and I_1/I_2 are cancelled from the equations. At this point, $Q_{T1} = Q_{T2} = Q_1 + Q_2$.

$$Q_p = Q_1 + Q_2; \text{ when } T_1 = T_2; \text{ and } T_c = T_1 = T_2$$

tributary flows may be added to obtain the Q_p .

Note #1: . At a junction of two independent drainage systems that have the same T_c , the

This equation may be expanded for a junction of more than three independent drainage systems using the same concept. The concept is that when Q from a selected subarea (e.g., Q_1) is combined with Q from another subarea with a shorter T_c (e.g., Q_2), the Q from the subarea with the shorter T_c is reduced by the ratio of the T_c 's (T_2/T_1); and when Q from a selected subarea (e.g., Q_2) is combined with Q from another subarea with a longer T_c (e.g., Q_1), the Q from the subarea with the longer T_c is reduced by the ratio of the T_c 's (T_1/T_2).

Calculate Q_{T1} , Q_{T2} , and Q_{T3} . Select the largest Q and use the T_c associated with that Q for further calculations (see the three Notes for options). If the largest calculated Q 's are equal (e.g., $Q_{T1} = Q_{T2} > Q_{T3}$), use the shorter of the T_c 's associated with that Q .

Peak Flows at Junctions

MITIGATED Peak Flows at Junctions

Area D (POC-4)				
Tx		Ix	Qx	
D.1 - East 1/2 of Main House	5.00	7.64	Q1	0.01
D.2 - Cabana and Pool	5.00	7.64	Q2	0.02
D.4 - Slope Below Pool & Main House	5.00	7.64	Q2	4.91
D.3 - West 1/2 of Emp #1	6.92	6.20	Q2	0.01

Q				
Q1	5.00	0.04	5.00	
Q2	5.00	0.04	5.00	
Q3	5.00	0.04		
Q4	6.92	4.02		
Q		4.02		

Area F (POC-6)				
Tx		Ix	Qx	
F.1 - S. Central Section of Emp #1	5.00	7.64	Q1	0.01
F.2 - Slope below S. Central Sec. of Emp #1	5.00	7.64	Q1	1.95

Q				
Q1	5.00	1.96	5.00	
Q2	5.00	1.96		
Q		1.96		

Area E (POC-5)				
Tx		Ix	Qx	
E.1 - Driveway to Main house	5.00	7.64	Q2	2.68
E.2 - Bottom of DW near cabana	9.74	4.97	Q2	0.98
E.3 - Portion of house #1 & Shop	13.00	4.13	Q2	0.97

Q				
Q1	5.00	3.56	5.00	
Q2	9.74	3.45		
Q3	13.00	3.23		
Q		3.56		

Area E (POC-5)				
Tx		Ix	Qx	
E.1 - Driveway to	5.00	7.64	Q2	0.03
E.4 - Pasture area	5.00	7.64	Q2	6.96
E.2 - Bottom of DW	9.74	4.97	Q2	0.01
E.3 - Portion of ho	13.00	4.13	Q2	0.01

Q				
Q1	5.00	6.99	5.00	
Q2	5.00	6.99		
Q3	9.74	4.56		
Q4	13.00	3.79		
Q		6.99		

Area G (POC-7)				
Tx		Ix	Qx	
G.1 - SW Quadrant	5.00	7.64	Q1	0.01
G.2 - Slope Below	5.00	7.64	Q1	8.34

Q				
Q1	5.00	8.35	5.00	
Q2	5.00	8.35		
Q		8.35		

Area E (POC-5)				
Tx		Ix	Qx	
B.1 - Nat. Slope	5.00	7.64	Q2	1.11
B.2 - Driveway	5.00	7.64	Q2	2.58
B.3 - Por of DW	12.87	4.15	Q2	2.76

Q				
Q1	5.00	4.76	5.00	
Q2	5.00	4.76		
Q3	12.87	4.76		
Q		4.76		

$$Q_p = Q_1 + Q_2; \text{ when } T_1 = T_2; \text{ and } T_0 = T_1 = T_2$$

This can be verified by using the junction equation above. Let Q_1 , T_1 , and $I_1 = 0$. When T_1 and T_2 are the same, I_1 and I_2 are also the same, and T_1/T_2 and $I_2/I_1 = 1$. T_1/T_2 and I_2/I_1 are cancelled from the equations. At this point, $Q_{11} = Q_{12} = Q_1 + Q_2$.

Note #2: In the upstream part of a watershed, a conservative computation is acceptable. When the times of concentration (T_c 's) are relatively close in magnitude (within 10%), use the shorter T_c for the intensity and the equation $Q = \Sigma(CA)I$.

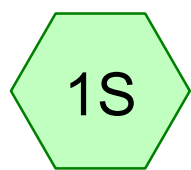
Note #3: An optional method of determining the T_c is to use the equation $T_c = [(\Sigma(CA)^{.744} P^0)/Q]^{1.45}$

This equation is from $Q = \Sigma(CA)I = \Sigma(CA)(7.44 P^0/T_c^{.45})$ and solving for T_c . The advantage in this option is that the T_c is consistent with the peak flow Q , and avoids inappropriate fluctuation in downstream flows in some cases.

Calculate Q_{11} , Q_{12} , and Q_{13} . Select the largest Q and use the T_c associated with that Q for further calculations (see the three Notes for options). If the largest calculated Q 's are equal (e.g., $Q_{11} = Q_{12} > Q_{13}$), use the shorter of the T_c 's associated with that Q .

This equation may be expanded for a junction of more than three independent drainage systems using the same concept. The concept is that when Q from a selected subarea (e.g., Q_2) is combined with Q from another subarea with a shorter T_c (e.g., Q_1), the Q from the subarea with the shorter T_c is reduced by the ratio of the T_c 's (I_2/I_1); and when Q from a selected subarea (e.g., Q_2) is combined with Q from another subarea with a longer T_c (e.g., Q_3), the Q from the subarea with the longer T_c is reduced by the ratio of the T_c 's (T_2/T_3).

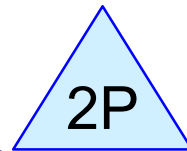
Note #1: At a junction of two independent drainage systems that have the same T_c , the tributary flows may be added to obtain the Q_p .



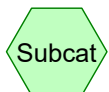
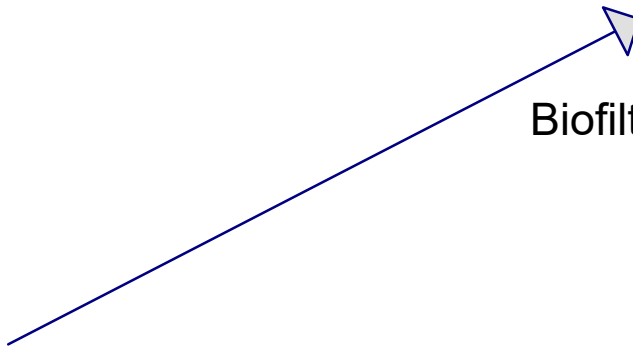
Basin A.3



Basin A.5



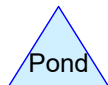
Biofiltration Area A.3



Subcat



Reach



Pond



Link

Routing Diagram for Secret Hills - IMP A.3 & A.5

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Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
81,496	0.30	<50% Grass cover, Poor, HSG C (1S, 3S)
53,422	0.87	Single Family Residential Development, HSG C (1S, 3S)
134,918	0.53	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
134,918	HSG C	1S, 3S
0	HSG D	
0	Other	
134,918		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	81,496	0	0	81,496	<50% Grass cover, Poor
0	0	53,422	0	0	53,422	Single Family Residential Development
0	0	134,918	0	0	134,918	TOTAL AREA

Secret Hills - IMP A.3 & A.5

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Defined 11 rainfall events from CA-San Diego IDF

Secret Hills - IMP A.3 & A.5

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CA-San Diego P6=2.9 Duration=9.81 min, Inten=4.95 in/hr

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: Basin A.3

Runoff Area=104,393 sf 0.00% Impervious Runoff Depth=0.44"
Tc=9.81 min C=0.55 Runoff=6.45 cfs 3,869 cf

Subcatchment3S: Basin A.5

Runoff Area=30,525 sf 0.00% Impervious Runoff Depth=0.36"
Tc=5.00 min C=0.45 Runoff=1.57 cfs 925 cf

Pond 2P: Biofiltration Area A.3

Peak Elev=3.48' Storage=4,702 cf Inflow=8.01 cfs 4,794 cf
Outflow=0.13 cfs 4,151 cf

Total Runoff Area = 134,918 sf Runoff Volume = 4,794 cf Average Runoff Depth = 0.43"
100.00% Pervious = 134,918 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Basin A.3

Runoff = 6.45 cfs @ 0.16 hrs, Volume= 3,869 cf, Depth= 0.44"

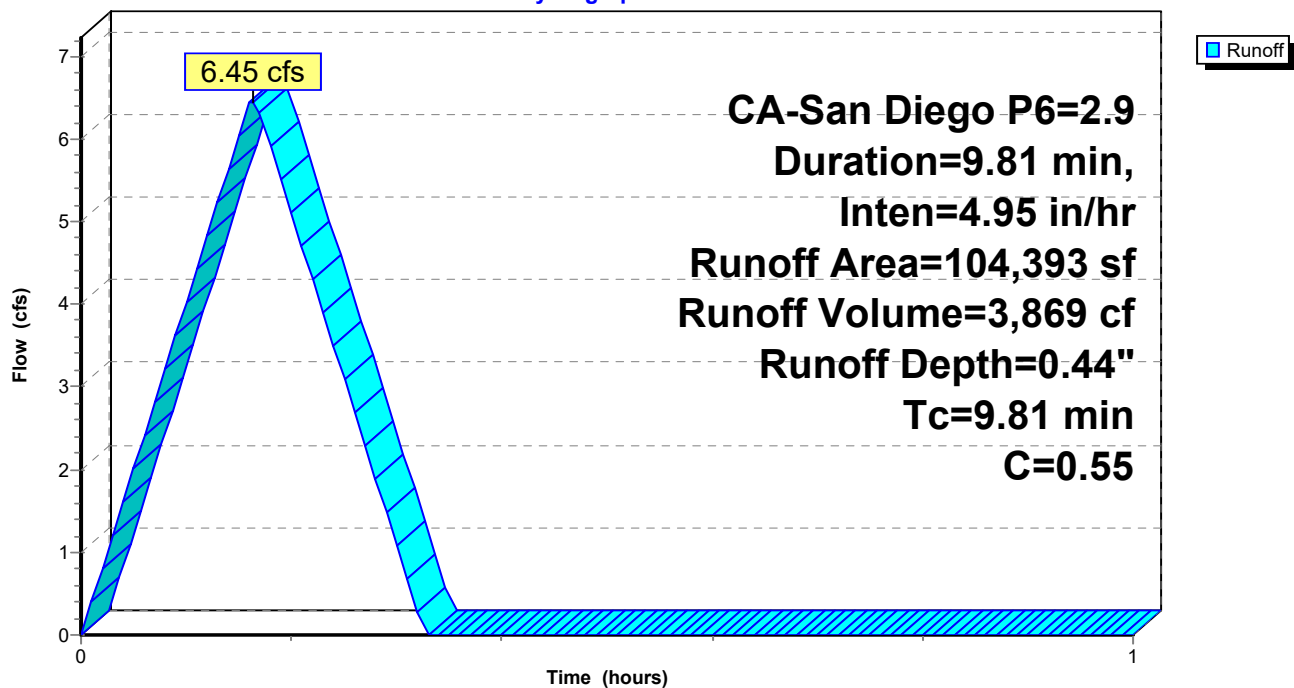
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CA-San Diego P6=2.9 Duration=9.81 min, Inten=4.95 in/hr

Area (sf)	C	Description
45,203	0.87	Single Family Residential Development, HSG C
55,885	0.30	<50% Grass cover, Poor, HSG C
3,305	0.30	<50% Grass cover, Poor, HSG C
104,393	0.55	Weighted Average
104,393		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.81					Direct Entry, Tc from RM

Subcatchment 1S: Basin A.3

Hydrograph



Hydrograph for Subcatchment 1S: Basin A.3

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	4.02	4.70	0.00	9.30	0.00	13.90	0.00
0.20	5.11	4.80	0.00	9.40	0.00	14.00	0.00
0.30	1.09	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

Hydrograph for Subcatchment 1S: Basin A.3 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

Summary for Subcatchment 3S: Basin A.5

Runoff = 1.57 cfs @ 0.09 hrs, Volume= 925 cf, Depth= 0.36"

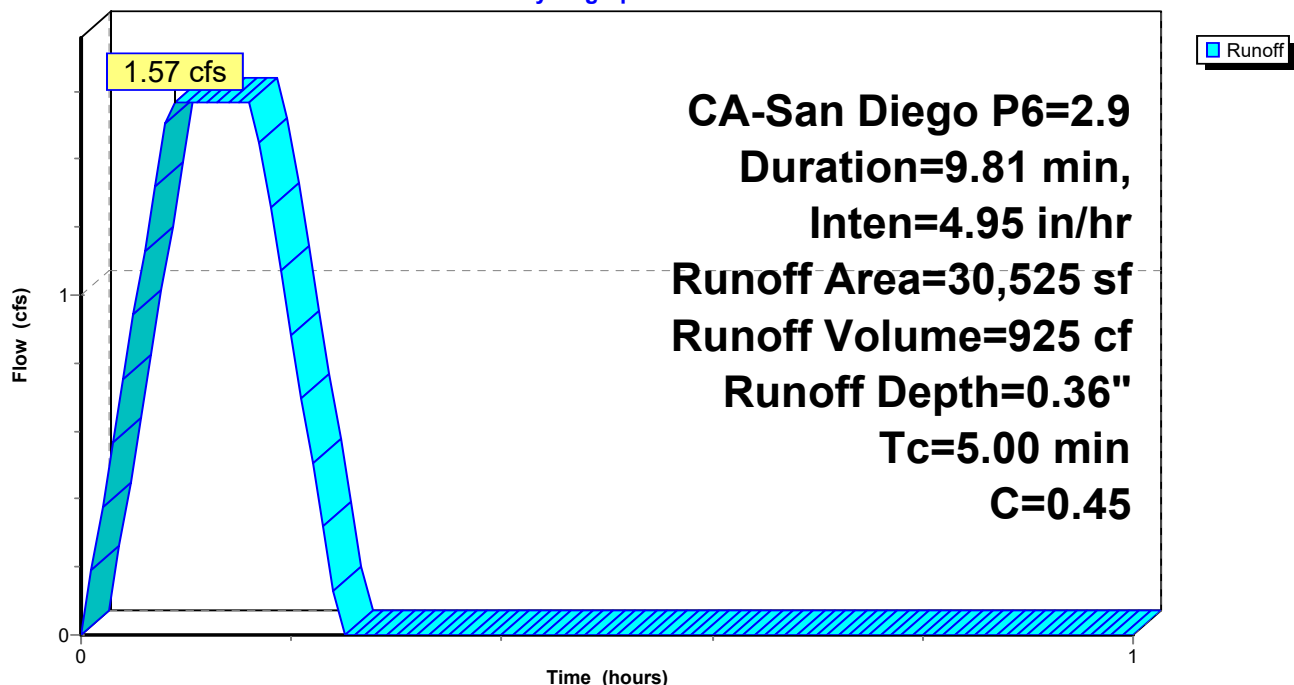
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CA-San Diego P6=2.9 Duration=9.81 min, Inten=4.95 in/hr

Area (sf)	C	Description
8,219	0.87	Single Family Residential Development, HSG C
21,631	0.30	<50% Grass cover, Poor, HSG C
675	0.30	<50% Grass cover, Poor, HSG C
30,525	0.45	Weighted Average
30,525		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry, Tc from RM

Subcatchment 3S: Basin A.5

Hydrograph



Hydrograph for Subcatchment 3S: Basin A.5

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	1.57	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.88	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.00	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

Hydrograph for Subcatchment 3S: Basin A.5 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

Summary for Pond 2P: Biofiltration Area A.3

Inflow Area = 134,918 sf, 0.00% Impervious, Inflow Depth = 0.43" for P6=2.9 event
 Inflow = 8.01 cfs @ 0.16 hrs, Volume= 4,794 cf
 Outflow = 0.13 cfs @ 0.33 hrs, Volume= 4,151 cf, Atten= 98%, Lag= 9.9 min
 Primary = 0.13 cfs @ 0.33 hrs, Volume= 4,151 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.48' @ 0.33 hrs Storage= 4,702 cf

Plug-Flow detention time= 332.1 min calculated for 4,151 cf (87% of inflow)
 Center-of-Mass det. time= 331.1 min (340.4 - 9.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	7,328 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	1,879	1,879
3.00	1,187	3,066
3.17	541	3,607
3.33	563	4,170
3.50	586	4,756
3.67	608	5,364
3.83	631	5,995
4.00	655	6,650
4.17	678	7,328

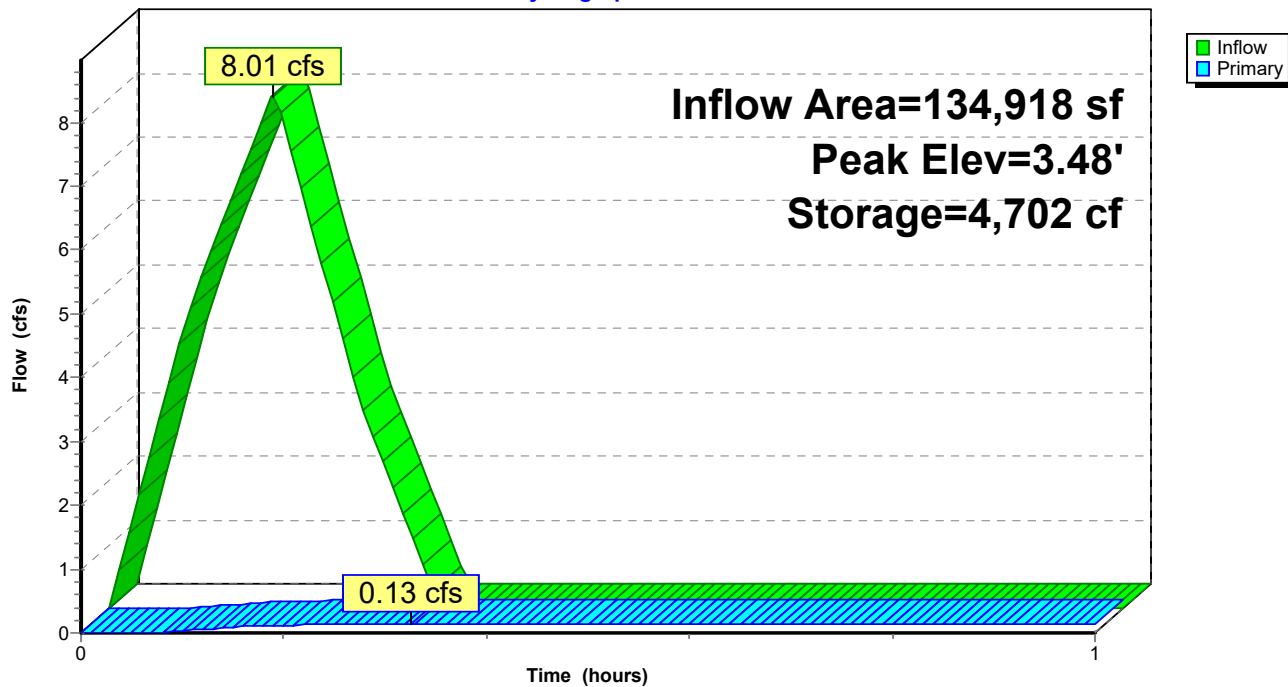
Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	1.7" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.13 cfs @ 0.33 hrs HW=3.48' (Free Discharge)

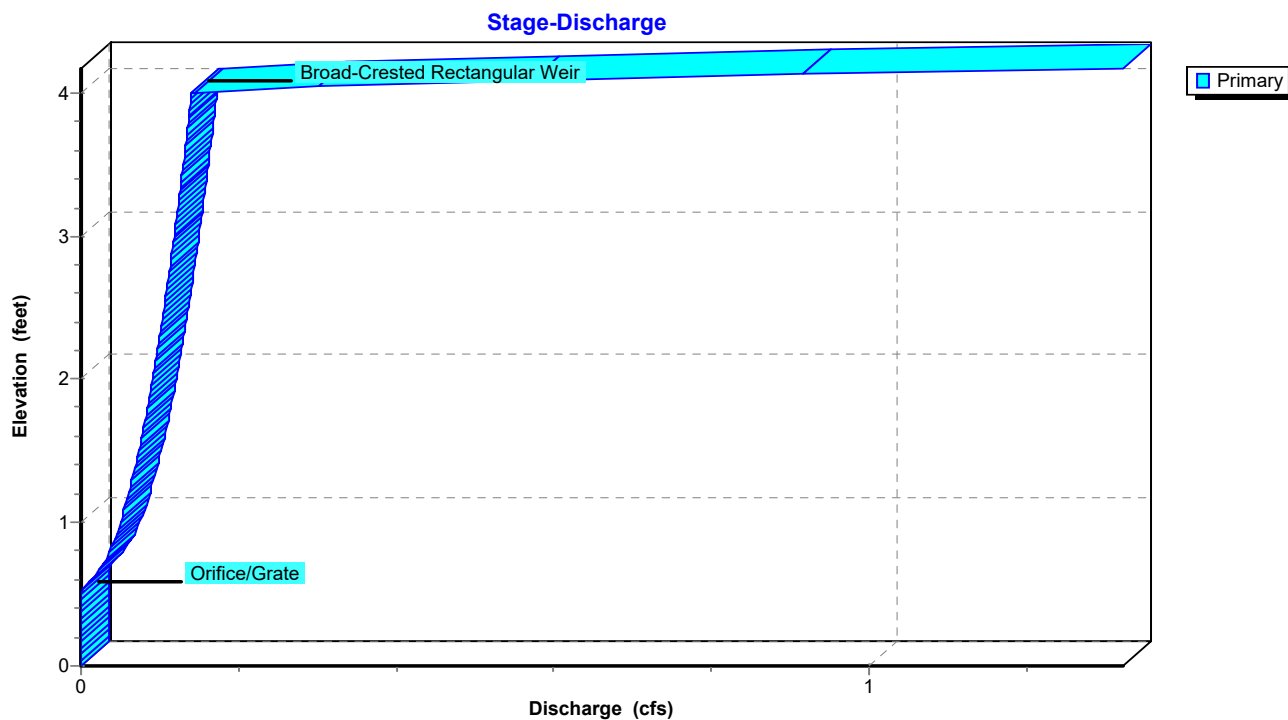
1=Orifice/Grate (Orifice Controls 0.13 cfs @ 8.22 fps)
 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 2P: Biofiltration Area A.3

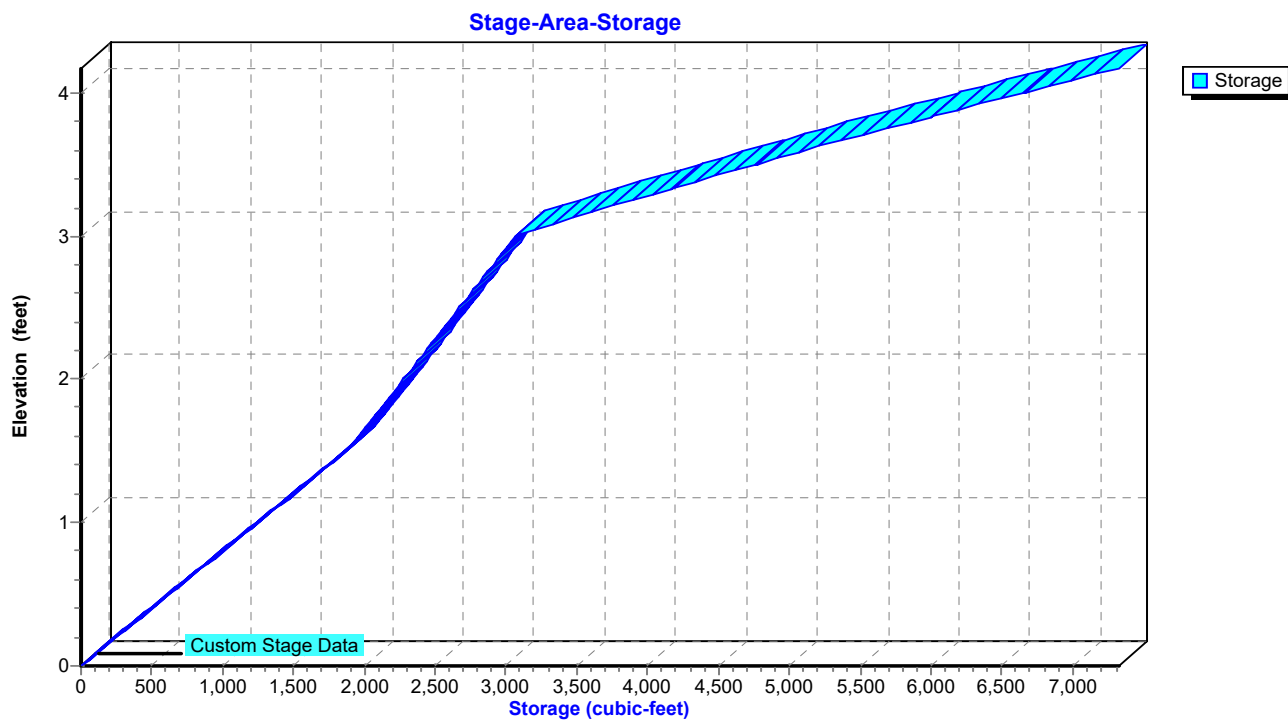
Hydrograph



Pond 2P: Biofiltration Area A.3



Pond 2P: Biofiltration Area A.3



Hydrograph for Pond 2P: Biofiltration Area A.3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	5.60	1,052	0.84	0.04
0.20	5.99	3,517	3.14	0.12
0.30	1.09	4,661	3.47	0.13
0.40	0.00	4,669	3.47	0.13
0.50	0.00	4,622	3.46	0.13
0.60	0.00	4,576	3.45	0.13
0.70	0.00	4,530	3.43	0.13
0.80	0.00	4,484	3.42	0.13
0.90	0.00	4,438	3.41	0.13
1.00	0.00	4,392	3.39	0.13
1.10	0.00	4,346	3.38	0.13
1.20	0.00	4,300	3.37	0.13
1.30	0.00	4,254	3.35	0.13
1.40	0.00	4,209	3.34	0.13
1.50	0.00	4,163	3.33	0.13
1.60	0.00	4,118	3.32	0.13
1.70	0.00	4,073	3.30	0.13
1.80	0.00	4,028	3.29	0.13
1.90	0.00	3,983	3.28	0.12
2.00	0.00	3,938	3.26	0.12
2.10	0.00	3,893	3.25	0.12
2.20	0.00	3,848	3.24	0.12
2.30	0.00	3,804	3.23	0.12
2.40	0.00	3,759	3.21	0.12
2.50	0.00	3,715	3.20	0.12
2.60	0.00	3,671	3.19	0.12
2.70	0.00	3,627	3.18	0.12
2.80	0.00	3,583	3.16	0.12
2.90	0.00	3,539	3.15	0.12
3.00	0.00	3,495	3.13	0.12
3.10	0.00	3,451	3.12	0.12
3.20	0.00	3,408	3.11	0.12
3.30	0.00	3,364	3.09	0.12
3.40	0.00	3,321	3.08	0.12
3.50	0.00	3,278	3.07	0.12
3.60	0.00	3,234	3.05	0.12
3.70	0.00	3,191	3.04	0.12
3.80	0.00	3,149	3.03	0.12
3.90	0.00	3,106	3.01	0.12
4.00	0.00	3,063	3.00	0.12
4.10	0.00	3,021	2.94	0.12
4.20	0.00	2,979	2.89	0.12
4.30	0.00	2,938	2.84	0.11
4.40	0.00	2,897	2.79	0.11
4.50	0.00	2,856	2.74	0.11

Hydrograph for Pond 2P: Biofiltration Area A.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	2,816	2.68	0.11
4.70	0.00	2,777	2.63	0.11
4.80	0.00	2,738	2.59	0.11
4.90	0.00	2,699	2.54	0.11
5.00	0.00	2,661	2.49	0.11
5.10	0.00	2,624	2.44	0.10
5.20	0.00	2,587	2.39	0.10
5.30	0.00	2,550	2.35	0.10
5.40	0.00	2,514	2.30	0.10
5.50	0.00	2,478	2.26	0.10
5.60	0.00	2,443	2.21	0.10
5.70	0.00	2,408	2.17	0.10
5.80	0.00	2,374	2.13	0.09
5.90	0.00	2,340	2.08	0.09
6.00	0.00	2,306	2.04	0.09
6.10	0.00	2,274	2.00	0.09
6.20	0.00	2,241	1.96	0.09
6.30	0.00	2,209	1.92	0.09
6.40	0.00	2,178	1.88	0.09
6.50	0.00	2,147	1.84	0.09
6.60	0.00	2,116	1.80	0.08
6.70	0.00	2,086	1.76	0.08
6.80	0.00	2,057	1.72	0.08
6.90	0.00	2,028	1.69	0.08
7.00	0.00	1,999	1.65	0.08
7.10	0.00	1,971	1.62	0.08
7.20	0.00	1,943	1.58	0.08
7.30	0.00	1,916	1.55	0.07
7.40	0.00	1,889	1.51	0.07
7.50	0.00	1,863	1.49	0.07
7.60	0.00	1,837	1.47	0.07
7.70	0.00	1,811	1.45	0.07
7.80	0.00	1,786	1.43	0.07
7.90	0.00	1,760	1.41	0.07
8.00	0.00	1,736	1.39	0.07
8.10	0.00	1,711	1.37	0.07
8.20	0.00	1,687	1.35	0.07
8.30	0.00	1,663	1.33	0.07
8.40	0.00	1,639	1.31	0.07
8.50	0.00	1,616	1.29	0.06
8.60	0.00	1,593	1.27	0.06
8.70	0.00	1,570	1.25	0.06
8.80	0.00	1,548	1.24	0.06
8.90	0.00	1,526	1.22	0.06
9.00	0.00	1,504	1.20	0.06
9.10	0.00	1,482	1.18	0.06

Hydrograph for Pond 2P: Biofiltration Area A.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	1,461	1.17	0.06
9.30	0.00	1,440	1.15	0.06
9.40	0.00	1,420	1.13	0.06
9.50	0.00	1,399	1.12	0.06
9.60	0.00	1,379	1.10	0.06
9.70	0.00	1,360	1.09	0.05
9.80	0.00	1,340	1.07	0.05
9.90	0.00	1,321	1.05	0.05
10.00	0.00	1,302	1.04	0.05
10.10	0.00	1,284	1.02	0.05
10.20	0.00	1,265	1.01	0.05
10.30	0.00	1,247	1.00	0.05
10.40	0.00	1,230	0.98	0.05
10.50	0.00	1,212	0.97	0.05
10.60	0.00	1,195	0.95	0.05
10.70	0.00	1,178	0.94	0.05
10.80	0.00	1,162	0.93	0.05
10.90	0.00	1,146	0.91	0.04
11.00	0.00	1,130	0.90	0.04
11.10	0.00	1,114	0.89	0.04
11.20	0.00	1,099	0.88	0.04
11.30	0.00	1,084	0.87	0.04
11.40	0.00	1,069	0.85	0.04
11.50	0.00	1,055	0.84	0.04
11.60	0.00	1,041	0.83	0.04
11.70	0.00	1,027	0.82	0.04
11.80	0.00	1,014	0.81	0.04
11.90	0.00	1,001	0.80	0.04
12.00	0.00	988	0.79	0.04
12.10	0.00	975	0.78	0.03
12.20	0.00	963	0.77	0.03
12.30	0.00	951	0.76	0.03
12.40	0.00	939	0.75	0.03
12.50	0.00	928	0.74	0.03
12.60	0.00	917	0.73	0.03
12.70	0.00	906	0.72	0.03
12.80	0.00	895	0.71	0.03
12.90	0.00	885	0.71	0.03
13.00	0.00	875	0.70	0.03
13.10	0.00	866	0.69	0.03
13.20	0.00	856	0.68	0.03
13.30	0.00	847	0.68	0.02
13.40	0.00	839	0.67	0.02
13.50	0.00	830	0.66	0.02
13.60	0.00	822	0.66	0.02
13.70	0.00	814	0.65	0.02

Hydrograph for Pond 2P: Biofiltration Area A.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	807	0.64	0.02
13.90	0.00	800	0.64	0.02
14.00	0.00	793	0.63	0.02
14.10	0.00	786	0.63	0.02
14.20	0.00	780	0.62	0.02
14.30	0.00	774	0.62	0.02
14.40	0.00	768	0.61	0.02
14.50	0.00	763	0.61	0.01
14.60	0.00	758	0.60	0.01
14.70	0.00	753	0.60	0.01
14.80	0.00	748	0.60	0.01
14.90	0.00	744	0.59	0.01
15.00	0.00	740	0.59	0.01
15.10	0.00	736	0.59	0.01
15.20	0.00	732	0.58	0.01
15.30	0.00	729	0.58	0.01
15.40	0.00	726	0.58	0.01
15.50	0.00	723	0.58	0.01
15.60	0.00	720	0.57	0.01
15.70	0.00	717	0.57	0.01
15.80	0.00	714	0.57	0.01
15.90	0.00	712	0.57	0.01
16.00	0.00	709	0.57	0.01
16.10	0.00	707	0.56	0.01
16.20	0.00	705	0.56	0.01
16.30	0.00	702	0.56	0.01
16.40	0.00	700	0.56	0.01
16.50	0.00	698	0.56	0.01
16.60	0.00	697	0.56	0.01
16.70	0.00	695	0.55	0.00
16.80	0.00	693	0.55	0.00
16.90	0.00	692	0.55	0.00
17.00	0.00	690	0.55	0.00
17.10	0.00	689	0.55	0.00
17.20	0.00	687	0.55	0.00
17.30	0.00	686	0.55	0.00
17.40	0.00	685	0.55	0.00
17.50	0.00	683	0.55	0.00
17.60	0.00	682	0.54	0.00
17.70	0.00	681	0.54	0.00
17.80	0.00	680	0.54	0.00
17.90	0.00	679	0.54	0.00
18.00	0.00	678	0.54	0.00
18.10	0.00	677	0.54	0.00
18.20	0.00	676	0.54	0.00
18.30	0.00	675	0.54	0.00

Hydrograph for Pond 2P: Biofiltration Area A.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	674	0.54	0.00
18.50	0.00	673	0.54	0.00
18.60	0.00	673	0.54	0.00
18.70	0.00	672	0.54	0.00
18.80	0.00	671	0.54	0.00
18.90	0.00	670	0.53	0.00
19.00	0.00	669	0.53	0.00
19.10	0.00	668	0.53	0.00
19.20	0.00	668	0.53	0.00
19.30	0.00	667	0.53	0.00
19.40	0.00	666	0.53	0.00
19.50	0.00	665	0.53	0.00
19.60	0.00	665	0.53	0.00
19.70	0.00	664	0.53	0.00
19.80	0.00	663	0.53	0.00
19.90	0.00	663	0.53	0.00
20.00	0.00	662	0.53	0.00
20.10	0.00	661	0.53	0.00
20.20	0.00	661	0.53	0.00
20.30	0.00	660	0.53	0.00
20.40	0.00	659	0.53	0.00
20.50	0.00	659	0.53	0.00
20.60	0.00	658	0.53	0.00
20.70	0.00	658	0.52	0.00
20.80	0.00	657	0.52	0.00
20.90	0.00	656	0.52	0.00
21.00	0.00	656	0.52	0.00
21.10	0.00	655	0.52	0.00
21.20	0.00	655	0.52	0.00
21.30	0.00	654	0.52	0.00
21.40	0.00	654	0.52	0.00
21.50	0.00	653	0.52	0.00
21.60	0.00	653	0.52	0.00
21.70	0.00	652	0.52	0.00
21.80	0.00	652	0.52	0.00
21.90	0.00	651	0.52	0.00
22.00	0.00	651	0.52	0.00
22.10	0.00	650	0.52	0.00
22.20	0.00	650	0.52	0.00
22.30	0.00	650	0.52	0.00
22.40	0.00	649	0.52	0.00
22.50	0.00	649	0.52	0.00
22.60	0.00	648	0.52	0.00
22.70	0.00	648	0.52	0.00
22.80	0.00	647	0.52	0.00
22.90	0.00	647	0.52	0.00

Hydrograph for Pond 2P: Biofiltration Area A.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	647	0.52	0.00
23.10	0.00	646	0.52	0.00
23.20	0.00	646	0.52	0.00
23.30	0.00	646	0.52	0.00
23.40	0.00	645	0.52	0.00
23.50	0.00	645	0.51	0.00
23.60	0.00	645	0.51	0.00
23.70	0.00	644	0.51	0.00
23.80	0.00	644	0.51	0.00
23.90	0.00	644	0.51	0.00
24.00	0.00	643	0.51	0.00

Stage-Discharge for Pond 2P: Biofiltration Area A.3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.10
0.05	0.00	2.35	0.10
0.10	0.00	2.40	0.10
0.15	0.00	2.45	0.10
0.20	0.00	2.50	0.11
0.25	0.00	2.55	0.11
0.30	0.00	2.60	0.11
0.35	0.00	2.65	0.11
0.40	0.00	2.70	0.11
0.45	0.00	2.75	0.11
0.50	0.00	2.80	0.11
0.55	0.00	2.85	0.11
0.60	0.01	2.90	0.12
0.65	0.02	2.95	0.12
0.70	0.03	3.00	0.12
0.75	0.03	3.05	0.12
0.80	0.04	3.10	0.12
0.85	0.04	3.15	0.12
0.90	0.04	3.20	0.12
0.95	0.05	3.25	0.12
1.00	0.05	3.30	0.13
1.05	0.05	3.35	0.13
1.10	0.06	3.40	0.13
1.15	0.06	3.45	0.13
1.20	0.06	3.50	0.13
1.25	0.06	3.55	0.13
1.30	0.06	3.60	0.13
1.35	0.07	3.65	0.13
1.40	0.07	3.70	0.13
1.45	0.07	3.75	0.14
1.50	0.07	3.80	0.14
1.55	0.08	3.85	0.14
1.60	0.08	3.90	0.14
1.65	0.08	3.95	0.14
1.70	0.08	4.00	0.14
1.75	0.08	4.05	0.33
1.80	0.08	4.10	0.67
1.85	0.09	4.15	1.12
1.90	0.09		
1.95	0.09		
2.00	0.09		
2.05	0.09		
2.10	0.09		
2.15	0.10		
2.20	0.10		
2.25	0.10		

Stage-Area-Storage for Pond 2P: Biofiltration Area A.3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	2,512
0.05	63	2.35	2,552
0.10	125	2.40	2,591
0.15	188	2.45	2,631
0.20	251	2.50	2,670
0.25	313	2.55	2,710
0.30	376	2.60	2,749
0.35	438	2.65	2,789
0.40	501	2.70	2,829
0.45	564	2.75	2,868
0.50	626	2.80	2,908
0.55	689	2.85	2,947
0.60	752	2.90	2,987
0.65	814	2.95	3,026
0.70	877	3.00	3,066
0.75	940	3.05	3,225
0.80	1,002	3.10	3,384
0.85	1,065	3.15	3,543
0.90	1,127	3.20	3,713
0.95	1,190	3.25	3,889
1.00	1,253	3.30	4,064
1.05	1,315	3.35	4,239
1.10	1,378	3.40	4,411
1.15	1,441	3.45	4,584
1.20	1,503	3.50	4,756
1.25	1,566	3.55	4,935
1.30	1,628	3.60	5,114
1.35	1,691	3.65	5,292
1.40	1,754	3.70	5,482
1.45	1,816	3.75	5,680
1.50	1,879	3.80	5,877
1.55	1,919	3.85	6,072
1.60	1,958	3.90	6,265
1.65	1,998	3.95	6,457
1.70	2,037	4.00	6,650
1.75	2,077	4.05	6,849
1.80	2,116	4.10	7,049
1.85	2,156	4.15	7,248
1.90	2,196		
1.95	2,235		
2.00	2,275		
2.05	2,314		
2.10	2,354		
2.15	2,393		
2.20	2,433		
2.25	2,473		

Secret Hills - IMP A.3 & A.5

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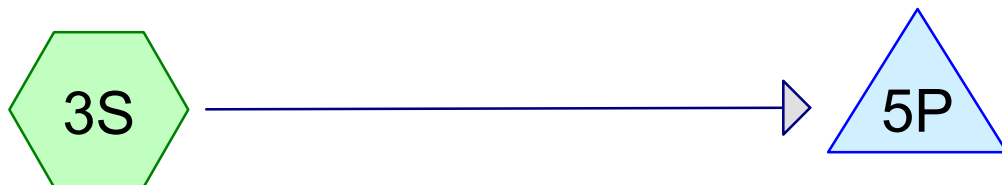
Current Event

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- 7 Subcat 1S: Basin A.3
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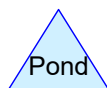
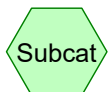
Basin D.1

Biofiltration Area D.1



Basin D.2

Biofiltration Area D.2



Routing Diagram for Secret Hills - Area D IMPs

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Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
10,545.00	0.300	<50% Grass cover, Poor, HSG C (1S, 3S)
1,094.00	0.010	Pool (3S)
28,237.00	0.870	Single Family Residential Development, HSG C (1S, 3S)
39,876.00	0.696	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0.00	HSG A	
0.00	HSG B	
38,782.00	HSG C	1S, 3S
0.00	HSG D	
1,094.00	Other	3S
39,876.00		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0.00	0.00	10,545.00	0.00	0.00	10,545.00	
0.00	0.00	0.00	0.00	1,094.00	1,094.00	
0.00	0.00	28,237.00	0.00	0.00	28,237.00	
0.00	0.00	38,782.00	0.00	1,094.00	39,876.00	

Secret Hills - Area D IMPs

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Defined 11 rainfall events from CA-San Diego IDF

Secret Hills - Area D IMPs

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CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: Basin D.1

Runoff Area=14,648.00 sf 0.00% Impervious Runoff Depth=0.45"
Tc=5.00 min C=0.701 Runoff=1.75 cfs 544 cf

Subcatchment 3S: Basin D.2

Runoff Area=25,228.00 sf 0.00% Impervious Runoff Depth=0.44"
Tc=5.00 min C=0.693 Runoff=2.98 cfs 926 cf

Pond 2P: Biofiltration Area D.1

Peak Elev=3.26' Storage=540 cf Inflow=1.75 cfs 544 cf
Outflow=0.01 cfs 499 cf

Pond 5P: Biofiltration Area D.2

Peak Elev=3.12' Storage=920 cf Inflow=2.98 cfs 926 cf
Outflow=0.02 cfs 755 cf

Total Runoff Area = 39,876.00 sf Runoff Volume = 1,470 cf Average Runoff Depth = 0.44"
100.00% Pervious = 39,876.00 sf 0.00% Impervious = 0.00 sf

Secret Hills - Area D IMPs

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CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

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Summary for Subcatchment 1S: Basin D.1

Runoff = 1.75 cfs @ 0.08 hrs, Volume= 544 cf, Depth= 0.45"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

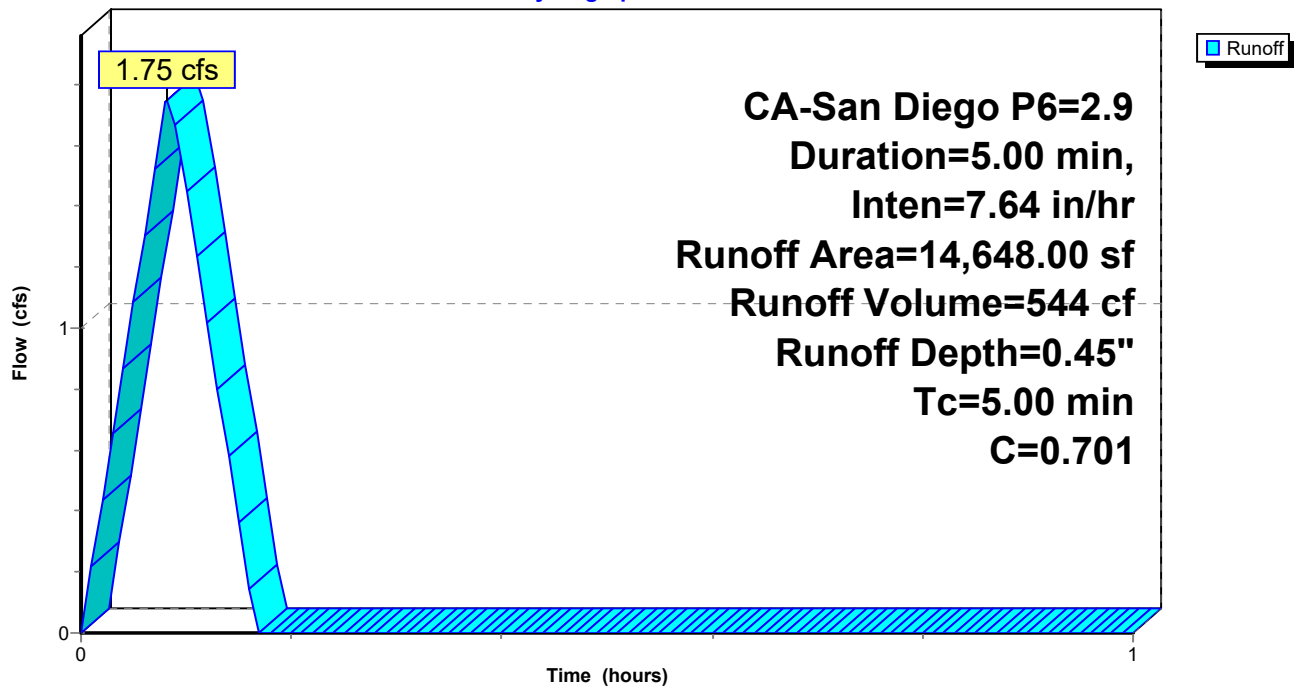
CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

Area (sf)	C	Description
10,305.00	0.870	Single Family Residential Development, HSG C
3,594.00	0.300	<50% Grass cover, Poor, HSG C
749.00	0.300	<50% Grass cover, Poor, HSG C
14,648.00	0.701	Weighted Average
14,648.00		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry, Tc from RM

Subcatchment 1S: Basin D.1

Hydrograph



Hydrograph for Subcatchment 1S: Basin D.1

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	1.45	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.00	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.00	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

Secret Hills - Area D IMPs

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Hydrograph for Subcatchment 1S: Basin D.1 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

Secret Hills - Area D IMPs

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Summary for Subcatchment 3S: Basin D.2

Runoff = 2.98 cfs @ 0.08 hrs, Volume= 926 cf, Depth= 0.44"

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

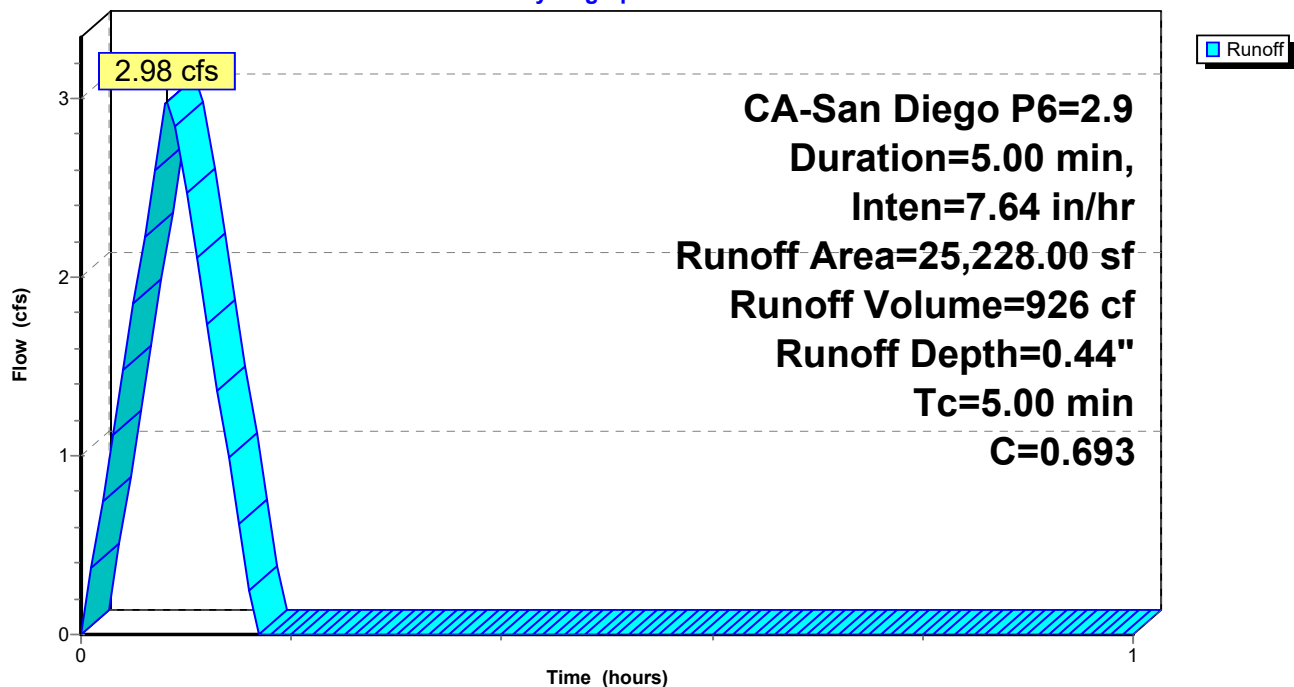
CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

Area (sf)	C	Description
17,932.00	0.870	Single Family Residential Development, HSG C
5,002.00	0.300	<50% Grass cover, Poor, HSG C
1,200.00	0.300	<50% Grass cover, Poor, HSG C
1,094.00	0.010	Pool
25,228.00	0.693	Weighted Average
25,228.00		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry, Tc from RM

Subcatchment 3S: Basin D.2

Hydrograph



Hydrograph for Subcatchment 3S: Basin D.2

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	2.47	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.00	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.00	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

Secret Hills - Area D IMPs

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Hydrograph for Subcatchment 3S: Basin D.2 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

Secret Hills - Area D IMPs

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Summary for Pond 2P: Biofiltration Area D.1

Inflow Area = 14,648.00 sf, 0.00% Impervious, Inflow Depth = 0.45" for P6=2.9 event
 Inflow = 1.75 cfs @ 0.08 hrs, Volume= 544 cf
 Outflow = 0.01 cfs @ 0.17 hrs, Volume= 499 cf, Atten= 99%, Lag= 5.5 min
 Primary = 0.01 cfs @ 0.17 hrs, Volume= 499 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.26' @ 0.17 hrs Storage= 540 cf

Plug-Flow detention time= 469.9 min calculated for 499 cf (92% of inflow)
 Center-of-Mass det. time= 469.6 min (474.6 - 5.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,097 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	253	253
3.00	162	415
3.17	76	491
3.33	83	574
3.50	90	664
3.67	97	761
3.83	104	865
4.00	112	977
4.17	120	1,097

Device	Routing	Invert	Outlet Devices
#1	Primary	0.25'	0.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir
Head (feet) 0.20 0.40 0.60 0.80 1.00			
Coef. (English) 2.80 2.92 3.08 3.30 3.32			

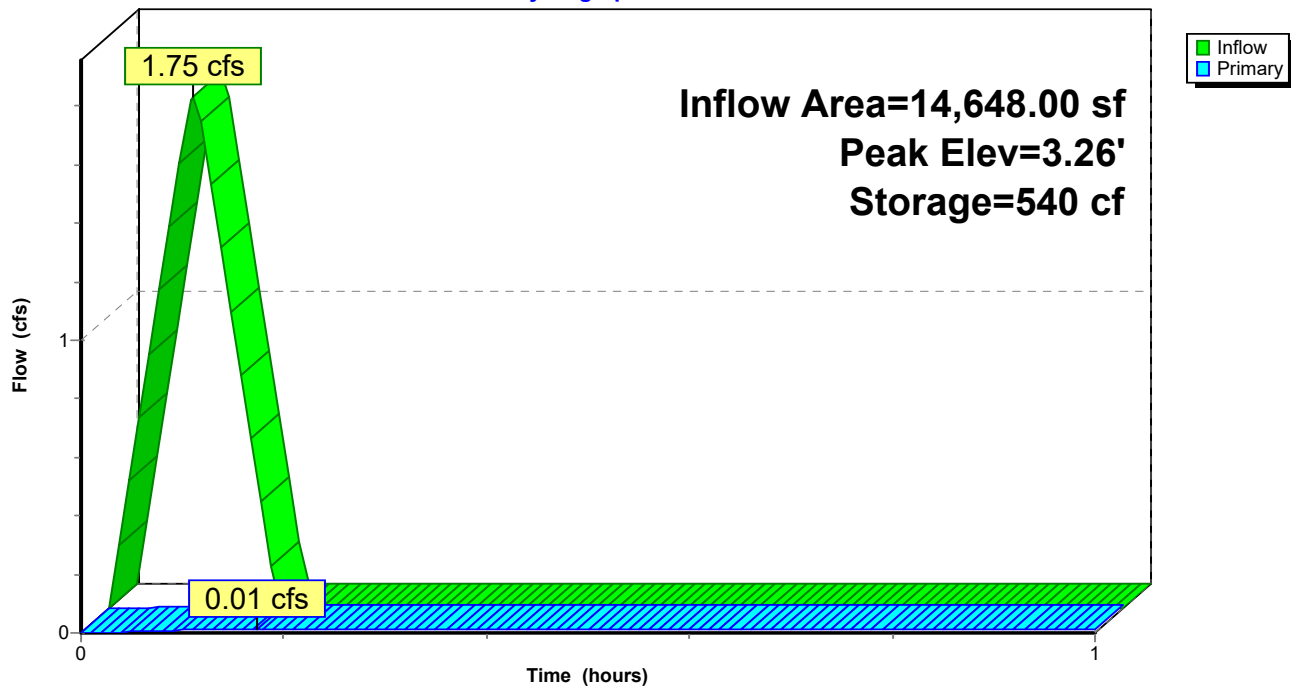
Primary OutFlow Max=0.01 cfs @ 0.17 hrs HW=3.26' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.33 fps)

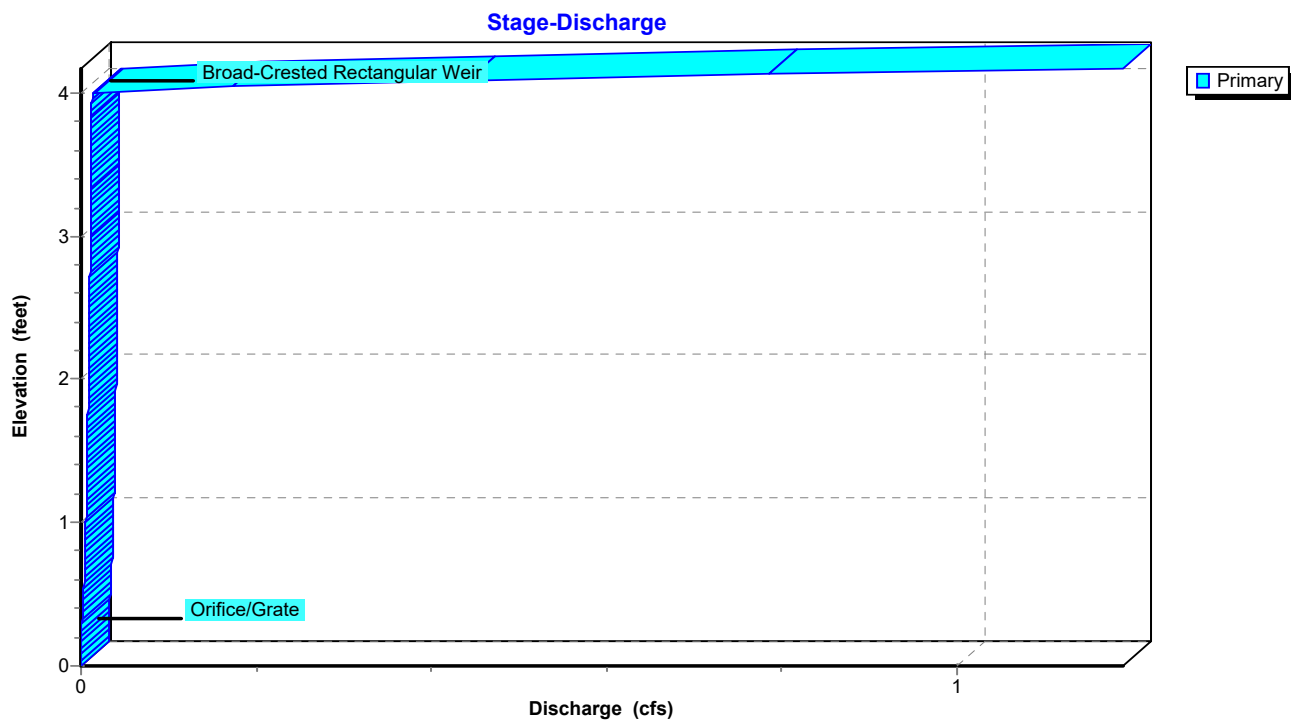
2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 2P: Biofiltration Area D.1

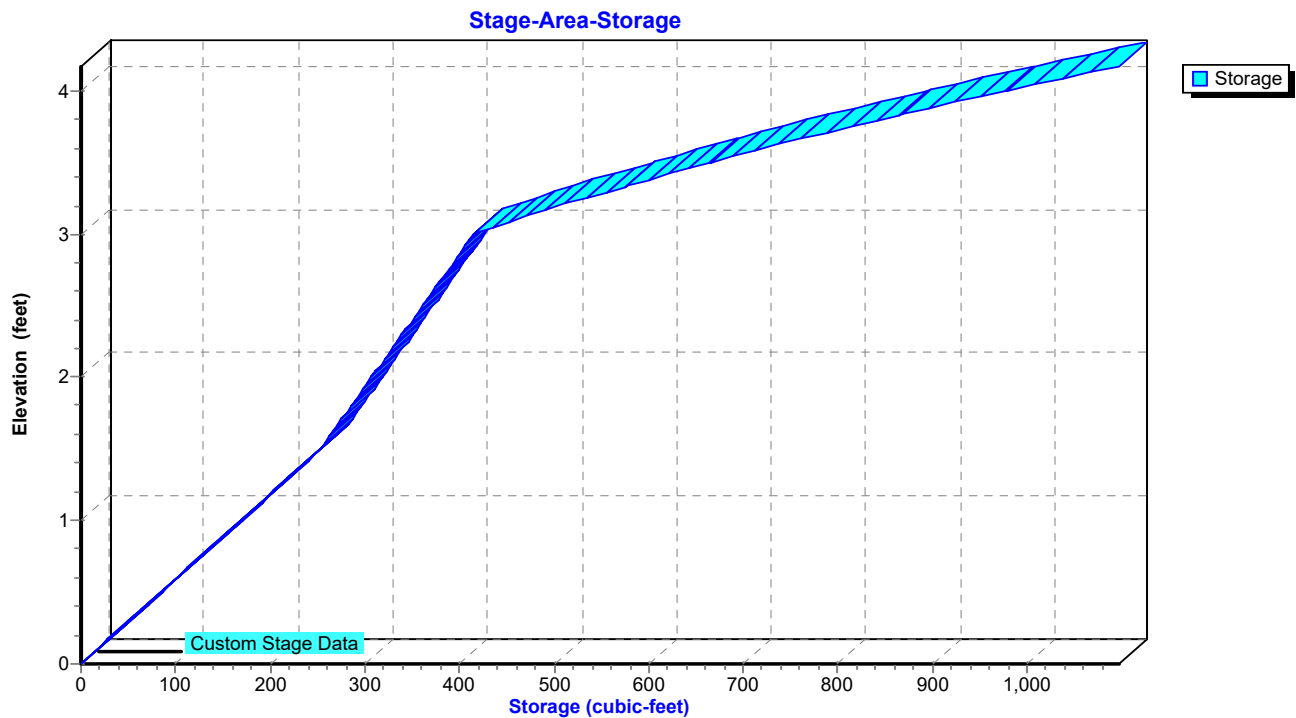
Hydrograph



Pond 2P: Biofiltration Area D.1



Pond 2P: Biofiltration Area D.1



Secret Hills - Area D IMPs

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Hydrograph for Pond 2P: Biofiltration Area D.1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	1.45	367	2.56	0.01
0.20	0.00	539	3.26	0.01
0.30	0.00	535	3.25	0.01
0.40	0.00	531	3.25	0.01
0.50	0.00	526	3.24	0.01
0.60	0.00	522	3.23	0.01
0.70	0.00	518	3.22	0.01
0.80	0.00	514	3.21	0.01
0.90	0.00	510	3.21	0.01
1.00	0.00	506	3.20	0.01
1.10	0.00	502	3.19	0.01
1.20	0.00	498	3.18	0.01
1.30	0.00	494	3.18	0.01
1.40	0.00	490	3.17	0.01
1.50	0.00	486	3.16	0.01
1.60	0.00	482	3.15	0.01
1.70	0.00	478	3.14	0.01
1.80	0.00	474	3.13	0.01
1.90	0.00	470	3.12	0.01
2.00	0.00	466	3.11	0.01
2.10	0.00	462	3.11	0.01
2.20	0.00	458	3.10	0.01
2.30	0.00	454	3.09	0.01
2.40	0.00	450	3.08	0.01
2.50	0.00	446	3.07	0.01
2.60	0.00	442	3.06	0.01
2.70	0.00	438	3.05	0.01
2.80	0.00	434	3.04	0.01
2.90	0.00	430	3.03	0.01
3.00	0.00	426	3.03	0.01
3.10	0.00	423	3.02	0.01
3.20	0.00	419	3.01	0.01
3.30	0.00	415	3.00	0.01
3.40	0.00	411	2.96	0.01
3.50	0.00	407	2.93	0.01
3.60	0.00	403	2.89	0.01
3.70	0.00	399	2.85	0.01
3.80	0.00	396	2.82	0.01
3.90	0.00	392	2.78	0.01
4.00	0.00	388	2.75	0.01
4.10	0.00	384	2.72	0.01
4.20	0.00	381	2.68	0.01
4.30	0.00	377	2.65	0.01
4.40	0.00	373	2.61	0.01
4.50	0.00	370	2.58	0.01

Hydrograph for Pond 2P: Biofiltration Area D.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	366	2.55	0.01
4.70	0.00	363	2.51	0.01
4.80	0.00	359	2.48	0.01
4.90	0.00	356	2.45	0.01
5.00	0.00	352	2.42	0.01
5.10	0.00	349	2.39	0.01
5.20	0.00	345	2.35	0.01
5.30	0.00	342	2.32	0.01
5.40	0.00	338	2.29	0.01
5.50	0.00	335	2.26	0.01
5.60	0.00	332	2.23	0.01
5.70	0.00	329	2.20	0.01
5.80	0.00	325	2.17	0.01
5.90	0.00	322	2.14	0.01
6.00	0.00	319	2.11	0.01
6.10	0.00	316	2.08	0.01
6.20	0.00	312	2.05	0.01
6.30	0.00	309	2.02	0.01
6.40	0.00	306	1.99	0.01
6.50	0.00	303	1.96	0.01
6.60	0.00	300	1.94	0.01
6.70	0.00	297	1.91	0.01
6.80	0.00	294	1.88	0.01
6.90	0.00	291	1.85	0.01
7.00	0.00	288	1.82	0.01
7.10	0.00	285	1.80	0.01
7.20	0.00	282	1.77	0.01
7.30	0.00	279	1.74	0.01
7.40	0.00	276	1.72	0.01
7.50	0.00	274	1.69	0.01
7.60	0.00	271	1.66	0.01
7.70	0.00	268	1.64	0.01
7.80	0.00	265	1.61	0.01
7.90	0.00	263	1.59	0.01
8.00	0.00	260	1.56	0.01
8.10	0.00	257	1.54	0.01
8.20	0.00	255	1.51	0.01
8.30	0.00	252	1.49	0.01
8.40	0.00	249	1.48	0.01
8.50	0.00	247	1.46	0.01
8.60	0.00	244	1.45	0.01
8.70	0.00	242	1.43	0.01
8.80	0.00	239	1.42	0.01
8.90	0.00	237	1.40	0.01
9.00	0.00	234	1.39	0.01
9.10	0.00	232	1.37	0.01

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Hydrograph for Pond 2P: Biofiltration Area D.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	229	1.36	0.01
9.30	0.00	227	1.34	0.01
9.40	0.00	224	1.33	0.01
9.50	0.00	222	1.31	0.01
9.60	0.00	219	1.30	0.01
9.70	0.00	217	1.29	0.01
9.80	0.00	215	1.27	0.01
9.90	0.00	212	1.26	0.01
10.00	0.00	210	1.24	0.01
10.10	0.00	208	1.23	0.01
10.20	0.00	205	1.22	0.01
10.30	0.00	203	1.20	0.01
10.40	0.00	201	1.19	0.01
10.50	0.00	198	1.18	0.01
10.60	0.00	196	1.16	0.01
10.70	0.00	194	1.15	0.01
10.80	0.00	192	1.14	0.01
10.90	0.00	190	1.12	0.01
11.00	0.00	187	1.11	0.01
11.10	0.00	185	1.10	0.01
11.20	0.00	183	1.09	0.01
11.30	0.00	181	1.07	0.01
11.40	0.00	179	1.06	0.01
11.50	0.00	177	1.05	0.01
11.60	0.00	175	1.04	0.01
11.70	0.00	173	1.02	0.01
11.80	0.00	171	1.01	0.01
11.90	0.00	169	1.00	0.01
12.00	0.00	167	0.99	0.01
12.10	0.00	165	0.98	0.01
12.20	0.00	163	0.96	0.01
12.30	0.00	161	0.95	0.01
12.40	0.00	159	0.94	0.01
12.50	0.00	157	0.93	0.01
12.60	0.00	155	0.92	0.01
12.70	0.00	153	0.91	0.01
12.80	0.00	151	0.90	0.01
12.90	0.00	149	0.88	0.01
13.00	0.00	147	0.87	0.01
13.10	0.00	146	0.86	0.01
13.20	0.00	144	0.85	0.01
13.30	0.00	142	0.84	0.00
13.40	0.00	140	0.83	0.00
13.50	0.00	138	0.82	0.00
13.60	0.00	137	0.81	0.00
13.70	0.00	135	0.80	0.00

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Hydrograph for Pond 2P: Biofiltration Area D.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	133	0.79	0.00
13.90	0.00	132	0.78	0.00
14.00	0.00	130	0.77	0.00
14.10	0.00	128	0.76	0.00
14.20	0.00	127	0.75	0.00
14.30	0.00	125	0.74	0.00
14.40	0.00	123	0.73	0.00
14.50	0.00	122	0.72	0.00
14.60	0.00	120	0.71	0.00
14.70	0.00	119	0.70	0.00
14.80	0.00	117	0.69	0.00
14.90	0.00	115	0.68	0.00
15.00	0.00	114	0.68	0.00
15.10	0.00	112	0.67	0.00
15.20	0.00	111	0.66	0.00
15.30	0.00	110	0.65	0.00
15.40	0.00	108	0.64	0.00
15.50	0.00	107	0.63	0.00
15.60	0.00	105	0.62	0.00
15.70	0.00	104	0.62	0.00
15.80	0.00	102	0.61	0.00
15.90	0.00	101	0.60	0.00
16.00	0.00	100	0.59	0.00
16.10	0.00	98	0.58	0.00
16.20	0.00	97	0.58	0.00
16.30	0.00	96	0.57	0.00
16.40	0.00	95	0.56	0.00
16.50	0.00	93	0.55	0.00
16.60	0.00	92	0.55	0.00
16.70	0.00	91	0.54	0.00
16.80	0.00	90	0.53	0.00
16.90	0.00	88	0.52	0.00
17.00	0.00	87	0.52	0.00
17.10	0.00	86	0.51	0.00
17.20	0.00	85	0.50	0.00
17.30	0.00	84	0.50	0.00
17.40	0.00	83	0.49	0.00
17.50	0.00	82	0.48	0.00
17.60	0.00	80	0.48	0.00
17.70	0.00	79	0.47	0.00
17.80	0.00	78	0.46	0.00
17.90	0.00	77	0.46	0.00
18.00	0.00	76	0.45	0.00
18.10	0.00	75	0.45	0.00
18.20	0.00	74	0.44	0.00
18.30	0.00	73	0.44	0.00

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Hydrograph for Pond 2P: Biofiltration Area D.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	72	0.43	0.00
18.50	0.00	72	0.42	0.00
18.60	0.00	71	0.42	0.00
18.70	0.00	70	0.41	0.00
18.80	0.00	69	0.41	0.00
18.90	0.00	68	0.40	0.00
19.00	0.00	67	0.40	0.00
19.10	0.00	66	0.39	0.00
19.20	0.00	65	0.39	0.00
19.30	0.00	65	0.38	0.00
19.40	0.00	64	0.38	0.00
19.50	0.00	63	0.37	0.00
19.60	0.00	62	0.37	0.00
19.70	0.00	62	0.37	0.00
19.80	0.00	61	0.36	0.00
19.90	0.00	60	0.36	0.00
20.00	0.00	60	0.35	0.00
20.10	0.00	59	0.35	0.00
20.20	0.00	58	0.35	0.00
20.30	0.00	58	0.34	0.00
20.40	0.00	57	0.34	0.00
20.50	0.00	56	0.33	0.00
20.60	0.00	56	0.33	0.00
20.70	0.00	55	0.33	0.00
20.80	0.00	55	0.32	0.00
20.90	0.00	54	0.32	0.00
21.00	0.00	54	0.32	0.00
21.10	0.00	53	0.32	0.00
21.20	0.00	53	0.31	0.00
21.30	0.00	52	0.31	0.00
21.40	0.00	52	0.31	0.00
21.50	0.00	51	0.30	0.00
21.60	0.00	51	0.30	0.00
21.70	0.00	51	0.30	0.00
21.80	0.00	50	0.30	0.00
21.90	0.00	50	0.30	0.00
22.00	0.00	49	0.29	0.00
22.10	0.00	49	0.29	0.00
22.20	0.00	49	0.29	0.00
22.30	0.00	48	0.29	0.00
22.40	0.00	48	0.29	0.00
22.50	0.00	48	0.28	0.00
22.60	0.00	48	0.28	0.00
22.70	0.00	47	0.28	0.00
22.80	0.00	47	0.28	0.00
22.90	0.00	47	0.28	0.00

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Hydrograph for Pond 2P: Biofiltration Area D.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	47	0.28	0.00
23.10	0.00	46	0.28	0.00
23.20	0.00	46	0.27	0.00
23.30	0.00	46	0.27	0.00
23.40	0.00	46	0.27	0.00
23.50	0.00	46	0.27	0.00
23.60	0.00	46	0.27	0.00
23.70	0.00	45	0.27	0.00
23.80	0.00	45	0.27	0.00
23.90	0.00	45	0.27	0.00
24.00	0.00	45	0.27	0.00

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Stage-Discharge for Pond 2P: Biofiltration Area D.1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.01
0.05	0.00	2.35	0.01
0.10	0.00	2.40	0.01
0.15	0.00	2.45	0.01
0.20	0.00	2.50	0.01
0.25	0.00	2.55	0.01
0.30	0.00	2.60	0.01
0.35	0.00	2.65	0.01
0.40	0.00	2.70	0.01
0.45	0.00	2.75	0.01
0.50	0.00	2.80	0.01
0.55	0.00	2.85	0.01
0.60	0.00	2.90	0.01
0.65	0.00	2.95	0.01
0.70	0.00	3.00	0.01
0.75	0.00	3.05	0.01
0.80	0.00	3.10	0.01
0.85	0.00	3.15	0.01
0.90	0.01	3.20	0.01
0.95	0.01	3.25	0.01
1.00	0.01	3.30	0.01
1.05	0.01	3.35	0.01
1.10	0.01	3.40	0.01
1.15	0.01	3.45	0.01
1.20	0.01	3.50	0.01
1.25	0.01	3.55	0.01
1.30	0.01	3.60	0.01
1.35	0.01	3.65	0.01
1.40	0.01	3.70	0.01
1.45	0.01	3.75	0.01
1.50	0.01	3.80	0.01
1.55	0.01	3.85	0.01
1.60	0.01	3.90	0.01
1.65	0.01	3.95	0.01
1.70	0.01	4.00	0.01
1.75	0.01	4.05	0.20
1.80	0.01	4.10	0.54
1.85	0.01	4.15	0.99
1.90	0.01		
1.95	0.01		
2.00	0.01		
2.05	0.01		
2.10	0.01		
2.15	0.01		
2.20	0.01		
2.25	0.01		

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Stage-Area-Storage for Pond 2P: Biofiltration Area D.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	339
0.05	8	2.35	345
0.10	17	2.40	350
0.15	25	2.45	356
0.20	34	2.50	361
0.25	42	2.55	366
0.30	51	2.60	372
0.35	59	2.65	377
0.40	67	2.70	383
0.45	76	2.75	388
0.50	84	2.80	393
0.55	93	2.85	399
0.60	101	2.90	404
0.65	110	2.95	410
0.70	118	3.00	415
0.75	127	3.05	437
0.80	135	3.10	460
0.85	143	3.15	482
0.90	152	3.20	507
0.95	160	3.25	533
1.00	169	3.30	558
1.05	177	3.35	585
1.10	186	3.40	611
1.15	194	3.45	638
1.20	202	3.50	664
1.25	211	3.55	693
1.30	219	3.60	721
1.35	228	3.65	750
1.40	236	3.70	781
1.45	245	3.75	813
1.50	253	3.80	846
1.55	258	3.85	878
1.60	264	3.90	911
1.65	269	3.95	944
1.70	275	4.00	977
1.75	280	4.05	1,012
1.80	285	4.10	1,048
1.85	291	4.15	1,083
1.90	296		
1.95	302		
2.00	307		
2.05	312		
2.10	318		
2.15	323		
2.20	329		
2.25	334		

Summary for Pond 5P: Biofiltration Area D.2

Inflow Area = 25,228.00 sf, 0.00% Impervious, Inflow Depth = 0.44" for P6=2.9 event
 Inflow = 2.98 cfs @ 0.08 hrs, Volume= 926 cf
 Outflow = 0.02 cfs @ 0.17 hrs, Volume= 755 cf, Atten= 99%, Lag= 5.4 min
 Primary = 0.02 cfs @ 0.17 hrs, Volume= 755 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.12' @ 0.17 hrs Storage= 920 cf

Plug-Flow detention time= 415.9 min calculated for 755 cf (82% of inflow)
 Center-of-Mass det. time= 415.2 min (420.2 - 5.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,044 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	504	504
3.00	317	821
3.17	146	967
3.33	155	1,122
3.50	165	1,287
3.67	174	1,461
3.83	184	1,645
4.00	194	1,839
4.17	205	2,044

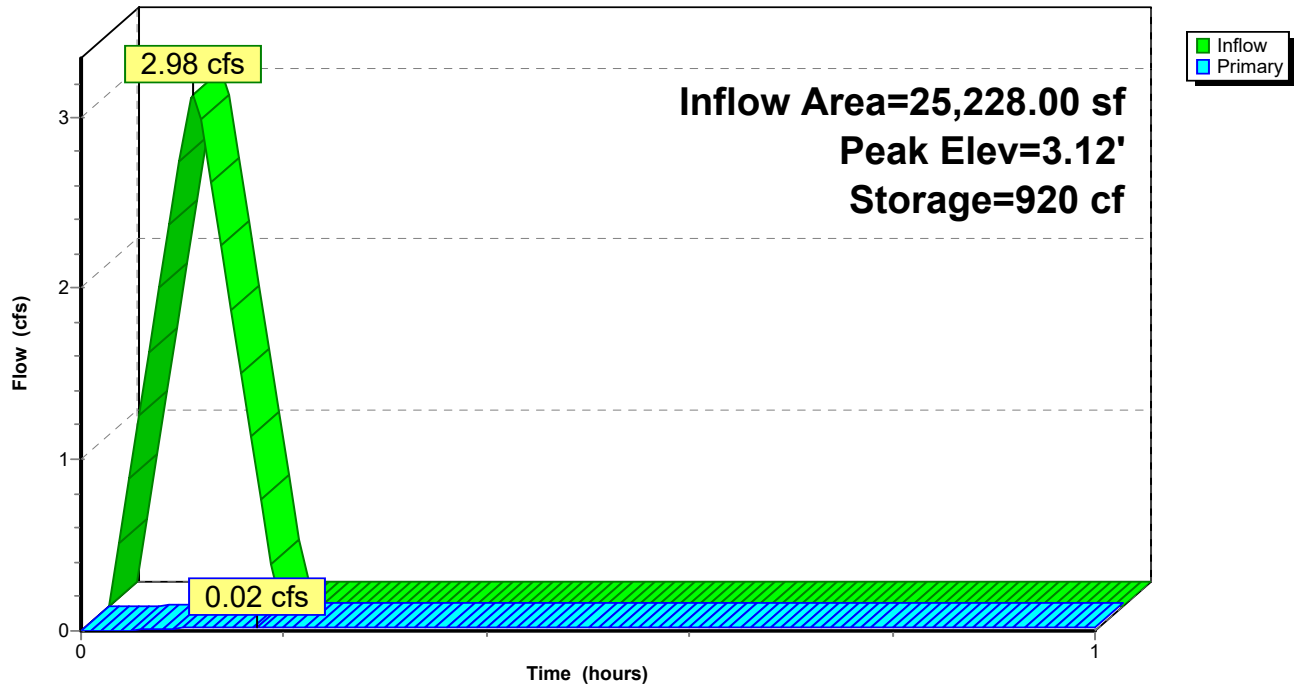
Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	0.7" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.02 cfs @ 0.17 hrs HW=3.11' (Free Discharge)

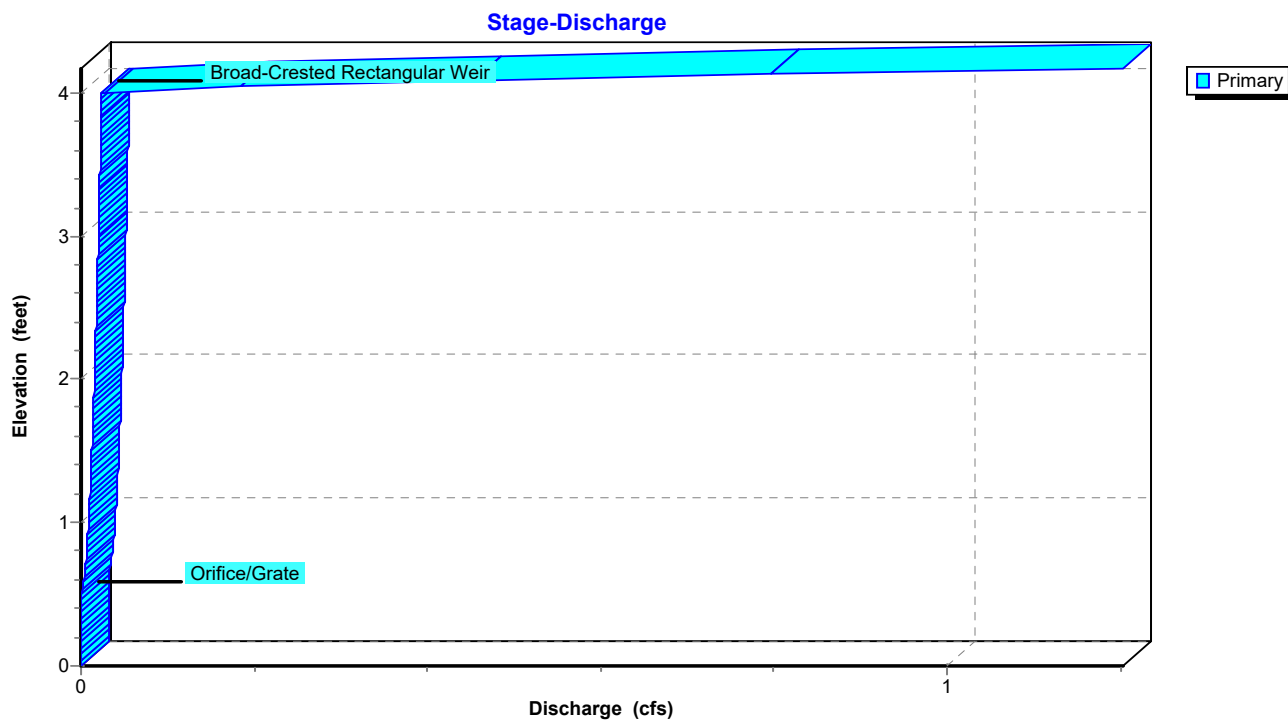
1=Orifice/Grate (Orifice Controls 0.02 cfs @ 7.74 fps)
 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Biofiltration Area D.2

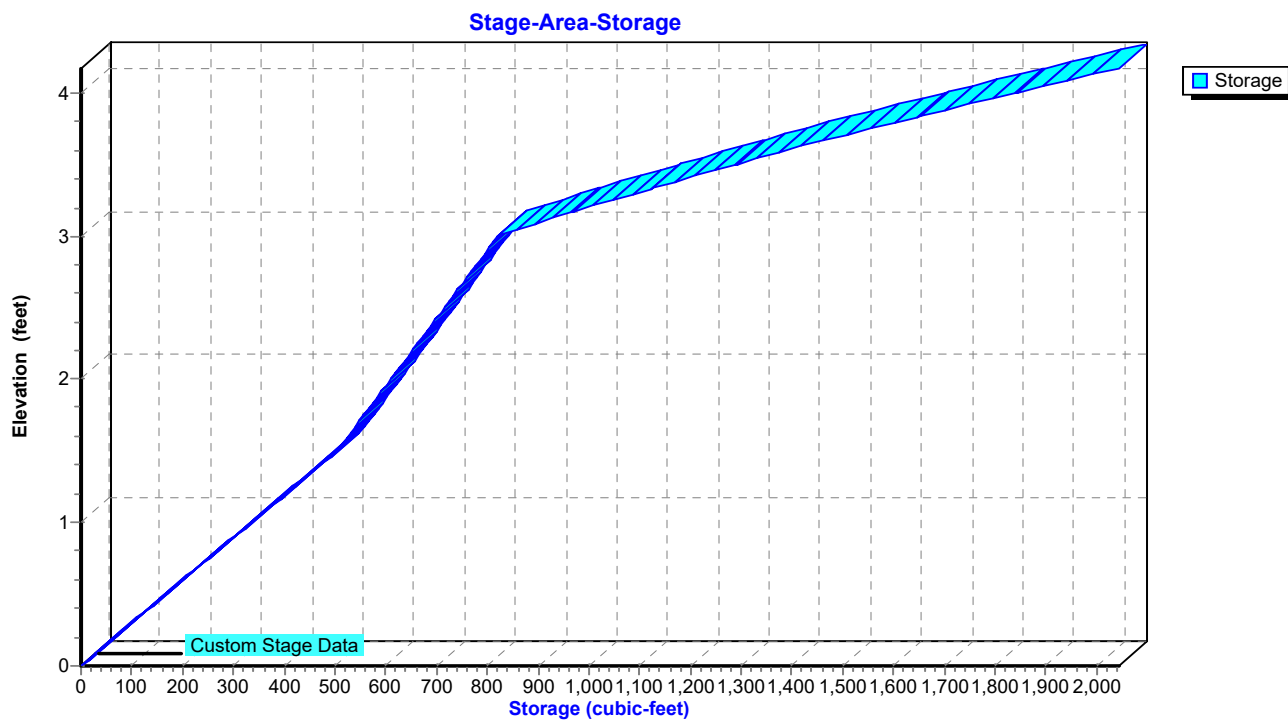
Hydrograph



Pond 5P: Biofiltration Area D.2



Pond 5P: Biofiltration Area D.2



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Hydrograph for Pond 5P: Biofiltration Area D.2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	2.47	626	2.08	0.02
0.20	0.00	917	3.11	0.02
0.30	0.00	910	3.10	0.02
0.40	0.00	903	3.10	0.02
0.50	0.00	895	3.09	0.02
0.60	0.00	888	3.08	0.02
0.70	0.00	880	3.07	0.02
0.80	0.00	873	3.06	0.02
0.90	0.00	866	3.05	0.02
1.00	0.00	858	3.04	0.02
1.10	0.00	851	3.03	0.02
1.20	0.00	844	3.03	0.02
1.30	0.00	836	3.02	0.02
1.40	0.00	829	3.01	0.02
1.50	0.00	822	3.00	0.02
1.60	0.00	814	2.97	0.02
1.70	0.00	807	2.93	0.02
1.80	0.00	800	2.90	0.02
1.90	0.00	793	2.87	0.02
2.00	0.00	786	2.83	0.02
2.10	0.00	779	2.80	0.02
2.20	0.00	772	2.77	0.02
2.30	0.00	765	2.74	0.02
2.40	0.00	758	2.70	0.02
2.50	0.00	751	2.67	0.02
2.60	0.00	745	2.64	0.02
2.70	0.00	738	2.61	0.02
2.80	0.00	731	2.58	0.02
2.90	0.00	725	2.54	0.02
3.00	0.00	718	2.51	0.02
3.10	0.00	712	2.48	0.02
3.20	0.00	705	2.45	0.02
3.30	0.00	699	2.42	0.02
3.40	0.00	692	2.39	0.02
3.50	0.00	686	2.36	0.02
3.60	0.00	680	2.33	0.02
3.70	0.00	674	2.30	0.02
3.80	0.00	668	2.27	0.02
3.90	0.00	661	2.25	0.02
4.00	0.00	655	2.22	0.02
4.10	0.00	649	2.19	0.02
4.20	0.00	643	2.16	0.02
4.30	0.00	638	2.13	0.02
4.40	0.00	632	2.10	0.02
4.50	0.00	626	2.08	0.02

Hydrograph for Pond 5P: Biofiltration Area D.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	620	2.05	0.02
4.70	0.00	615	2.02	0.02
4.80	0.00	609	2.00	0.02
4.90	0.00	603	1.97	0.02
5.00	0.00	598	1.94	0.02
5.10	0.00	592	1.92	0.02
5.20	0.00	587	1.89	0.02
5.30	0.00	581	1.87	0.01
5.40	0.00	576	1.84	0.01
5.50	0.00	571	1.82	0.01
5.60	0.00	566	1.79	0.01
5.70	0.00	560	1.77	0.01
5.80	0.00	555	1.74	0.01
5.90	0.00	550	1.72	0.01
6.00	0.00	545	1.70	0.01
6.10	0.00	540	1.67	0.01
6.20	0.00	535	1.65	0.01
6.30	0.00	530	1.63	0.01
6.40	0.00	526	1.60	0.01
6.50	0.00	521	1.58	0.01
6.60	0.00	516	1.56	0.01
6.70	0.00	511	1.54	0.01
6.80	0.00	507	1.51	0.01
6.90	0.00	502	1.49	0.01
7.00	0.00	498	1.48	0.01
7.10	0.00	493	1.47	0.01
7.20	0.00	489	1.45	0.01
7.30	0.00	484	1.44	0.01
7.40	0.00	480	1.43	0.01
7.50	0.00	476	1.42	0.01
7.60	0.00	471	1.40	0.01
7.70	0.00	467	1.39	0.01
7.80	0.00	463	1.38	0.01
7.90	0.00	458	1.36	0.01
8.00	0.00	454	1.35	0.01
8.10	0.00	450	1.34	0.01
8.20	0.00	446	1.33	0.01
8.30	0.00	442	1.31	0.01
8.40	0.00	438	1.30	0.01
8.50	0.00	434	1.29	0.01
8.60	0.00	429	1.28	0.01
8.70	0.00	425	1.27	0.01
8.80	0.00	422	1.25	0.01
8.90	0.00	418	1.24	0.01
9.00	0.00	414	1.23	0.01
9.10	0.00	410	1.22	0.01

Secret Hills - Area D IMPs

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Hydrograph for Pond 5P: Biofiltration Area D.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	406	1.21	0.01
9.30	0.00	402	1.20	0.01
9.40	0.00	398	1.19	0.01
9.50	0.00	395	1.17	0.01
9.60	0.00	391	1.16	0.01
9.70	0.00	387	1.15	0.01
9.80	0.00	384	1.14	0.01
9.90	0.00	380	1.13	0.01
10.00	0.00	376	1.12	0.01
10.10	0.00	373	1.11	0.01
10.20	0.00	369	1.10	0.01
10.30	0.00	366	1.09	0.01
10.40	0.00	362	1.08	0.01
10.50	0.00	359	1.07	0.01
10.60	0.00	356	1.06	0.01
10.70	0.00	352	1.05	0.01
10.80	0.00	349	1.04	0.01
10.90	0.00	346	1.03	0.01
11.00	0.00	342	1.02	0.01
11.10	0.00	339	1.01	0.01
11.20	0.00	336	1.00	0.01
11.30	0.00	333	0.99	0.01
11.40	0.00	330	0.98	0.01
11.50	0.00	327	0.97	0.01
11.60	0.00	324	0.96	0.01
11.70	0.00	321	0.95	0.01
11.80	0.00	318	0.95	0.01
11.90	0.00	315	0.94	0.01
12.00	0.00	312	0.93	0.01
12.10	0.00	309	0.92	0.01
12.20	0.00	306	0.91	0.01
12.30	0.00	303	0.90	0.01
12.40	0.00	300	0.89	0.01
12.50	0.00	297	0.89	0.01
12.60	0.00	295	0.88	0.01
12.70	0.00	292	0.87	0.01
12.80	0.00	289	0.86	0.01
12.90	0.00	287	0.85	0.01
13.00	0.00	284	0.85	0.01
13.10	0.00	281	0.84	0.01
13.20	0.00	279	0.83	0.01
13.30	0.00	276	0.82	0.01
13.40	0.00	274	0.82	0.01
13.50	0.00	271	0.81	0.01
13.60	0.00	269	0.80	0.01
13.70	0.00	267	0.79	0.01

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Hydrograph for Pond 5P: Biofiltration Area D.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	264	0.79	0.01
13.90	0.00	262	0.78	0.01
14.00	0.00	260	0.77	0.01
14.10	0.00	257	0.77	0.01
14.20	0.00	255	0.76	0.01
14.30	0.00	253	0.75	0.01
14.40	0.00	251	0.75	0.01
14.50	0.00	249	0.74	0.01
14.60	0.00	246	0.73	0.01
14.70	0.00	244	0.73	0.01
14.80	0.00	242	0.72	0.01
14.90	0.00	240	0.72	0.01
15.00	0.00	238	0.71	0.01
15.10	0.00	236	0.70	0.01
15.20	0.00	234	0.70	0.01
15.30	0.00	233	0.69	0.01
15.40	0.00	231	0.69	0.01
15.50	0.00	229	0.68	0.01
15.60	0.00	227	0.68	0.00
15.70	0.00	225	0.67	0.00
15.80	0.00	224	0.67	0.00
15.90	0.00	222	0.66	0.00
16.00	0.00	220	0.66	0.00
16.10	0.00	219	0.65	0.00
16.20	0.00	217	0.65	0.00
16.30	0.00	216	0.64	0.00
16.40	0.00	214	0.64	0.00
16.50	0.00	212	0.63	0.00
16.60	0.00	211	0.63	0.00
16.70	0.00	210	0.62	0.00
16.80	0.00	208	0.62	0.00
16.90	0.00	207	0.62	0.00
17.00	0.00	205	0.61	0.00
17.10	0.00	204	0.61	0.00
17.20	0.00	203	0.60	0.00
17.30	0.00	202	0.60	0.00
17.40	0.00	200	0.60	0.00
17.50	0.00	199	0.59	0.00
17.60	0.00	198	0.59	0.00
17.70	0.00	197	0.59	0.00
17.80	0.00	196	0.58	0.00
17.90	0.00	195	0.58	0.00
18.00	0.00	194	0.58	0.00
18.10	0.00	193	0.57	0.00
18.20	0.00	192	0.57	0.00
18.30	0.00	191	0.57	0.00

Hydrograph for Pond 5P: Biofiltration Area D.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	190	0.57	0.00
18.50	0.00	189	0.56	0.00
18.60	0.00	189	0.56	0.00
18.70	0.00	188	0.56	0.00
18.80	0.00	187	0.56	0.00
18.90	0.00	186	0.55	0.00
19.00	0.00	186	0.55	0.00
19.10	0.00	185	0.55	0.00
19.20	0.00	184	0.55	0.00
19.30	0.00	184	0.55	0.00
19.40	0.00	183	0.55	0.00
19.50	0.00	183	0.54	0.00
19.60	0.00	182	0.54	0.00
19.70	0.00	182	0.54	0.00
19.80	0.00	181	0.54	0.00
19.90	0.00	181	0.54	0.00
20.00	0.00	180	0.54	0.00
20.10	0.00	180	0.54	0.00
20.20	0.00	179	0.53	0.00
20.30	0.00	179	0.53	0.00
20.40	0.00	179	0.53	0.00
20.50	0.00	178	0.53	0.00
20.60	0.00	178	0.53	0.00
20.70	0.00	177	0.53	0.00
20.80	0.00	177	0.53	0.00
20.90	0.00	177	0.53	0.00
21.00	0.00	176	0.53	0.00
21.10	0.00	176	0.52	0.00
21.20	0.00	176	0.52	0.00
21.30	0.00	176	0.52	0.00
21.40	0.00	175	0.52	0.00
21.50	0.00	175	0.52	0.00
21.60	0.00	175	0.52	0.00
21.70	0.00	175	0.52	0.00
21.80	0.00	174	0.52	0.00
21.90	0.00	174	0.52	0.00
22.00	0.00	174	0.52	0.00
22.10	0.00	174	0.52	0.00
22.20	0.00	173	0.52	0.00
22.30	0.00	173	0.52	0.00
22.40	0.00	173	0.52	0.00
22.50	0.00	173	0.51	0.00
22.60	0.00	173	0.51	0.00
22.70	0.00	173	0.51	0.00
22.80	0.00	172	0.51	0.00
22.90	0.00	172	0.51	0.00

Hydrograph for Pond 5P: Biofiltration Area D.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	172	0.51	0.00
23.10	0.00	172	0.51	0.00
23.20	0.00	172	0.51	0.00
23.30	0.00	172	0.51	0.00
23.40	0.00	172	0.51	0.00
23.50	0.00	171	0.51	0.00
23.60	0.00	171	0.51	0.00
23.70	0.00	171	0.51	0.00
23.80	0.00	171	0.51	0.00
23.90	0.00	171	0.51	0.00
24.00	0.00	171	0.51	0.00

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Stage-Discharge for Pond 5P: Biofiltration Area D.2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.02
0.05	0.00	2.35	0.02
0.10	0.00	2.40	0.02
0.15	0.00	2.45	0.02
0.20	0.00	2.50	0.02
0.25	0.00	2.55	0.02
0.30	0.00	2.60	0.02
0.35	0.00	2.65	0.02
0.40	0.00	2.70	0.02
0.45	0.00	2.75	0.02
0.50	0.00	2.80	0.02
0.55	0.00	2.85	0.02
0.60	0.00	2.90	0.02
0.65	0.00	2.95	0.02
0.70	0.01	3.00	0.02
0.75	0.01	3.05	0.02
0.80	0.01	3.10	0.02
0.85	0.01	3.15	0.02
0.90	0.01	3.20	0.02
0.95	0.01	3.25	0.02
1.00	0.01	3.30	0.02
1.05	0.01	3.35	0.02
1.10	0.01	3.40	0.02
1.15	0.01	3.45	0.02
1.20	0.01	3.50	0.02
1.25	0.01	3.55	0.02
1.30	0.01	3.60	0.02
1.35	0.01	3.65	0.02
1.40	0.01	3.70	0.02
1.45	0.01	3.75	0.02
1.50	0.01	3.80	0.02
1.55	0.01	3.85	0.02
1.60	0.01	3.90	0.02
1.65	0.01	3.95	0.02
1.70	0.01	4.00	0.02
1.75	0.01	4.05	0.21
1.80	0.01	4.10	0.56
1.85	0.01	4.15	1.00
1.90	0.02		
1.95	0.02		
2.00	0.02		
2.05	0.02		
2.10	0.02		
2.15	0.02		
2.20	0.02		
2.25	0.02		

Stage-Area-Storage for Pond 5P: Biofiltration Area D.2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	673
0.05	17	2.35	684
0.10	34	2.40	694
0.15	50	2.45	705
0.20	67	2.50	715
0.25	84	2.55	726
0.30	101	2.60	736
0.35	118	2.65	747
0.40	134	2.70	758
0.45	151	2.75	768
0.50	168	2.80	779
0.55	185	2.85	789
0.60	202	2.90	800
0.65	218	2.95	810
0.70	235	3.00	821
0.75	252	3.05	864
0.80	269	3.10	907
0.85	286	3.15	950
0.90	302	3.20	996
0.95	319	3.25	1,045
1.00	336	3.30	1,093
1.05	353	3.35	1,141
1.10	370	3.40	1,190
1.15	386	3.45	1,238
1.20	403	3.50	1,287
1.25	420	3.55	1,338
1.30	437	3.60	1,389
1.35	454	3.65	1,441
1.40	470	3.70	1,496
1.45	487	3.75	1,553
1.50	504	3.80	1,611
1.55	515	3.85	1,668
1.60	525	3.90	1,725
1.65	536	3.95	1,782
1.70	546	4.00	1,839
1.75	557	4.05	1,899
1.80	567	4.10	1,960
1.85	578	4.15	2,020
1.90	589		
1.95	599		
2.00	610		
2.05	620		
2.10	631		
2.15	641		
2.20	652		
2.25	663		

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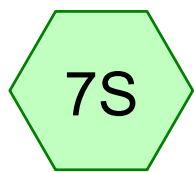
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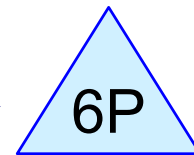
- 1 Routing Diagram
- 2 Area Listing (all nodes)
- 3 Soil Listing (all nodes)
- 4 Ground Covers (all nodes)
- 5 Notes Listing (all nodes)

Current Event

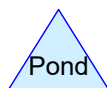
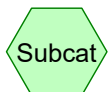
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- 7 Subcat 1S: Basin D.1
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Basin D.3



Biofiltration Area D.3



Routing Diagram for Secret Hills - IMP D.3

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Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
4,792	0.30	<50% Grass cover, Poor, HSG C (7S)
9,639	0.87	Single Family Residential Development, HSG C (7S)
14,431	0.68	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
14,431	HSG C	7S
0	HSG D	
0	Other	
14,431		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	4,792	0	0	4,792	<50% Grass cover, Poor
0	0	9,639	0	0	9,639	Single Family Residential Development
0	0	14,431	0	0	14,431	TOTAL AREA

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Defined 11 rainfall events from CA-San Diego IDF

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 7S: Basin D.3

Runoff Area=14,431 sf 0.00% Impervious Runoff Depth=0.31"
Tc=6.91 min C=0.68 Runoff=1.21 cfs 376 cf

Pond 6P: Biofiltration Area D.3

Peak Elev=3.05' Storage=373 cf Inflow=1.21 cfs 376 cf
Outflow=0.01 cfs 308 cf

Total Runoff Area = 14,431 sf Runoff Volume = 376 cf Average Runoff Depth = 0.31"
100.00% Pervious = 14,431 sf 0.00% Impervious = 0 sf

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s/n S00493 © 2020 HydroCAD Software Solutions LLC Page 7**Summary for Subcatchment 7S: Basin D.3**

[48] Hint: Peak<CiA due to short duration

Runoff = 1.21 cfs @ 0.08 hrs, Volume= 376 cf, Depth= 0.31"

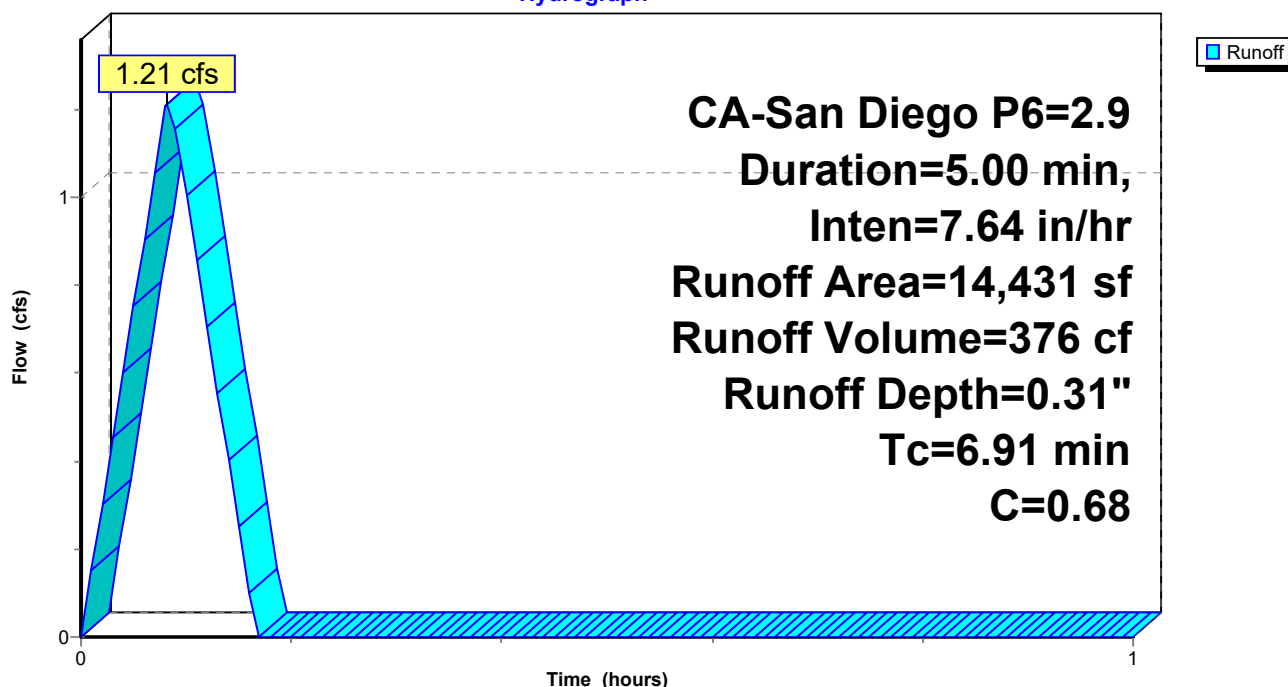
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

Area (sf)	C	Description
9,639	0.87	Single Family Residential Development, HSG C
4,137	0.30	<50% Grass cover, Poor, HSG C
655	0.30	<50% Grass cover, Poor, HSG C
14,431	0.68	Weighted Average
14,431		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.91					Direct Entry, Tc from RM

Subcatchment 7S: Basin D.3

Hydrograph



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Hydrograph for Subcatchment 7S: Basin D.3

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	1.00	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.00	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.00	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

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Hydrograph for Subcatchment 7S: Basin D.3 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

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Summary for Pond 6P: Biofiltration Area D.3

Inflow Area = 14,431 sf, 0.00% Impervious, Inflow Depth = 0.31" for P6=2.9 event
 Inflow = 1.21 cfs @ 0.08 hrs, Volume= 376 cf
 Outflow = 0.01 cfs @ 0.17 hrs, Volume= 308 cf, Atten= 99%, Lag= 5.4 min
 Primary = 0.01 cfs @ 0.17 hrs, Volume= 308 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.05' @ 0.17 hrs Storage= 373 cf

Plug-Flow detention time= 337.9 min calculated for 308 cf (82% of inflow)
 Center-of-Mass det. time= 337.2 min (342.2 - 5.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	994 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	204	204
3.00	150	354
3.17	71	425
3.33	77	502
3.50	84	586
3.67	91	677
3.83	98	775
4.00	106	881
4.17	113	994

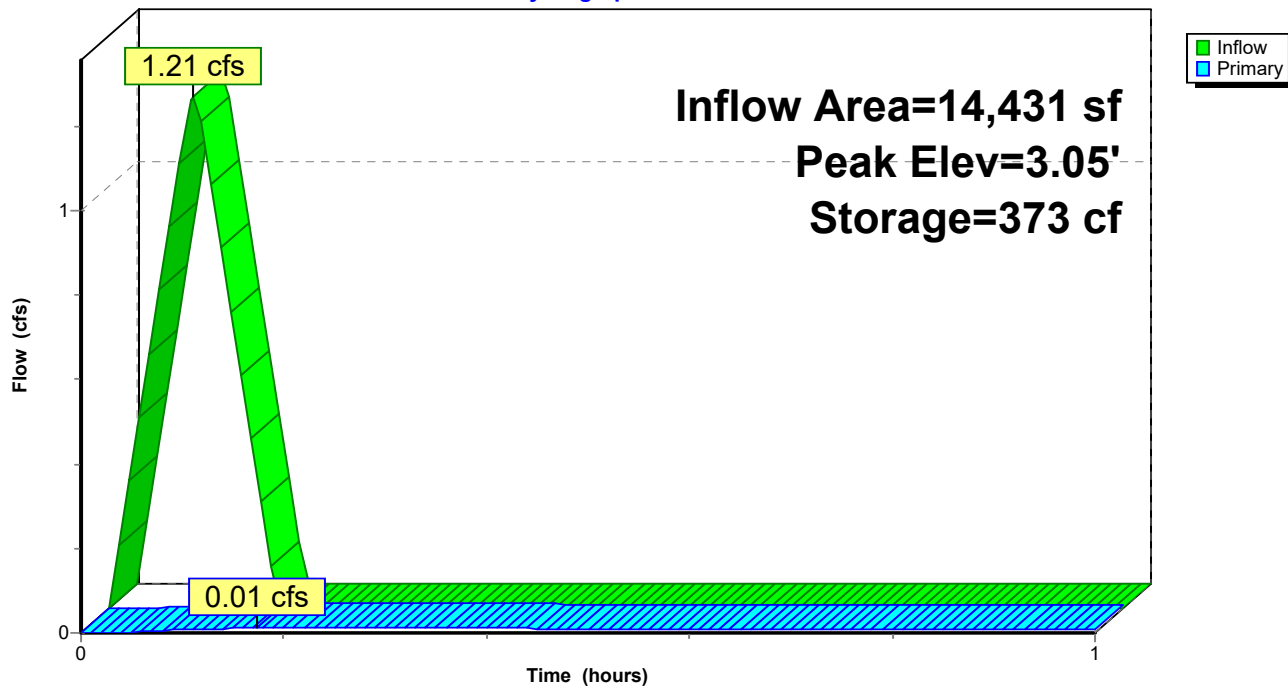
Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	0.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.01 cfs @ 0.17 hrs HW=3.04' (Free Discharge)

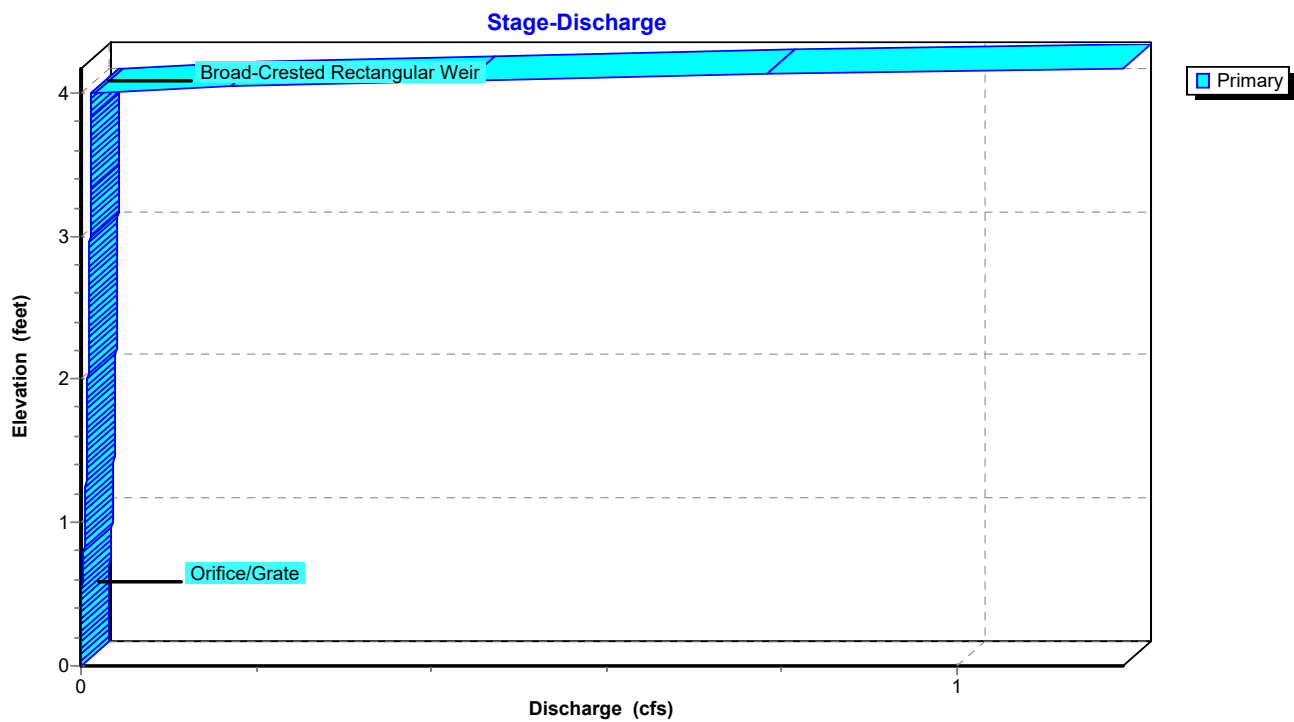
1=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.65 fps)
 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 6P: Biofiltration Area D.3

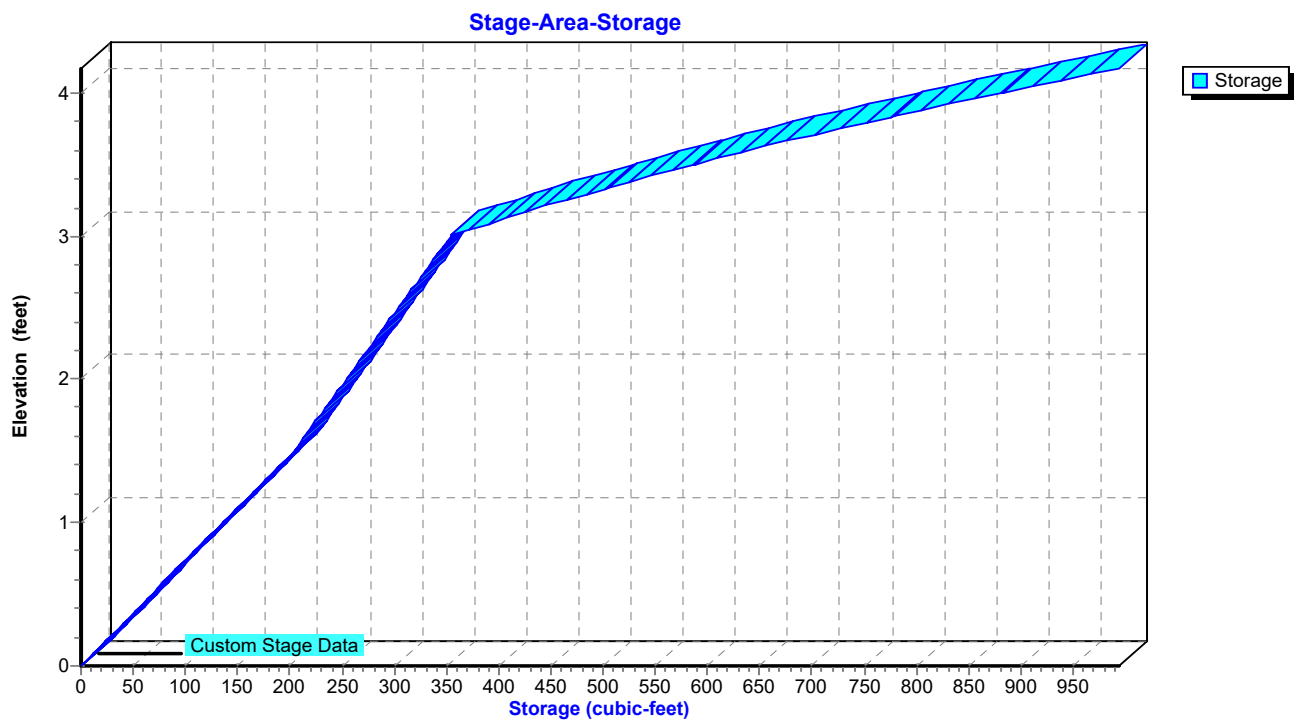
Hydrograph



Pond 6P: Biofiltration Area D.3



Pond 6P: Biofiltration Area D.3



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Hydrograph for Pond 6P: Biofiltration Area D.3

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	1.00	254	2.00	0.01
0.20	0.00	372	3.04	0.01
0.30	0.00	368	3.03	0.01
0.40	0.00	364	3.02	0.01
0.50	0.00	361	3.02	0.01
0.60	0.00	357	3.01	0.01
0.70	0.00	353	2.99	0.01
0.80	0.00	349	2.95	0.01
0.90	0.00	346	2.92	0.01
1.00	0.00	342	2.88	0.01
1.10	0.00	338	2.84	0.01
1.20	0.00	335	2.81	0.01
1.30	0.00	331	2.77	0.01
1.40	0.00	328	2.74	0.01
1.50	0.00	324	2.70	0.01
1.60	0.00	321	2.67	0.01
1.70	0.00	317	2.63	0.01
1.80	0.00	314	2.60	0.01
1.90	0.00	311	2.57	0.01
2.00	0.00	307	2.53	0.01
2.10	0.00	304	2.50	0.01
2.20	0.00	301	2.47	0.01
2.30	0.00	297	2.43	0.01
2.40	0.00	294	2.40	0.01
2.50	0.00	291	2.37	0.01
2.60	0.00	288	2.34	0.01
2.70	0.00	284	2.30	0.01
2.80	0.00	281	2.27	0.01
2.90	0.00	278	2.24	0.01
3.00	0.00	275	2.21	0.01
3.10	0.00	272	2.18	0.01
3.20	0.00	269	2.15	0.01
3.30	0.00	266	2.12	0.01
3.40	0.00	263	2.09	0.01
3.50	0.00	260	2.06	0.01
3.60	0.00	257	2.03	0.01
3.70	0.00	254	2.00	0.01
3.80	0.00	251	1.97	0.01
3.90	0.00	249	1.95	0.01
4.00	0.00	246	1.92	0.01
4.10	0.00	243	1.89	0.01
4.20	0.00	240	1.86	0.01
4.30	0.00	237	1.83	0.01
4.40	0.00	235	1.81	0.01
4.50	0.00	232	1.78	0.01

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Hydrograph for Pond 6P: Biofiltration Area D.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	229	1.75	0.01
4.70	0.00	227	1.73	0.01
4.80	0.00	224	1.70	0.01
4.90	0.00	222	1.68	0.01
5.00	0.00	219	1.65	0.01
5.10	0.00	217	1.63	0.01
5.20	0.00	214	1.60	0.01
5.30	0.00	212	1.58	0.01
5.40	0.00	209	1.55	0.01
5.50	0.00	207	1.53	0.01
5.60	0.00	205	1.51	0.01
5.70	0.00	202	1.49	0.01
5.80	0.00	200	1.47	0.01
5.90	0.00	198	1.45	0.01
6.00	0.00	195	1.44	0.01
6.10	0.00	193	1.42	0.01
6.20	0.00	191	1.40	0.01
6.30	0.00	189	1.39	0.01
6.40	0.00	187	1.37	0.01
6.50	0.00	184	1.36	0.01
6.60	0.00	182	1.34	0.01
6.70	0.00	180	1.32	0.01
6.80	0.00	178	1.31	0.01
6.90	0.00	176	1.29	0.01
7.00	0.00	174	1.28	0.01
7.10	0.00	172	1.26	0.01
7.20	0.00	170	1.25	0.01
7.30	0.00	168	1.23	0.01
7.40	0.00	166	1.22	0.01
7.50	0.00	164	1.20	0.01
7.60	0.00	162	1.19	0.01
7.70	0.00	160	1.18	0.01
7.80	0.00	158	1.16	0.01
7.90	0.00	156	1.15	0.01
8.00	0.00	154	1.13	0.01
8.10	0.00	152	1.12	0.01
8.20	0.00	151	1.11	0.01
8.30	0.00	149	1.09	0.00
8.40	0.00	147	1.08	0.00
8.50	0.00	145	1.07	0.00
8.60	0.00	144	1.06	0.00
8.70	0.00	142	1.04	0.00
8.80	0.00	140	1.03	0.00
8.90	0.00	138	1.02	0.00
9.00	0.00	137	1.01	0.00
9.10	0.00	135	0.99	0.00

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Hydrograph for Pond 6P: Biofiltration Area D.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	134	0.98	0.00
9.30	0.00	132	0.97	0.00
9.40	0.00	130	0.96	0.00
9.50	0.00	129	0.95	0.00
9.60	0.00	127	0.94	0.00
9.70	0.00	126	0.92	0.00
9.80	0.00	124	0.91	0.00
9.90	0.00	123	0.90	0.00
10.00	0.00	121	0.89	0.00
10.10	0.00	120	0.88	0.00
10.20	0.00	119	0.87	0.00
10.30	0.00	117	0.86	0.00
10.40	0.00	116	0.85	0.00
10.50	0.00	114	0.84	0.00
10.60	0.00	113	0.83	0.00
10.70	0.00	112	0.82	0.00
10.80	0.00	110	0.81	0.00
10.90	0.00	109	0.80	0.00
11.00	0.00	108	0.79	0.00
11.10	0.00	107	0.78	0.00
11.20	0.00	106	0.78	0.00
11.30	0.00	104	0.77	0.00
11.40	0.00	103	0.76	0.00
11.50	0.00	102	0.75	0.00
11.60	0.00	101	0.74	0.00
11.70	0.00	100	0.73	0.00
11.80	0.00	99	0.73	0.00
11.90	0.00	98	0.72	0.00
12.00	0.00	97	0.71	0.00
12.10	0.00	96	0.70	0.00
12.20	0.00	95	0.70	0.00
12.30	0.00	94	0.69	0.00
12.40	0.00	93	0.68	0.00
12.50	0.00	92	0.67	0.00
12.60	0.00	91	0.67	0.00
12.70	0.00	90	0.66	0.00
12.80	0.00	89	0.66	0.00
12.90	0.00	88	0.65	0.00
13.00	0.00	87	0.64	0.00
13.10	0.00	87	0.64	0.00
13.20	0.00	86	0.63	0.00
13.30	0.00	85	0.63	0.00
13.40	0.00	84	0.62	0.00
13.50	0.00	84	0.61	0.00
13.60	0.00	83	0.61	0.00
13.70	0.00	82	0.60	0.00

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Hydrograph for Pond 6P: Biofiltration Area D.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	81	0.60	0.00
13.90	0.00	81	0.59	0.00
14.00	0.00	80	0.59	0.00
14.10	0.00	80	0.59	0.00
14.20	0.00	79	0.58	0.00
14.30	0.00	78	0.58	0.00
14.40	0.00	78	0.57	0.00
14.50	0.00	77	0.57	0.00
14.60	0.00	77	0.57	0.00
14.70	0.00	76	0.56	0.00
14.80	0.00	76	0.56	0.00
14.90	0.00	76	0.56	0.00
15.00	0.00	75	0.55	0.00
15.10	0.00	75	0.55	0.00
15.20	0.00	74	0.55	0.00
15.30	0.00	74	0.54	0.00
15.40	0.00	74	0.54	0.00
15.50	0.00	73	0.54	0.00
15.60	0.00	73	0.54	0.00
15.70	0.00	73	0.53	0.00
15.80	0.00	72	0.53	0.00
15.90	0.00	72	0.53	0.00
16.00	0.00	72	0.53	0.00
16.10	0.00	72	0.53	0.00
16.20	0.00	71	0.53	0.00
16.30	0.00	71	0.52	0.00
16.40	0.00	71	0.52	0.00
16.50	0.00	71	0.52	0.00
16.60	0.00	71	0.52	0.00
16.70	0.00	71	0.52	0.00
16.80	0.00	70	0.52	0.00
16.90	0.00	70	0.52	0.00
17.00	0.00	70	0.52	0.00
17.10	0.00	70	0.51	0.00
17.20	0.00	70	0.51	0.00
17.30	0.00	70	0.51	0.00
17.40	0.00	70	0.51	0.00
17.50	0.00	70	0.51	0.00
17.60	0.00	70	0.51	0.00
17.70	0.00	69	0.51	0.00
17.80	0.00	69	0.51	0.00
17.90	0.00	69	0.51	0.00
18.00	0.00	69	0.51	0.00
18.10	0.00	69	0.51	0.00
18.20	0.00	69	0.51	0.00
18.30	0.00	69	0.51	0.00

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Hydrograph for Pond 6P: Biofiltration Area D.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	69	0.51	0.00
18.50	0.00	69	0.51	0.00
18.60	0.00	69	0.51	0.00
18.70	0.00	69	0.51	0.00
18.80	0.00	69	0.51	0.00
18.90	0.00	69	0.51	0.00
19.00	0.00	69	0.50	0.00
19.10	0.00	69	0.50	0.00
19.20	0.00	69	0.50	0.00
19.30	0.00	69	0.50	0.00
19.40	0.00	69	0.50	0.00
19.50	0.00	69	0.50	0.00
19.60	0.00	68	0.50	0.00
19.70	0.00	68	0.50	0.00
19.80	0.00	68	0.50	0.00
19.90	0.00	68	0.50	0.00
20.00	0.00	68	0.50	0.00
20.10	0.00	68	0.50	0.00
20.20	0.00	68	0.50	0.00
20.30	0.00	68	0.50	0.00
20.40	0.00	68	0.50	0.00
20.50	0.00	68	0.50	0.00
20.60	0.00	68	0.50	0.00
20.70	0.00	68	0.50	0.00
20.80	0.00	68	0.50	0.00
20.90	0.00	68	0.50	0.00
21.00	0.00	68	0.50	0.00
21.10	0.00	68	0.50	0.00
21.20	0.00	68	0.50	0.00
21.30	0.00	68	0.50	0.00
21.40	0.00	68	0.50	0.00
21.50	0.00	68	0.50	0.00
21.60	0.00	68	0.50	0.00
21.70	0.00	68	0.50	0.00
21.80	0.00	68	0.50	0.00
21.90	0.00	68	0.50	0.00
22.00	0.00	68	0.50	0.00
22.10	0.00	68	0.50	0.00
22.20	0.00	68	0.50	0.00
22.30	0.00	68	0.50	0.00
22.40	0.00	68	0.50	0.00
22.50	0.00	68	0.50	0.00
22.60	0.00	68	0.50	0.00
22.70	0.00	68	0.50	0.00
22.80	0.00	68	0.50	0.00
22.90	0.00	68	0.50	0.00

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Hydrograph for Pond 6P: Biofiltration Area D.3 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	68	0.50	0.00
23.10	0.00	68	0.50	0.00
23.20	0.00	68	0.50	0.00
23.30	0.00	68	0.50	0.00
23.40	0.00	68	0.50	0.00
23.50	0.00	68	0.50	0.00
23.60	0.00	68	0.50	0.00
23.70	0.00	68	0.50	0.00
23.80	0.00	68	0.50	0.00
23.90	0.00	68	0.50	0.00
24.00	0.00	68	0.50	0.00

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Stage-Discharge for Pond 6P: Biofiltration Area D.3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.01
0.05	0.00	2.35	0.01
0.10	0.00	2.40	0.01
0.15	0.00	2.45	0.01
0.20	0.00	2.50	0.01
0.25	0.00	2.55	0.01
0.30	0.00	2.60	0.01
0.35	0.00	2.65	0.01
0.40	0.00	2.70	0.01
0.45	0.00	2.75	0.01
0.50	0.00	2.80	0.01
0.55	0.00	2.85	0.01
0.60	0.00	2.90	0.01
0.65	0.00	2.95	0.01
0.70	0.00	3.00	0.01
0.75	0.00	3.05	0.01
0.80	0.00	3.10	0.01
0.85	0.00	3.15	0.01
0.90	0.00	3.20	0.01
0.95	0.00	3.25	0.01
1.00	0.00	3.30	0.01
1.05	0.00	3.35	0.01
1.10	0.00	3.40	0.01
1.15	0.01	3.45	0.01
1.20	0.01	3.50	0.01
1.25	0.01	3.55	0.01
1.30	0.01	3.60	0.01
1.35	0.01	3.65	0.01
1.40	0.01	3.70	0.01
1.45	0.01	3.75	0.01
1.50	0.01	3.80	0.01
1.55	0.01	3.85	0.01
1.60	0.01	3.90	0.01
1.65	0.01	3.95	0.01
1.70	0.01	4.00	0.01
1.75	0.01	4.05	0.20
1.80	0.01	4.10	0.54
1.85	0.01	4.15	0.99
1.90	0.01		
1.95	0.01		
2.00	0.01		
2.05	0.01		
2.10	0.01		
2.15	0.01		
2.20	0.01		
2.25	0.01		

Secret Hills - IMP D.3

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Stage-Area-Storage for Pond 6P: Biofiltration Area D.3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	284
0.05	7	2.35	289
0.10	14	2.40	294
0.15	20	2.45	299
0.20	27	2.50	304
0.25	34	2.55	309
0.30	41	2.60	314
0.35	48	2.65	319
0.40	54	2.70	324
0.45	61	2.75	329
0.50	68	2.80	334
0.55	75	2.85	339
0.60	82	2.90	344
0.65	88	2.95	349
0.70	95	3.00	354
0.75	102	3.05	375
0.80	109	3.10	396
0.85	116	3.15	417
0.90	122	3.20	439
0.95	129	3.25	464
1.00	136	3.30	488
1.05	143	3.35	512
1.10	150	3.40	537
1.15	156	3.45	561
1.20	163	3.50	586
1.25	170	3.55	613
1.30	177	3.60	640
1.35	184	3.65	666
1.40	190	3.70	695
1.45	197	3.75	726
1.50	204	3.80	757
1.55	209	3.85	787
1.60	214	3.90	819
1.65	219	3.95	850
1.70	224	4.00	881
1.75	229	4.05	914
1.80	234	4.10	947
1.85	239	4.15	981
1.90	244		
1.95	249		
2.00	254		
2.05	259		
2.10	264		
2.15	269		
2.20	274		
2.25	279		

Secret Hills - IMP D.3

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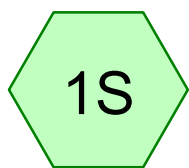
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Project Reports

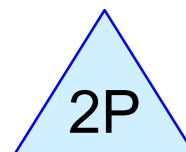
- 1 Routing Diagram
- 2 Area Listing (all nodes)
- 3 Soil Listing (all nodes)
- 4 Ground Covers (all nodes)
- 5 Notes Listing (all nodes)

Current Event

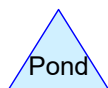
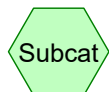
- 6 Node Listing
- 7 Subcat 7S: Basin D.3
- 10 Pond 6P: Biofiltration Area D.3



Basin E.1



Biofiltration Area E.1



Routing Diagram for Secret Hills - IMP E.2

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Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
20,942	0.30	<50% Grass cover, Poor, HSG C (1S)
10,349	0.87	Single Family Residential Development, HSG C (1S)
31,291	0.49	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
31,291	HSG C	1S
0	HSG D	
0	Other	
31,291		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	20,942	0	0	20,942	<50% Grass cover, Poor
0	0	10,349	0	0	10,349	Single Family Residential Development
0	0	31,291	0	0	31,291	TOTAL AREA

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Defined 11 rainfall events from CA-San Diego IDF

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: Basin E.1

Runoff Area=31,291 sf 0.00% Impervious Runoff Depth=0.31"
Tc=5.00 min C=0.49 Runoff=2.62 cfs 812 cf

Pond 2P: Biofiltration Area E.1

Peak Elev=3.53' Storage=802 cf Inflow=2.62 cfs 812 cf
Outflow=0.03 cfs 712 cf

Total Runoff Area = 31,291 sf Runoff Volume = 812 cf Average Runoff Depth = 0.31"
100.00% Pervious = 31,291 sf 0.00% Impervious = 0 sf

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Summary for Subcatchment 1S: Basin E.1

Runoff = 2.62 cfs @ 0.08 hrs, Volume= 812 cf, Depth= 0.31"

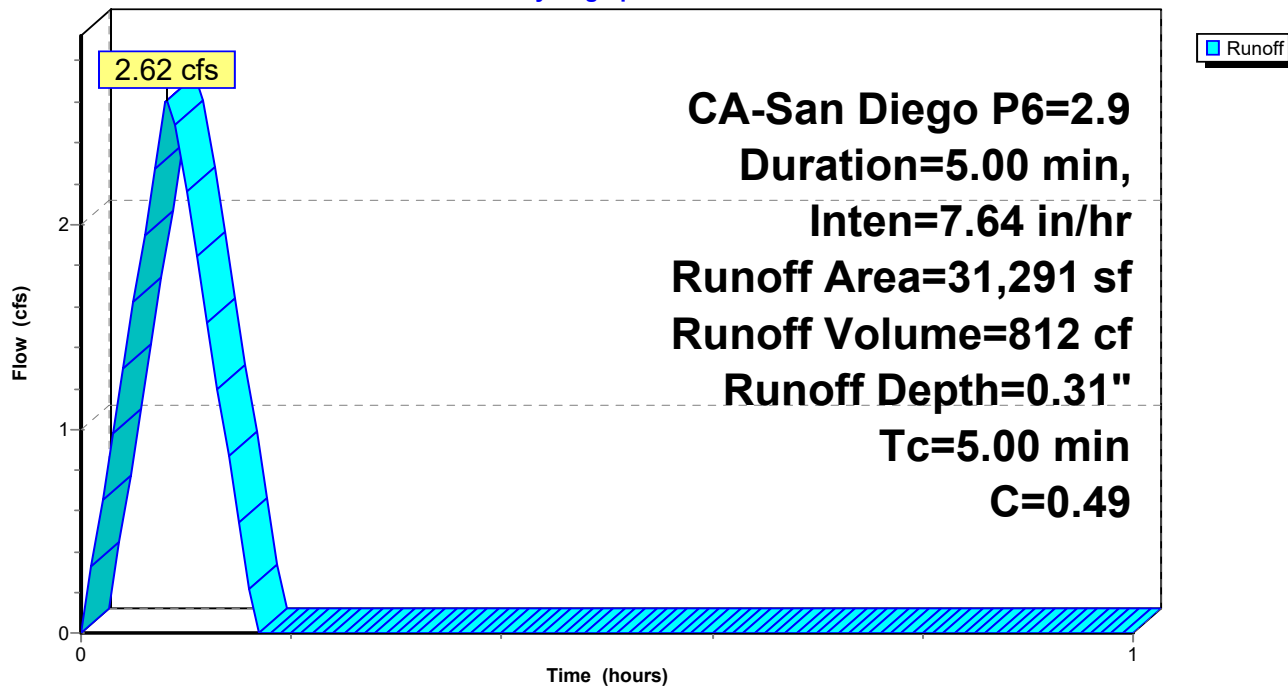
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

Area (sf)	C	Description
10,349	0.87	Single Family Residential Development, HSG C
20,137	0.30	<50% Grass cover, Poor, HSG C
805	0.30	<50% Grass cover, Poor, HSG C
31,291	0.49	Weighted Average
31,291		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry, Tc from RM

Subcatchment 1S: Basin E.1

Hydrograph



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Hydrograph for Subcatchment 1S: Basin E.1

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	2.17	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.00	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.00	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

Secret Hills - IMP E.2

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Hydrograph for Subcatchment 1S: Basin E.1 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

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Summary for Pond 2P: Biofiltration Area E.1

Inflow Area = 31,291 sf, 0.00% Impervious, Inflow Depth = 0.31" for P6=2.9 event
 Inflow = 2.62 cfs @ 0.08 hrs, Volume= 812 cf
 Outflow = 0.03 cfs @ 0.17 hrs, Volume= 712 cf, Atten= 99%, Lag= 5.4 min
 Primary = 0.03 cfs @ 0.17 hrs, Volume= 712 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.53' @ 0.17 hrs Storage= 802 cf

Plug-Flow detention time= 247.8 min calculated for 712 cf (88% of inflow)
 Center-of-Mass det. time= 247.2 min (252.2 - 5.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,288 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	302	302
3.00	191	493
3.17	89	582
3.33	97	679
3.50	105	784
3.67	113	897
3.83	122	1,019
4.00	130	1,149
4.17	139	1,288

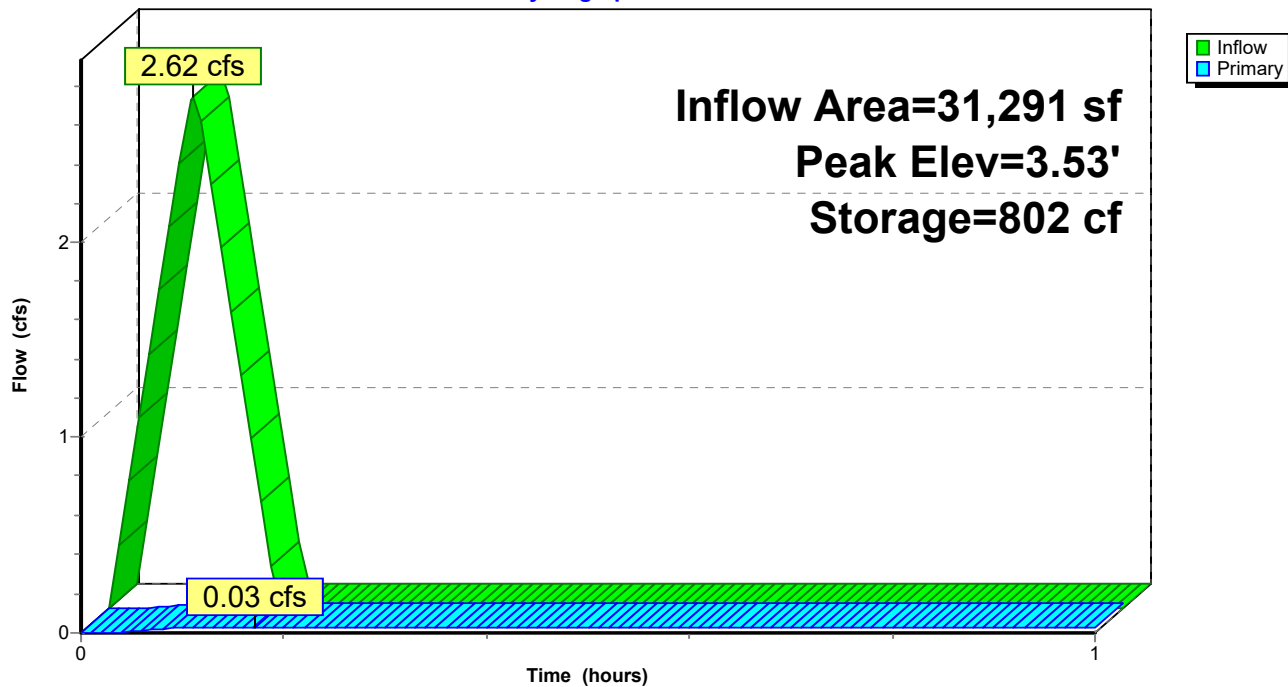
Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	0.8" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir
			Head (feet) 0.20 0.40 0.60 0.80 1.00
			Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.03 cfs @ 0.17 hrs HW=3.53' (Free Discharge)

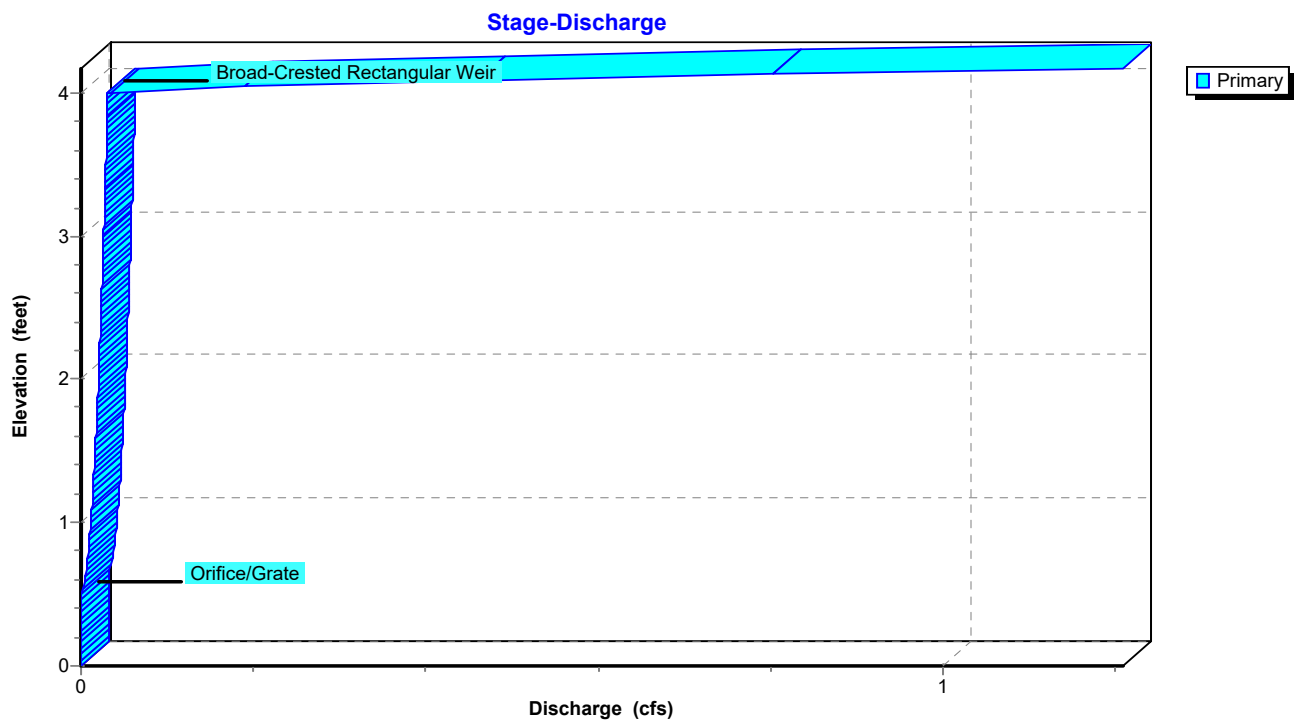
1=Orifice/Grate (Orifice Controls 0.03 cfs @ 8.33 fps)
 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 2P: Biofiltration Area E.1

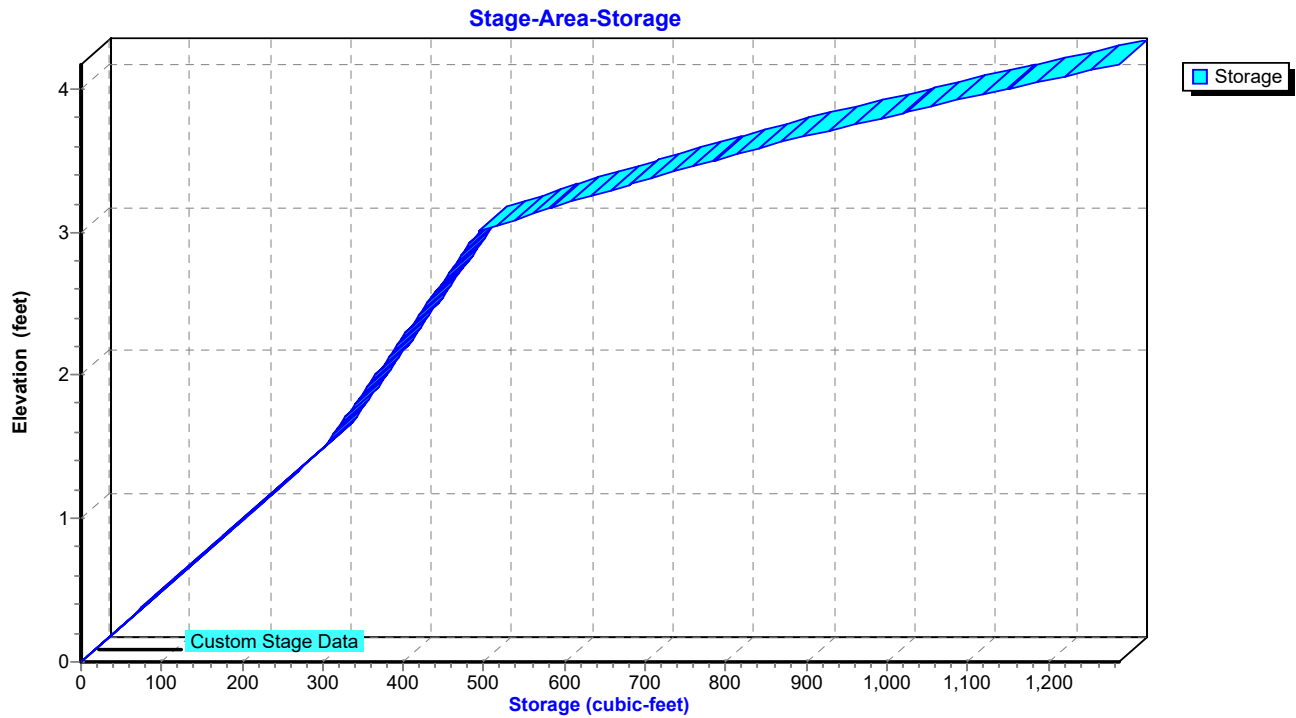
Hydrograph



Pond 2P: Biofiltration Area E.1



Pond 2P: Biofiltration Area E.1



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Hydrograph for Pond 2P: Biofiltration Area E.1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	2.17	547	3.10	0.03
0.20	0.00	799	3.52	0.03
0.30	0.00	788	3.51	0.03
0.40	0.00	778	3.49	0.03
0.50	0.00	767	3.47	0.03
0.60	0.00	757	3.46	0.03
0.70	0.00	747	3.44	0.03
0.80	0.00	736	3.42	0.03
0.90	0.00	726	3.41	0.03
1.00	0.00	716	3.39	0.03
1.10	0.00	706	3.37	0.03
1.20	0.00	696	3.36	0.03
1.30	0.00	685	3.34	0.03
1.40	0.00	675	3.32	0.03
1.50	0.00	665	3.31	0.03
1.60	0.00	655	3.29	0.03
1.70	0.00	645	3.27	0.03
1.80	0.00	635	3.26	0.03
1.90	0.00	625	3.24	0.03
2.00	0.00	615	3.22	0.03
2.10	0.00	605	3.21	0.03
2.20	0.00	595	3.19	0.03
2.30	0.00	586	3.18	0.03
2.40	0.00	576	3.16	0.03
2.50	0.00	566	3.14	0.03
2.60	0.00	556	3.12	0.03
2.70	0.00	546	3.10	0.03
2.80	0.00	537	3.08	0.03
2.90	0.00	527	3.07	0.03
3.00	0.00	518	3.05	0.03
3.10	0.00	508	3.03	0.03
3.20	0.00	498	3.01	0.03
3.30	0.00	489	2.97	0.03
3.40	0.00	480	2.89	0.03
3.50	0.00	470	2.82	0.03
3.60	0.00	461	2.75	0.03
3.70	0.00	452	2.68	0.02
3.80	0.00	443	2.61	0.02
3.90	0.00	435	2.54	0.02
4.00	0.00	426	2.48	0.02
4.10	0.00	418	2.41	0.02
4.20	0.00	410	2.35	0.02
4.30	0.00	402	2.28	0.02
4.40	0.00	394	2.22	0.02
4.50	0.00	386	2.16	0.02

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Hydrograph for Pond 2P: Biofiltration Area E.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	378	2.10	0.02
4.70	0.00	371	2.04	0.02
4.80	0.00	363	1.98	0.02
4.90	0.00	356	1.93	0.02
5.00	0.00	349	1.87	0.02
5.10	0.00	342	1.82	0.02
5.20	0.00	335	1.76	0.02
5.30	0.00	329	1.71	0.02
5.40	0.00	322	1.66	0.02
5.50	0.00	316	1.61	0.02
5.60	0.00	310	1.56	0.02
5.70	0.00	304	1.51	0.02
5.80	0.00	298	1.48	0.02
5.90	0.00	292	1.45	0.02
6.00	0.00	286	1.42	0.02
6.10	0.00	281	1.39	0.02
6.20	0.00	275	1.37	0.02
6.30	0.00	270	1.34	0.02
6.40	0.00	264	1.31	0.01
6.50	0.00	259	1.29	0.01
6.60	0.00	254	1.26	0.01
6.70	0.00	249	1.23	0.01
6.80	0.00	243	1.21	0.01
6.90	0.00	239	1.18	0.01
7.00	0.00	234	1.16	0.01
7.10	0.00	229	1.14	0.01
7.20	0.00	224	1.11	0.01
7.30	0.00	220	1.09	0.01
7.40	0.00	215	1.07	0.01
7.50	0.00	211	1.05	0.01
7.60	0.00	207	1.03	0.01
7.70	0.00	202	1.01	0.01
7.80	0.00	198	0.98	0.01
7.90	0.00	194	0.96	0.01
8.00	0.00	190	0.95	0.01
8.10	0.00	187	0.93	0.01
8.20	0.00	183	0.91	0.01
8.30	0.00	179	0.89	0.01
8.40	0.00	176	0.87	0.01
8.50	0.00	172	0.85	0.01
8.60	0.00	169	0.84	0.01
8.70	0.00	165	0.82	0.01
8.80	0.00	162	0.81	0.01
8.90	0.00	159	0.79	0.01
9.00	0.00	156	0.78	0.01
9.10	0.00	153	0.76	0.01

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Hydrograph for Pond 2P: Biofiltration Area E.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	150	0.75	0.01
9.30	0.00	148	0.73	0.01
9.40	0.00	145	0.72	0.01
9.50	0.00	142	0.71	0.01
9.60	0.00	140	0.69	0.01
9.70	0.00	137	0.68	0.01
9.80	0.00	135	0.67	0.01
9.90	0.00	133	0.66	0.01
10.00	0.00	131	0.65	0.01
10.10	0.00	129	0.64	0.01
10.20	0.00	127	0.63	0.01
10.30	0.00	125	0.62	0.00
10.40	0.00	123	0.61	0.00
10.50	0.00	122	0.60	0.00
10.60	0.00	120	0.60	0.00
10.70	0.00	119	0.59	0.00
10.80	0.00	117	0.58	0.00
10.90	0.00	116	0.58	0.00
11.00	0.00	115	0.57	0.00
11.10	0.00	114	0.57	0.00
11.20	0.00	113	0.56	0.00
11.30	0.00	112	0.56	0.00
11.40	0.00	111	0.55	0.00
11.50	0.00	110	0.55	0.00
11.60	0.00	110	0.55	0.00
11.70	0.00	109	0.54	0.00
11.80	0.00	109	0.54	0.00
11.90	0.00	108	0.54	0.00
12.00	0.00	108	0.53	0.00
12.10	0.00	107	0.53	0.00
12.20	0.00	107	0.53	0.00
12.30	0.00	106	0.53	0.00
12.40	0.00	106	0.53	0.00
12.50	0.00	106	0.52	0.00
12.60	0.00	105	0.52	0.00
12.70	0.00	105	0.52	0.00
12.80	0.00	105	0.52	0.00
12.90	0.00	104	0.52	0.00
13.00	0.00	104	0.52	0.00
13.10	0.00	104	0.52	0.00
13.20	0.00	104	0.52	0.00
13.30	0.00	104	0.51	0.00
13.40	0.00	103	0.51	0.00
13.50	0.00	103	0.51	0.00
13.60	0.00	103	0.51	0.00
13.70	0.00	103	0.51	0.00

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Hydrograph for Pond 2P: Biofiltration Area E.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	103	0.51	0.00
13.90	0.00	103	0.51	0.00
14.00	0.00	102	0.51	0.00
14.10	0.00	102	0.51	0.00
14.20	0.00	102	0.51	0.00
14.30	0.00	102	0.51	0.00
14.40	0.00	102	0.51	0.00
14.50	0.00	102	0.51	0.00
14.60	0.00	102	0.51	0.00
14.70	0.00	102	0.51	0.00
14.80	0.00	102	0.51	0.00
14.90	0.00	102	0.50	0.00
15.00	0.00	102	0.50	0.00
15.10	0.00	102	0.50	0.00
15.20	0.00	101	0.50	0.00
15.30	0.00	101	0.50	0.00
15.40	0.00	101	0.50	0.00
15.50	0.00	101	0.50	0.00
15.60	0.00	101	0.50	0.00
15.70	0.00	101	0.50	0.00
15.80	0.00	101	0.50	0.00
15.90	0.00	101	0.50	0.00
16.00	0.00	101	0.50	0.00
16.10	0.00	101	0.50	0.00
16.20	0.00	101	0.50	0.00
16.30	0.00	101	0.50	0.00
16.40	0.00	101	0.50	0.00
16.50	0.00	101	0.50	0.00
16.60	0.00	101	0.50	0.00
16.70	0.00	101	0.50	0.00
16.80	0.00	101	0.50	0.00
16.90	0.00	101	0.50	0.00
17.00	0.00	101	0.50	0.00
17.10	0.00	101	0.50	0.00
17.20	0.00	101	0.50	0.00
17.30	0.00	101	0.50	0.00
17.40	0.00	101	0.50	0.00
17.50	0.00	101	0.50	0.00
17.60	0.00	101	0.50	0.00
17.70	0.00	101	0.50	0.00
17.80	0.00	101	0.50	0.00
17.90	0.00	101	0.50	0.00
18.00	0.00	101	0.50	0.00
18.10	0.00	101	0.50	0.00
18.20	0.00	101	0.50	0.00
18.30	0.00	101	0.50	0.00

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Hydrograph for Pond 2P: Biofiltration Area E.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	101	0.50	0.00
18.50	0.00	101	0.50	0.00
18.60	0.00	101	0.50	0.00
18.70	0.00	101	0.50	0.00
18.80	0.00	101	0.50	0.00
18.90	0.00	101	0.50	0.00
19.00	0.00	101	0.50	0.00
19.10	0.00	101	0.50	0.00
19.20	0.00	101	0.50	0.00
19.30	0.00	101	0.50	0.00
19.40	0.00	101	0.50	0.00
19.50	0.00	101	0.50	0.00
19.60	0.00	101	0.50	0.00
19.70	0.00	101	0.50	0.00
19.80	0.00	101	0.50	0.00
19.90	0.00	101	0.50	0.00
20.00	0.00	101	0.50	0.00
20.10	0.00	101	0.50	0.00
20.20	0.00	101	0.50	0.00
20.30	0.00	101	0.50	0.00
20.40	0.00	101	0.50	0.00
20.50	0.00	101	0.50	0.00
20.60	0.00	101	0.50	0.00
20.70	0.00	101	0.50	0.00
20.80	0.00	101	0.50	0.00
20.90	0.00	101	0.50	0.00
21.00	0.00	101	0.50	0.00
21.10	0.00	101	0.50	0.00
21.20	0.00	101	0.50	0.00
21.30	0.00	101	0.50	0.00
21.40	0.00	101	0.50	0.00
21.50	0.00	101	0.50	0.00
21.60	0.00	101	0.50	0.00
21.70	0.00	101	0.50	0.00
21.80	0.00	101	0.50	0.00
21.90	0.00	101	0.50	0.00
22.00	0.00	101	0.50	0.00
22.10	0.00	101	0.50	0.00
22.20	0.00	101	0.50	0.00
22.30	0.00	101	0.50	0.00
22.40	0.00	101	0.50	0.00
22.50	0.00	101	0.50	0.00
22.60	0.00	101	0.50	0.00
22.70	0.00	101	0.50	0.00
22.80	0.00	101	0.50	0.00
22.90	0.00	101	0.50	0.00

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Hydrograph for Pond 2P: Biofiltration Area E.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	101	0.50	0.00
23.10	0.00	101	0.50	0.00
23.20	0.00	101	0.50	0.00
23.30	0.00	101	0.50	0.00
23.40	0.00	101	0.50	0.00
23.50	0.00	101	0.50	0.00
23.60	0.00	101	0.50	0.00
23.70	0.00	101	0.50	0.00
23.80	0.00	101	0.50	0.00
23.90	0.00	101	0.50	0.00
24.00	0.00	101	0.50	0.00

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Stage-Discharge for Pond 2P: Biofiltration Area E.1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.02
0.05	0.00	2.35	0.02
0.10	0.00	2.40	0.02
0.15	0.00	2.45	0.02
0.20	0.00	2.50	0.02
0.25	0.00	2.55	0.02
0.30	0.00	2.60	0.02
0.35	0.00	2.65	0.02
0.40	0.00	2.70	0.02
0.45	0.00	2.75	0.03
0.50	0.00	2.80	0.03
0.55	0.00	2.85	0.03
0.60	0.00	2.90	0.03
0.65	0.01	2.95	0.03
0.70	0.01	3.00	0.03
0.75	0.01	3.05	0.03
0.80	0.01	3.10	0.03
0.85	0.01	3.15	0.03
0.90	0.01	3.20	0.03
0.95	0.01	3.25	0.03
1.00	0.01	3.30	0.03
1.05	0.01	3.35	0.03
1.10	0.01	3.40	0.03
1.15	0.01	3.45	0.03
1.20	0.01	3.50	0.03
1.25	0.01	3.55	0.03
1.30	0.01	3.60	0.03
1.35	0.02	3.65	0.03
1.40	0.02	3.70	0.03
1.45	0.02	3.75	0.03
1.50	0.02	3.80	0.03
1.55	0.02	3.85	0.03
1.60	0.02	3.90	0.03
1.65	0.02	3.95	0.03
1.70	0.02	4.00	0.03
1.75	0.02	4.05	0.22
1.80	0.02	4.10	0.56
1.85	0.02	4.15	1.01
1.90	0.02		
1.95	0.02		
2.00	0.02		
2.05	0.02		
2.10	0.02		
2.15	0.02		
2.20	0.02		
2.25	0.02		

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Stage-Area-Storage for Pond 2P: Biofiltration Area E.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	404
0.05	10	2.35	410
0.10	20	2.40	417
0.15	30	2.45	423
0.20	40	2.50	429
0.25	50	2.55	436
0.30	60	2.60	442
0.35	70	2.65	448
0.40	81	2.70	455
0.45	91	2.75	461
0.50	101	2.80	468
0.55	111	2.85	474
0.60	121	2.90	480
0.65	131	2.95	487
0.70	141	3.00	493
0.75	151	3.05	519
0.80	161	3.10	545
0.85	171	3.15	572
0.90	181	3.20	600
0.95	191	3.25	631
1.00	201	3.30	661
1.05	211	3.35	691
1.10	221	3.40	722
1.15	232	3.45	753
1.20	242	3.50	784
1.25	252	3.55	817
1.30	262	3.60	850
1.35	272	3.65	884
1.40	282	3.70	920
1.45	292	3.75	958
1.50	302	3.80	996
1.55	308	3.85	1,034
1.60	315	3.90	1,073
1.65	321	3.95	1,111
1.70	327	4.00	1,149
1.75	334	4.05	1,190
1.80	340	4.10	1,231
1.85	347	4.15	1,272
1.90	353		
1.95	359		
2.00	366		
2.05	372		
2.10	378		
2.15	385		
2.20	391		
2.25	398		

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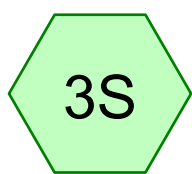
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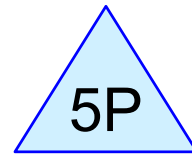
- 1 Routing Diagram
- 2 Area Listing (all nodes)
- 3 Soil Listing (all nodes)
- 4 Ground Covers (all nodes)
- 5 Notes Listing (all nodes)

Current Event

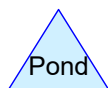
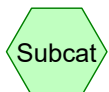
- 6 Node Listing
- 7 Subcat 1S: Basin E.1
- 10 Pond 2P: Biofiltration Area E.1



Basin E.2



Biofiltration Area E.2



Routing Diagram for Secret Hills - IMP E.2

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Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
4,835	0.30	<50% Grass cover, Poor, HSG C (3S)
8,267	0.87	Single Family Residential Development, HSG C (3S)
13,102	0.66	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
13,102	HSG C	3S
0	HSG D	
0	Other	
13,102		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	4,835	0	0	4,835	<50% Grass cover, Poor
0	0	8,267	0	0	8,267	Single Family Residential Development
0	0	13,102	0	0	13,102	TOTAL AREA

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Defined 11 rainfall events from CA-San Diego IDF

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Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment3S: Basin E.2

Runoff Area=13,102 sf 0.00% Impervious Runoff Depth=0.53"
Tc=9.74 min C=0.66 Runoff=0.98 cfs 581 cf

Pond 5P: Biofiltration Area E.2

Peak Elev=3.76' Storage=573 cf Inflow=0.98 cfs 581 cf
Outflow=0.01 cfs 525 cf

Total Runoff Area = 13,102 sf Runoff Volume = 581 cf Average Runoff Depth = 0.53"
100.00% Pervious = 13,102 sf 0.00% Impervious = 0 sf

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Summary for Subcatchment 3S: Basin E.2

Runoff = 0.98 cfs @ 0.16 hrs, Volume= 581 cf, Depth= 0.53"

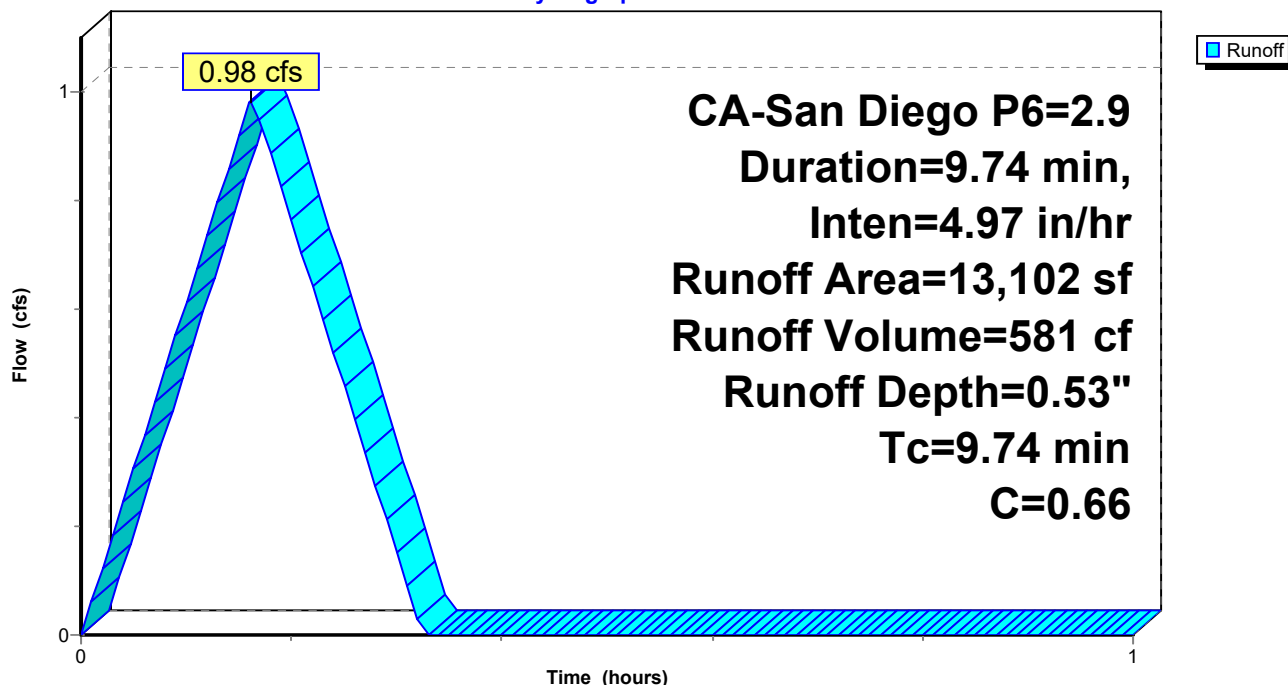
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
CA-San Diego P6=2.9 Duration=9.74 min, Inten=4.97 in/hr

Area (sf)	C	Description
8,267	0.87	Single Family Residential Development, HSG C
4,270	0.30	<50% Grass cover, Poor, HSG C
565	0.30	<50% Grass cover, Poor, HSG C
13,102	0.66	Weighted Average
13,102		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.74					Direct Entry, Tc from RM

Subcatchment 3S: Basin E.2

Hydrograph



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Hydrograph for Subcatchment 3S: Basin E.2

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	0.61	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.76	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.15	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

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Hydrograph for Subcatchment 3S: Basin E.2 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

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Summary for Pond 5P: Biofiltration Area E.2

Inflow Area = 13,102 sf, 0.00% Impervious, Inflow Depth = 0.53" for P6=2.9 event
 Inflow = 0.98 cfs @ 0.16 hrs, Volume= 581 cf
 Outflow = 0.01 cfs @ 0.33 hrs, Volume= 525 cf, Atten= 99%, Lag= 9.9 min
 Primary = 0.01 cfs @ 0.33 hrs, Volume= 525 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.76' @ 0.33 hrs Storage= 573 cf

Plug-Flow detention time= 425.5 min calculated for 525 cf (90% of inflow)
 Center-of-Mass det. time= 425.2 min (434.9 - 9.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	796 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	168	168
3.00	107	275
3.17	51	326
3.33	59	385
3.50	66	451
3.67	74	525
3.83	82	607
4.00	90	697
4.17	99	796

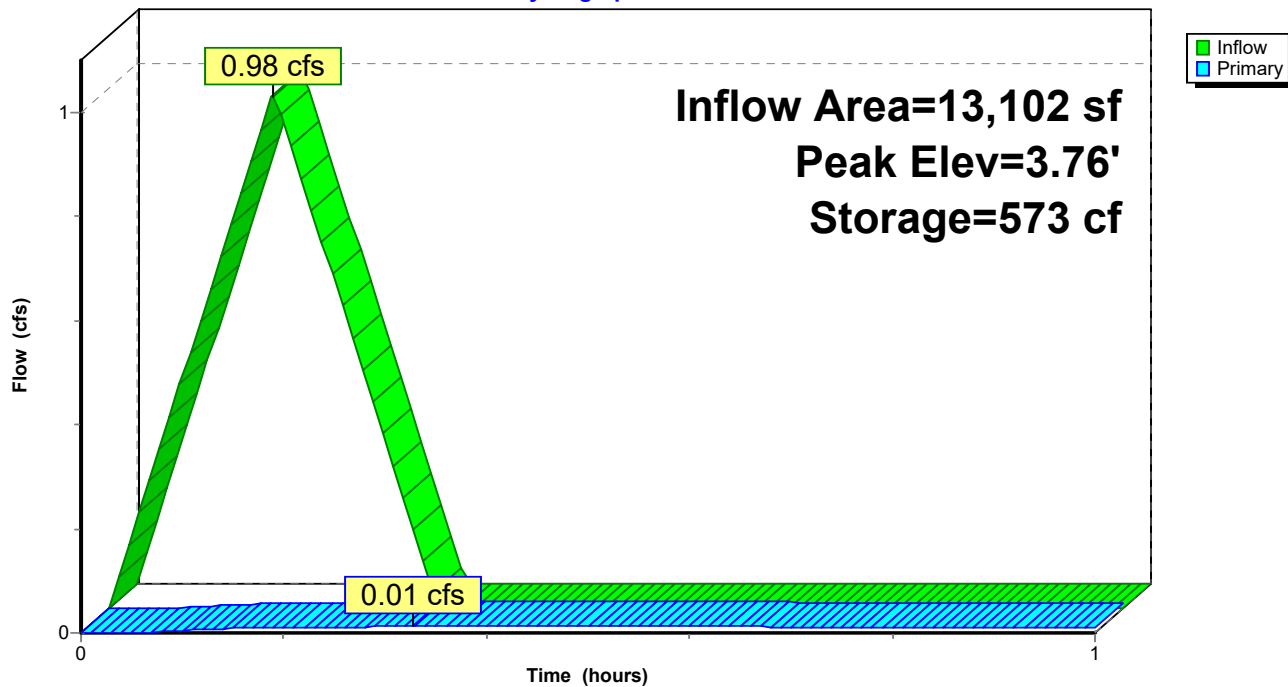
Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	0.5" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.01 cfs @ 0.33 hrs HW=3.76' (Free Discharge)

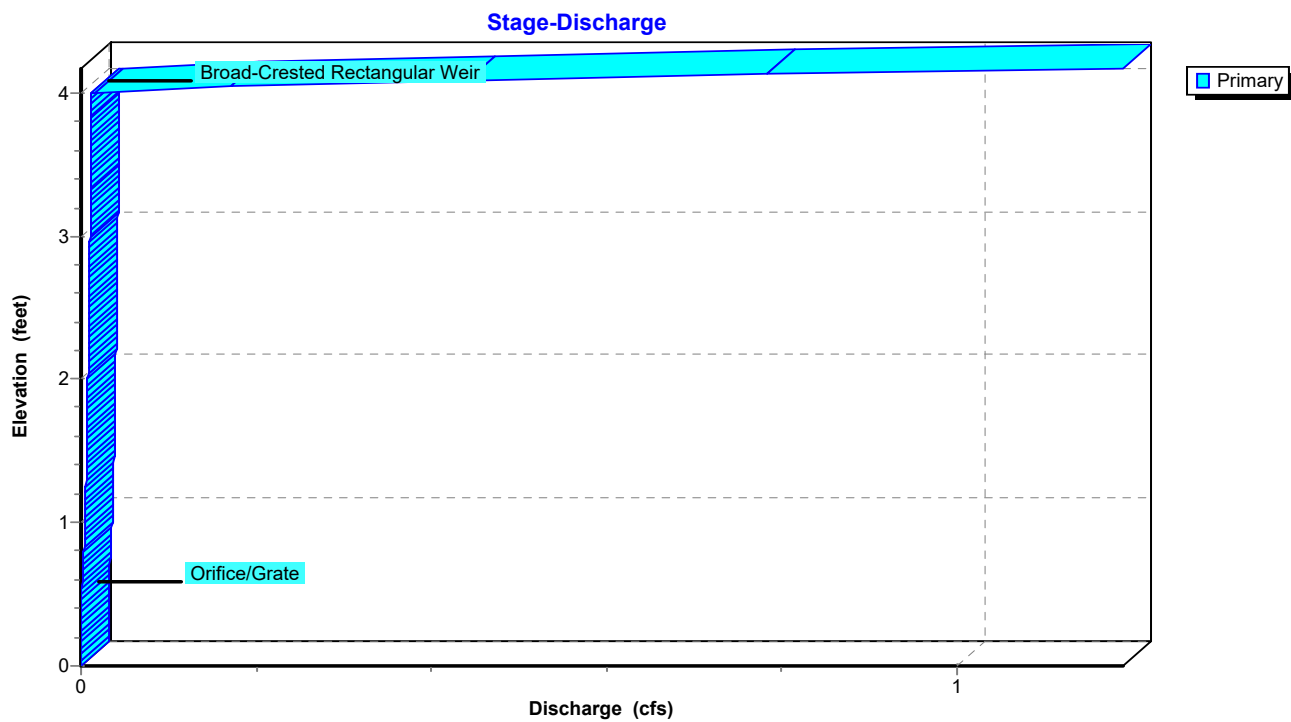
1=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.67 fps)
 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Biofiltration Area E.2

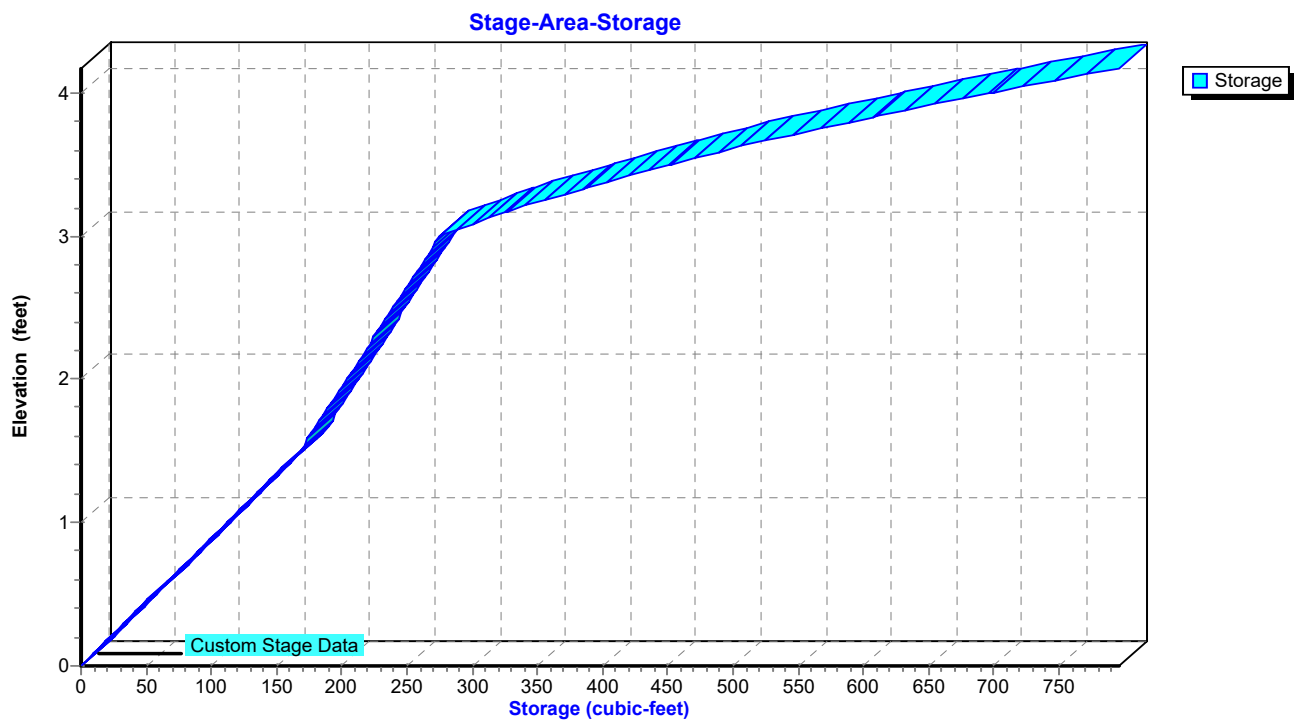
Hydrograph



Pond 5P: Biofiltration Area E.2



Pond 5P: Biofiltration Area E.2



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Hydrograph for Pond 5P: Biofiltration Area E.2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	0.61	110	0.98	0.00
0.20	0.76	406	3.38	0.01
0.30	0.15	567	3.75	0.01
0.40	0.00	570	3.76	0.01
0.50	0.00	565	3.75	0.01
0.60	0.00	561	3.74	0.01
0.70	0.00	557	3.73	0.01
0.80	0.00	553	3.72	0.01
0.90	0.00	548	3.72	0.01
1.00	0.00	544	3.71	0.01
1.10	0.00	540	3.70	0.01
1.20	0.00	536	3.69	0.01
1.30	0.00	531	3.68	0.01
1.40	0.00	527	3.67	0.01
1.50	0.00	523	3.67	0.01
1.60	0.00	519	3.66	0.01
1.70	0.00	515	3.65	0.01
1.80	0.00	511	3.64	0.01
1.90	0.00	506	3.63	0.01
2.00	0.00	502	3.62	0.01
2.10	0.00	498	3.61	0.01
2.20	0.00	494	3.60	0.01
2.30	0.00	490	3.59	0.01
2.40	0.00	486	3.58	0.01
2.50	0.00	481	3.57	0.01
2.60	0.00	477	3.56	0.01
2.70	0.00	473	3.55	0.01
2.80	0.00	469	3.54	0.01
2.90	0.00	465	3.53	0.01
3.00	0.00	461	3.52	0.01
3.10	0.00	457	3.51	0.01
3.20	0.00	453	3.50	0.01
3.30	0.00	449	3.49	0.01
3.40	0.00	445	3.48	0.01
3.50	0.00	441	3.47	0.01
3.60	0.00	436	3.46	0.01
3.70	0.00	432	3.45	0.01
3.80	0.00	428	3.44	0.01
3.90	0.00	424	3.43	0.01
4.00	0.00	420	3.42	0.01
4.10	0.00	416	3.41	0.01
4.20	0.00	412	3.40	0.01
4.30	0.00	408	3.39	0.01
4.40	0.00	404	3.38	0.01
4.50	0.00	400	3.37	0.01

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Hydrograph for Pond 5P: Biofiltration Area E.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	396	3.36	0.01
4.70	0.00	392	3.35	0.01
4.80	0.00	388	3.34	0.01
4.90	0.00	384	3.33	0.01
5.00	0.00	380	3.32	0.01
5.10	0.00	376	3.31	0.01
5.20	0.00	373	3.30	0.01
5.30	0.00	369	3.29	0.01
5.40	0.00	365	3.27	0.01
5.50	0.00	361	3.26	0.01
5.60	0.00	357	3.25	0.01
5.70	0.00	353	3.24	0.01
5.80	0.00	349	3.23	0.01
5.90	0.00	345	3.22	0.01
6.00	0.00	341	3.21	0.01
6.10	0.00	337	3.20	0.01
6.20	0.00	334	3.19	0.01
6.30	0.00	330	3.18	0.01
6.40	0.00	326	3.17	0.01
6.50	0.00	322	3.16	0.01
6.60	0.00	318	3.14	0.01
6.70	0.00	314	3.13	0.01
6.80	0.00	311	3.12	0.01
6.90	0.00	307	3.11	0.01
7.00	0.00	303	3.09	0.01
7.10	0.00	299	3.08	0.01
7.20	0.00	295	3.07	0.01
7.30	0.00	292	3.06	0.01
7.40	0.00	288	3.04	0.01
7.50	0.00	284	3.03	0.01
7.60	0.00	280	3.02	0.01
7.70	0.00	277	3.01	0.01
7.80	0.00	273	2.97	0.01
7.90	0.00	269	2.92	0.01
8.00	0.00	266	2.87	0.01
8.10	0.00	262	2.82	0.01
8.20	0.00	258	2.77	0.01
8.30	0.00	255	2.72	0.01
8.40	0.00	251	2.67	0.01
8.50	0.00	248	2.62	0.01
8.60	0.00	245	2.57	0.01
8.70	0.00	241	2.53	0.01
8.80	0.00	238	2.48	0.01
8.90	0.00	235	2.43	0.01
9.00	0.00	231	2.39	0.01
9.10	0.00	228	2.34	0.01

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Hydrograph for Pond 5P: Biofiltration Area E.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	225	2.30	0.01
9.30	0.00	222	2.25	0.01
9.40	0.00	219	2.21	0.01
9.50	0.00	216	2.17	0.01
9.60	0.00	213	2.13	0.01
9.70	0.00	210	2.08	0.01
9.80	0.00	207	2.04	0.01
9.90	0.00	204	2.00	0.01
10.00	0.00	201	1.96	0.01
10.10	0.00	198	1.92	0.01
10.20	0.00	195	1.88	0.01
10.30	0.00	193	1.85	0.01
10.40	0.00	190	1.81	0.01
10.50	0.00	187	1.77	0.01
10.60	0.00	185	1.73	0.01
10.70	0.00	182	1.70	0.01
10.80	0.00	180	1.66	0.01
10.90	0.00	177	1.63	0.01
11.00	0.00	175	1.59	0.01
11.10	0.00	172	1.56	0.01
11.20	0.00	170	1.52	0.01
11.30	0.00	167	1.49	0.01
11.40	0.00	165	1.47	0.01
11.50	0.00	163	1.45	0.01
11.60	0.00	161	1.43	0.01
11.70	0.00	158	1.41	0.01
11.80	0.00	156	1.39	0.01
11.90	0.00	154	1.37	0.01
12.00	0.00	152	1.35	0.01
12.10	0.00	150	1.34	0.01
12.20	0.00	147	1.32	0.01
12.30	0.00	145	1.30	0.01
12.40	0.00	143	1.28	0.01
12.50	0.00	141	1.26	0.01
12.60	0.00	139	1.24	0.01
12.70	0.00	137	1.23	0.01
12.80	0.00	135	1.21	0.01
12.90	0.00	133	1.19	0.01
13.00	0.00	131	1.17	0.01
13.10	0.00	129	1.16	0.01
13.20	0.00	128	1.14	0.01
13.30	0.00	126	1.12	0.01
13.40	0.00	124	1.11	0.01
13.50	0.00	122	1.09	0.00
13.60	0.00	120	1.07	0.00
13.70	0.00	119	1.06	0.00

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Hydrograph for Pond 5P: Biofiltration Area E.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	117	1.04	0.00
13.90	0.00	115	1.03	0.00
14.00	0.00	114	1.01	0.00
14.10	0.00	112	1.00	0.00
14.20	0.00	110	0.98	0.00
14.30	0.00	109	0.97	0.00
14.40	0.00	107	0.96	0.00
14.50	0.00	106	0.94	0.00
14.60	0.00	104	0.93	0.00
14.70	0.00	103	0.92	0.00
14.80	0.00	101	0.90	0.00
14.90	0.00	100	0.89	0.00
15.00	0.00	98	0.88	0.00
15.10	0.00	97	0.86	0.00
15.20	0.00	95	0.85	0.00
15.30	0.00	94	0.84	0.00
15.40	0.00	93	0.83	0.00
15.50	0.00	91	0.82	0.00
15.60	0.00	90	0.81	0.00
15.70	0.00	89	0.79	0.00
15.80	0.00	88	0.78	0.00
15.90	0.00	87	0.77	0.00
16.00	0.00	85	0.76	0.00
16.10	0.00	84	0.75	0.00
16.20	0.00	83	0.74	0.00
16.30	0.00	82	0.73	0.00
16.40	0.00	81	0.72	0.00
16.50	0.00	80	0.71	0.00
16.60	0.00	79	0.70	0.00
16.70	0.00	78	0.69	0.00
16.80	0.00	77	0.69	0.00
16.90	0.00	76	0.68	0.00
17.00	0.00	75	0.67	0.00
17.10	0.00	74	0.66	0.00
17.20	0.00	73	0.65	0.00
17.30	0.00	72	0.65	0.00
17.40	0.00	72	0.64	0.00
17.50	0.00	71	0.63	0.00
17.60	0.00	70	0.62	0.00
17.70	0.00	69	0.62	0.00
17.80	0.00	69	0.61	0.00
17.90	0.00	68	0.61	0.00
18.00	0.00	67	0.60	0.00
18.10	0.00	66	0.59	0.00
18.20	0.00	66	0.59	0.00
18.30	0.00	65	0.58	0.00

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Hydrograph for Pond 5P: Biofiltration Area E.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	65	0.58	0.00
18.50	0.00	64	0.57	0.00
18.60	0.00	64	0.57	0.00
18.70	0.00	63	0.56	0.00
18.80	0.00	63	0.56	0.00
18.90	0.00	62	0.56	0.00
19.00	0.00	62	0.55	0.00
19.10	0.00	61	0.55	0.00
19.20	0.00	61	0.55	0.00
19.30	0.00	61	0.54	0.00
19.40	0.00	60	0.54	0.00
19.50	0.00	60	0.54	0.00
19.60	0.00	60	0.53	0.00
19.70	0.00	60	0.53	0.00
19.80	0.00	59	0.53	0.00
19.90	0.00	59	0.53	0.00
20.00	0.00	59	0.53	0.00
20.10	0.00	59	0.52	0.00
20.20	0.00	58	0.52	0.00
20.30	0.00	58	0.52	0.00
20.40	0.00	58	0.52	0.00
20.50	0.00	58	0.52	0.00
20.60	0.00	58	0.52	0.00
20.70	0.00	58	0.52	0.00
20.80	0.00	58	0.51	0.00
20.90	0.00	57	0.51	0.00
21.00	0.00	57	0.51	0.00
21.10	0.00	57	0.51	0.00
21.20	0.00	57	0.51	0.00
21.30	0.00	57	0.51	0.00
21.40	0.00	57	0.51	0.00
21.50	0.00	57	0.51	0.00
21.60	0.00	57	0.51	0.00
21.70	0.00	57	0.51	0.00
21.80	0.00	57	0.51	0.00
21.90	0.00	57	0.51	0.00
22.00	0.00	57	0.51	0.00
22.10	0.00	57	0.51	0.00
22.20	0.00	57	0.51	0.00
22.30	0.00	57	0.50	0.00
22.40	0.00	57	0.50	0.00
22.50	0.00	56	0.50	0.00
22.60	0.00	56	0.50	0.00
22.70	0.00	56	0.50	0.00
22.80	0.00	56	0.50	0.00
22.90	0.00	56	0.50	0.00

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Hydrograph for Pond 5P: Biofiltration Area E.2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	56	0.50	0.00
23.10	0.00	56	0.50	0.00
23.20	0.00	56	0.50	0.00
23.30	0.00	56	0.50	0.00
23.40	0.00	56	0.50	0.00
23.50	0.00	56	0.50	0.00
23.60	0.00	56	0.50	0.00
23.70	0.00	56	0.50	0.00
23.80	0.00	56	0.50	0.00
23.90	0.00	56	0.50	0.00
24.00	0.00	56	0.50	0.00

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Stage-Discharge for Pond 5P: Biofiltration Area E.2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.01
0.05	0.00	2.35	0.01
0.10	0.00	2.40	0.01
0.15	0.00	2.45	0.01
0.20	0.00	2.50	0.01
0.25	0.00	2.55	0.01
0.30	0.00	2.60	0.01
0.35	0.00	2.65	0.01
0.40	0.00	2.70	0.01
0.45	0.00	2.75	0.01
0.50	0.00	2.80	0.01
0.55	0.00	2.85	0.01
0.60	0.00	2.90	0.01
0.65	0.00	2.95	0.01
0.70	0.00	3.00	0.01
0.75	0.00	3.05	0.01
0.80	0.00	3.10	0.01
0.85	0.00	3.15	0.01
0.90	0.00	3.20	0.01
0.95	0.00	3.25	0.01
1.00	0.00	3.30	0.01
1.05	0.00	3.35	0.01
1.10	0.00	3.40	0.01
1.15	0.01	3.45	0.01
1.20	0.01	3.50	0.01
1.25	0.01	3.55	0.01
1.30	0.01	3.60	0.01
1.35	0.01	3.65	0.01
1.40	0.01	3.70	0.01
1.45	0.01	3.75	0.01
1.50	0.01	3.80	0.01
1.55	0.01	3.85	0.01
1.60	0.01	3.90	0.01
1.65	0.01	3.95	0.01
1.70	0.01	4.00	0.01
1.75	0.01	4.05	0.20
1.80	0.01	4.10	0.54
1.85	0.01	4.15	0.99
1.90	0.01		
1.95	0.01		
2.00	0.01		
2.05	0.01		
2.10	0.01		
2.15	0.01		
2.20	0.01		
2.25	0.01		

Secret Hills - IMP E.2

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CA-San Diego P6=2.9 Duration=9.74 min, Inten=4.97 in/hr

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Stage-Area-Storage for Pond 5P: Biofiltration Area E.2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	225
0.05	6	2.35	229
0.10	11	2.40	232
0.15	17	2.45	236
0.20	22	2.50	239
0.25	28	2.55	243
0.30	34	2.60	246
0.35	39	2.65	250
0.40	45	2.70	254
0.45	50	2.75	257
0.50	56	2.80	261
0.55	62	2.85	264
0.60	67	2.90	268
0.65	73	2.95	271
0.70	78	3.00	275
0.75	84	3.05	290
0.80	90	3.10	305
0.85	95	3.15	320
0.90	101	3.20	337
0.95	106	3.25	356
1.00	112	3.30	374
1.05	118	3.35	393
1.10	123	3.40	412
1.15	129	3.45	432
1.20	134	3.50	451
1.25	140	3.55	473
1.30	146	3.60	495
1.35	151	3.65	516
1.40	157	3.70	540
1.45	162	3.75	566
1.50	168	3.80	592
1.55	172	3.85	618
1.60	175	3.90	644
1.65	179	3.95	671
1.70	182	4.00	697
1.75	186	4.05	726
1.80	189	4.10	755
1.85	193	4.15	784
1.90	197		
1.95	200		
2.00	204		
2.05	207		
2.10	211		
2.15	214		
2.20	218		
2.25	222		

Secret Hills - IMP E.2

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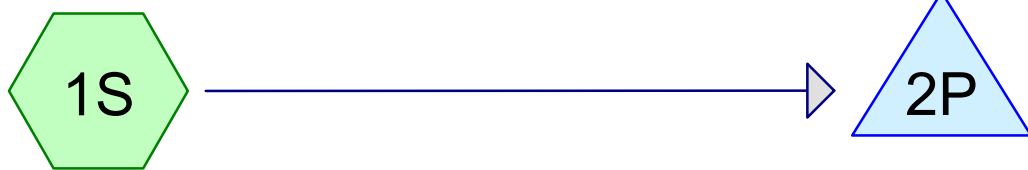
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- 3 Soil Listing (all nodes)
- 4 Ground Covers (all nodes)
- 5 Notes Listing (all nodes)

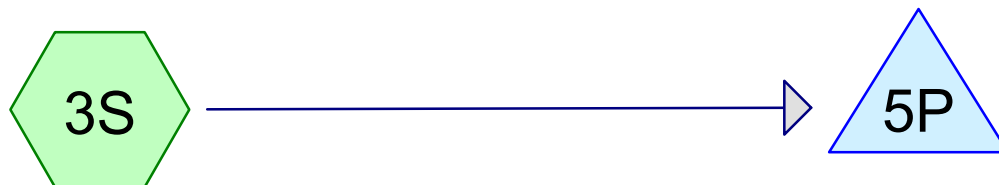
Current Event

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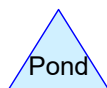
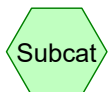
Basin F.1

Biofiltration Area F.1



Basin G.1

Biofiltration Area G.1



Routing Diagram for Secret Hills - Area F & G IMPs

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Secret Hills - Area F & G IMPs

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Area Listing (all nodes)

Area (sq-ft)	C	Description (subcatchment-numbers)
8,124	0.30	<50% Grass cover, Poor, HSG C (1S, 3S)
18,616	0.87	Single Family Residential Development, HSG C (1S, 3S)
26,740	0.70	TOTAL AREA

Secret Hills - Area F & G IMPs

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
26,740	HSG C	1S, 3S
0	HSG D	
0	Other	
26,740		TOTAL AREA

Secret Hills - Area F & G IMPs

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Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
0	0	8,124	0	0	8,124	<50% Grass cover, Poor
0	0	18,616	0	0	18,616	Single Family Residential Development
0	0	26,740	0	0	26,740	TOTAL AREA

Secret Hills - Area F & G IMPs

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Notes Listing (all nodes)

Line#	Node Number	Notes
1	Project	Defined 11 rainfall events from CA-San Diego IDF

Time span=0.00-24.00 hrs, dt=0.01 hrs, 2401 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: Basin F.1	Runoff Area=7,333 sf 0.00% Impervious Runoff Depth=0.47" Tc=5.00 min C=0.74 Runoff=0.93 cfs 288 cf
Subcatchment 3S: Basin G.1	Runoff Area=19,407 sf 0.00% Impervious Runoff Depth=0.43" Tc=5.00 min C=0.68 Runoff=2.25 cfs 699 cf
Pond 2P: Biofiltration Area F.1	Peak Elev=3.42' Storage=285 cf Inflow=0.93 cfs 288 cf Outflow=0.01 cfs 249 cf
Pond 5P: Biofiltration Area G.1	Peak Elev=3.20' Storage=694 cf Inflow=2.25 cfs 699 cf Outflow=0.02 cfs 582 cf

Total Runoff Area = 26,740 sf Runoff Volume = 987 cf Average Runoff Depth = 0.44"
100.00% Pervious = 26,740 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Basin F.1

Runoff = 0.93 cfs @ 0.08 hrs, Volume= 288 cf, Depth= 0.47"

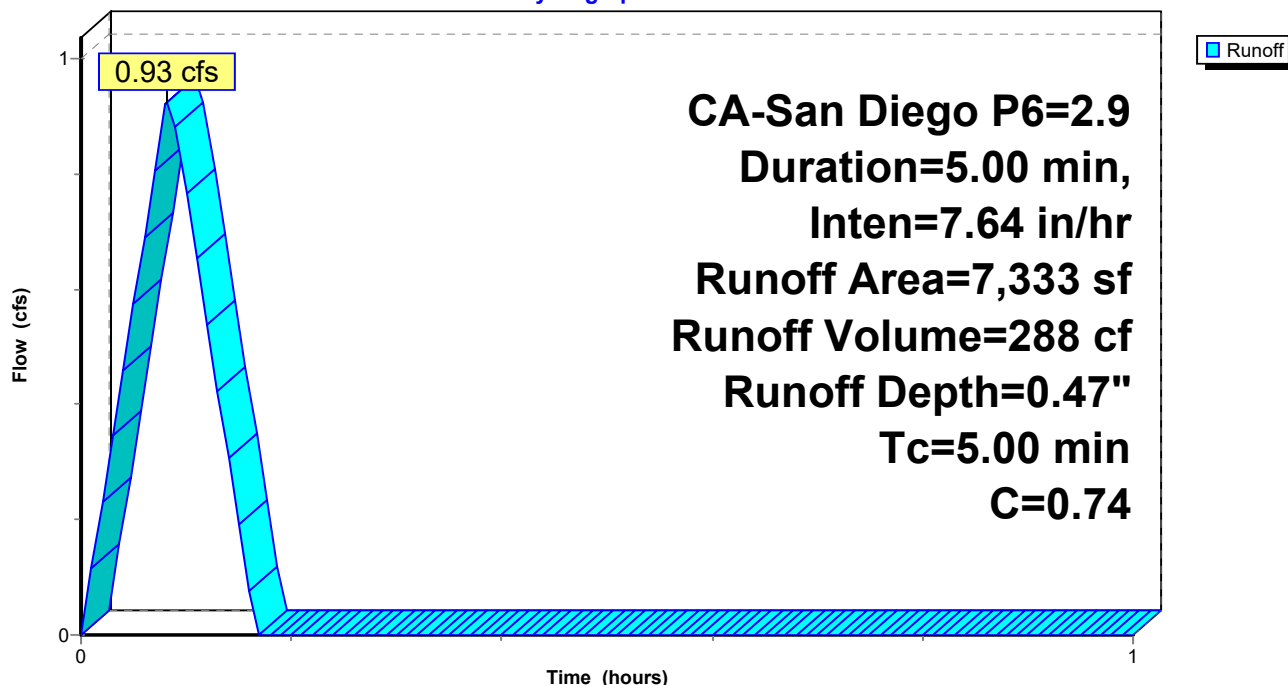
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

Area (sf)	C	Description
5,661	0.87	Single Family Residential Development, HSG C
1,292	0.30	<50% Grass cover, Poor, HSG C
380	0.30	<50% Grass cover, Poor, HSG C
7,333	0.74	Weighted Average
7,333		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry, Tc from RM

Subcatchment 1S: Basin F.1

Hydrograph



Hydrograph for Subcatchment 1S: Basin F.1

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	0.77	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.00	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.00	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

Hydrograph for Subcatchment 1S: Basin F.1 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

Summary for Subcatchment 3S: Basin G.1

Runoff = 2.25 cfs @ 0.08 hrs, Volume= 699 cf, Depth= 0.43"

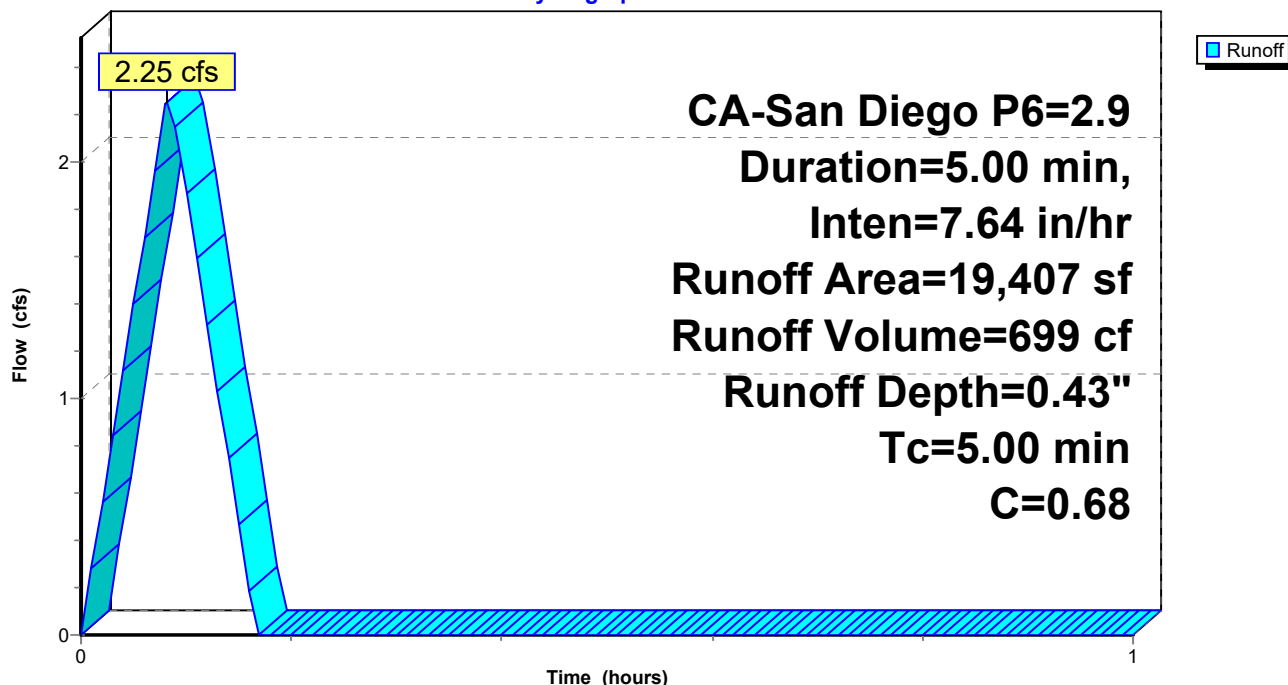
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 CA-San Diego P6=2.9 Duration=5.00 min, Inten=7.64 in/hr

Area (sf)	C	Description
12,955	0.87	Single Family Residential Development, HSG C
5,572	0.30	<50% Grass cover, Poor, HSG C
880	0.30	<50% Grass cover, Poor, HSG C
19,407	0.68	Weighted Average
19,407		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.00					Direct Entry, Tc from RM

Subcatchment 3S: Basin G.1

Hydrograph



Hydrograph for Subcatchment 3S: Basin G.1

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
0.00	0.00	4.60	0.00	9.20	0.00	13.80	0.00
0.10	1.87	4.70	0.00	9.30	0.00	13.90	0.00
0.20	0.00	4.80	0.00	9.40	0.00	14.00	0.00
0.30	0.00	4.90	0.00	9.50	0.00	14.10	0.00
0.40	0.00	5.00	0.00	9.60	0.00	14.20	0.00
0.50	0.00	5.10	0.00	9.70	0.00	14.30	0.00
0.60	0.00	5.20	0.00	9.80	0.00	14.40	0.00
0.70	0.00	5.30	0.00	9.90	0.00	14.50	0.00
0.80	0.00	5.40	0.00	10.00	0.00	14.60	0.00
0.90	0.00	5.50	0.00	10.10	0.00	14.70	0.00
1.00	0.00	5.60	0.00	10.20	0.00	14.80	0.00
1.10	0.00	5.70	0.00	10.30	0.00	14.90	0.00
1.20	0.00	5.80	0.00	10.40	0.00	15.00	0.00
1.30	0.00	5.90	0.00	10.50	0.00	15.10	0.00
1.40	0.00	6.00	0.00	10.60	0.00	15.20	0.00
1.50	0.00	6.10	0.00	10.70	0.00	15.30	0.00
1.60	0.00	6.20	0.00	10.80	0.00	15.40	0.00
1.70	0.00	6.30	0.00	10.90	0.00	15.50	0.00
1.80	0.00	6.40	0.00	11.00	0.00	15.60	0.00
1.90	0.00	6.50	0.00	11.10	0.00	15.70	0.00
2.00	0.00	6.60	0.00	11.20	0.00	15.80	0.00
2.10	0.00	6.70	0.00	11.30	0.00	15.90	0.00
2.20	0.00	6.80	0.00	11.40	0.00	16.00	0.00
2.30	0.00	6.90	0.00	11.50	0.00	16.10	0.00
2.40	0.00	7.00	0.00	11.60	0.00	16.20	0.00
2.50	0.00	7.10	0.00	11.70	0.00	16.30	0.00
2.60	0.00	7.20	0.00	11.80	0.00	16.40	0.00
2.70	0.00	7.30	0.00	11.90	0.00	16.50	0.00
2.80	0.00	7.40	0.00	12.00	0.00	16.60	0.00
2.90	0.00	7.50	0.00	12.10	0.00	16.70	0.00
3.00	0.00	7.60	0.00	12.20	0.00	16.80	0.00
3.10	0.00	7.70	0.00	12.30	0.00	16.90	0.00
3.20	0.00	7.80	0.00	12.40	0.00	17.00	0.00
3.30	0.00	7.90	0.00	12.50	0.00	17.10	0.00
3.40	0.00	8.00	0.00	12.60	0.00	17.20	0.00
3.50	0.00	8.10	0.00	12.70	0.00	17.30	0.00
3.60	0.00	8.20	0.00	12.80	0.00	17.40	0.00
3.70	0.00	8.30	0.00	12.90	0.00	17.50	0.00
3.80	0.00	8.40	0.00	13.00	0.00	17.60	0.00
3.90	0.00	8.50	0.00	13.10	0.00	17.70	0.00
4.00	0.00	8.60	0.00	13.20	0.00	17.80	0.00
4.10	0.00	8.70	0.00	13.30	0.00	17.90	0.00
4.20	0.00	8.80	0.00	13.40	0.00	18.00	0.00
4.30	0.00	8.90	0.00	13.50	0.00	18.10	0.00
4.40	0.00	9.00	0.00	13.60	0.00	18.20	0.00
4.50	0.00	9.10	0.00	13.70	0.00	18.30	0.00

Hydrograph for Subcatchment 3S: Basin G.1 (continued)

Time (hours)	Runoff (cfs)	Time (hours)	Runoff (cfs)
18.40	0.00	23.00	0.00
18.50	0.00	23.10	0.00
18.60	0.00	23.20	0.00
18.70	0.00	23.30	0.00
18.80	0.00	23.40	0.00
18.90	0.00	23.50	0.00
19.00	0.00	23.60	0.00
19.10	0.00	23.70	0.00
19.20	0.00	23.80	0.00
19.30	0.00	23.90	0.00
19.40	0.00	24.00	0.00
19.50	0.00		
19.60	0.00		
19.70	0.00		
19.80	0.00		
19.90	0.00		
20.00	0.00		
20.10	0.00		
20.20	0.00		
20.30	0.00		
20.40	0.00		
20.50	0.00		
20.60	0.00		
20.70	0.00		
20.80	0.00		
20.90	0.00		
21.00	0.00		
21.10	0.00		
21.20	0.00		
21.30	0.00		
21.40	0.00		
21.50	0.00		
21.60	0.00		
21.70	0.00		
21.80	0.00		
21.90	0.00		
22.00	0.00		
22.10	0.00		
22.20	0.00		
22.30	0.00		
22.40	0.00		
22.50	0.00		
22.60	0.00		
22.70	0.00		
22.80	0.00		
22.90	0.00		

Summary for Pond 2P: Biofiltration Area F.1

Inflow Area = 7,333 sf, 0.00% Impervious, Inflow Depth = 0.47" for P6=2.9 event
 Inflow = 0.93 cfs @ 0.08 hrs, Volume= 288 cf
 Outflow = 0.01 cfs @ 0.17 hrs, Volume= 249 cf, Atten= 99%, Lag= 5.4 min
 Primary = 0.01 cfs @ 0.17 hrs, Volume= 249 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.42' @ 0.17 hrs Storage= 285 cf

Plug-Flow detention time= 354.7 min calculated for 249 cf (87% of inflow)
 Center-of-Mass det. time= 354.2 min (359.2 - 5.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	535 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	114	114
3.00	73	187
3.17	35	222
3.33	39	261
3.50	44	305
3.67	49	354
3.83	55	409
4.00	60	469
4.17	66	535

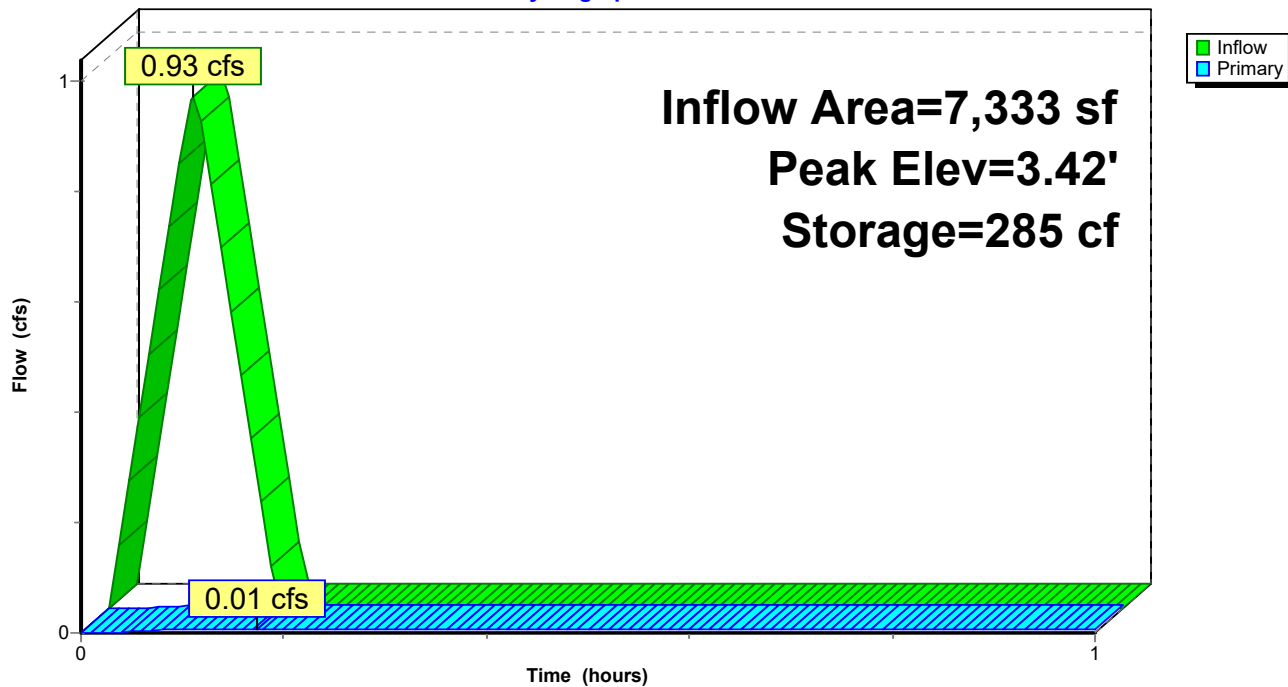
Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	0.4" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.01 cfs @ 0.17 hrs HW=3.42' (Free Discharge)

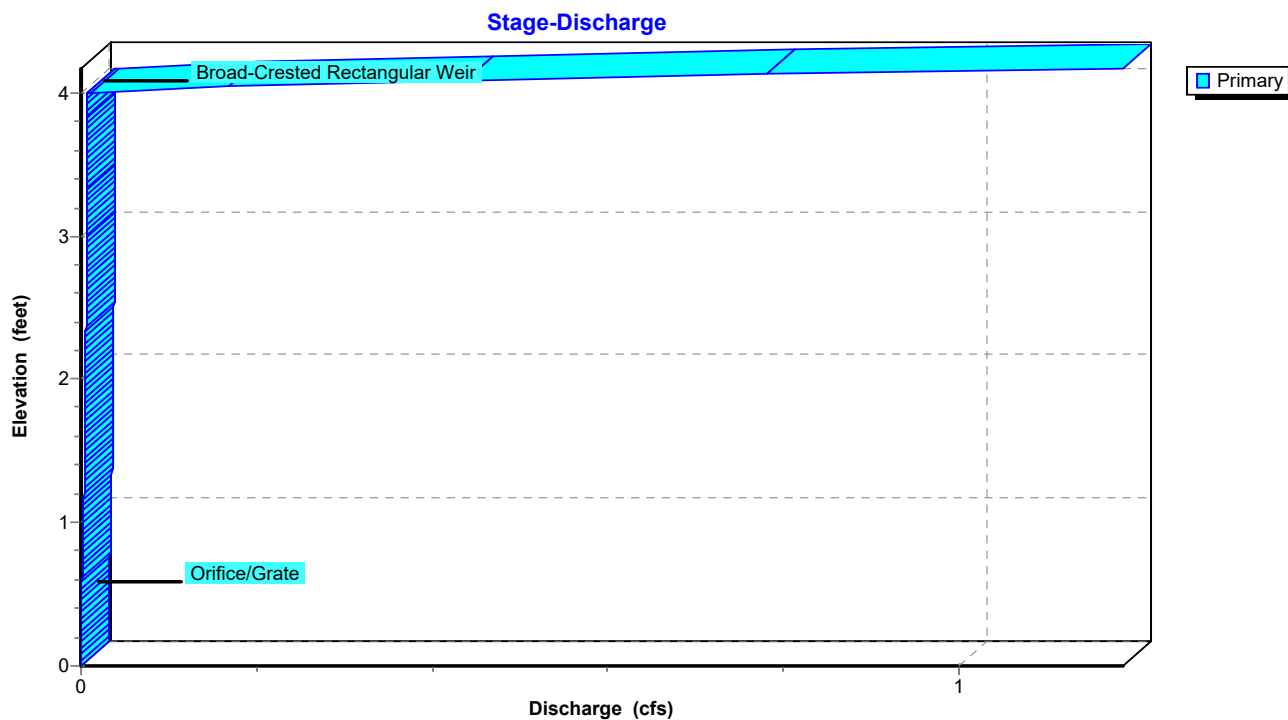
1=Orifice/Grate (Orifice Controls 0.01 cfs @ 8.21 fps)
 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 2P: Biofiltration Area F.1

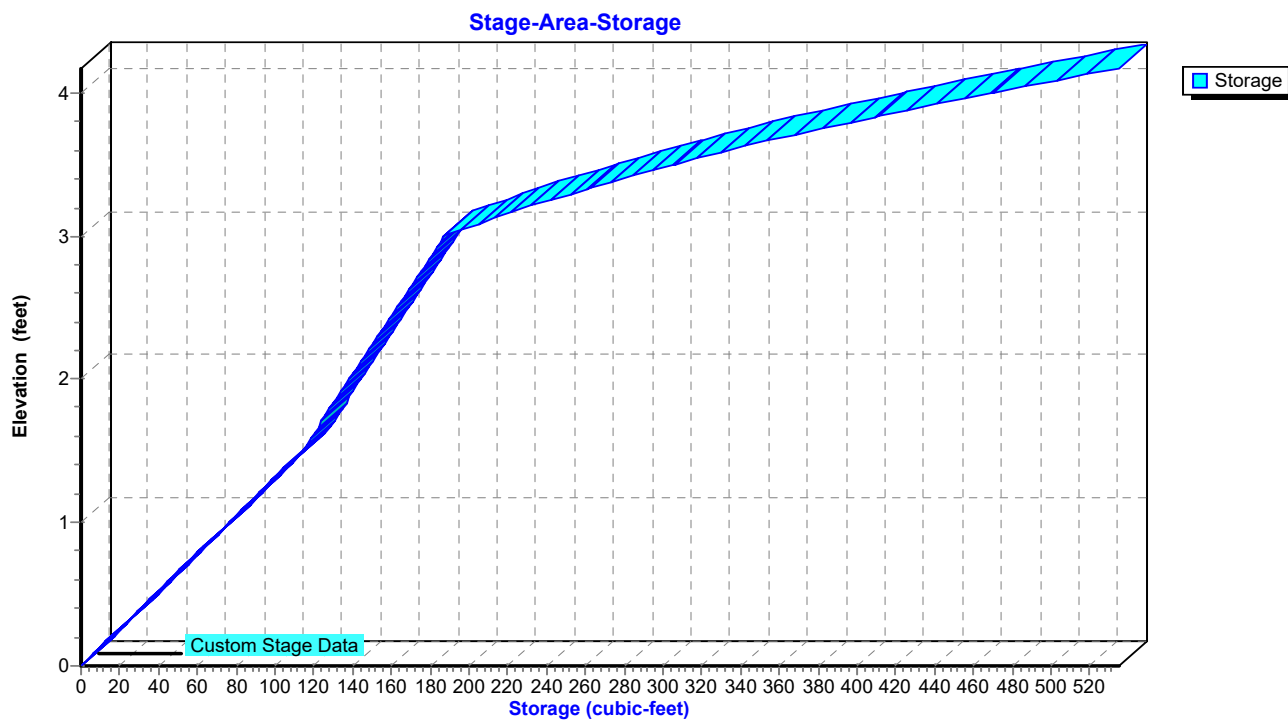
Hydrograph



Pond 2P: Biofiltration Area F.1



Pond 2P: Biofiltration Area F.1



Hydrograph for Pond 2P: Biofiltration Area F.1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	0.77	194	3.03	0.01
0.20	0.00	284	3.42	0.01
0.30	0.00	282	3.41	0.01
0.40	0.00	279	3.40	0.01
0.50	0.00	276	3.39	0.01
0.60	0.00	274	3.38	0.01
0.70	0.00	271	3.37	0.01
0.80	0.00	269	3.36	0.01
0.90	0.00	266	3.35	0.01
1.00	0.00	264	3.34	0.01
1.10	0.00	261	3.33	0.01
1.20	0.00	259	3.32	0.01
1.30	0.00	256	3.31	0.01
1.40	0.00	254	3.30	0.01
1.50	0.00	251	3.29	0.01
1.60	0.00	249	3.28	0.01
1.70	0.00	246	3.27	0.01
1.80	0.00	244	3.26	0.01
1.90	0.00	241	3.25	0.01
2.00	0.00	239	3.24	0.01
2.10	0.00	236	3.23	0.01
2.20	0.00	234	3.22	0.01
2.30	0.00	231	3.21	0.01
2.40	0.00	229	3.20	0.01
2.50	0.00	226	3.19	0.01
2.60	0.00	224	3.18	0.01
2.70	0.00	221	3.17	0.01
2.80	0.00	219	3.15	0.01
2.90	0.00	216	3.14	0.01
3.00	0.00	214	3.13	0.01
3.10	0.00	211	3.12	0.01
3.20	0.00	209	3.11	0.01
3.30	0.00	206	3.09	0.01
3.40	0.00	204	3.08	0.01
3.50	0.00	202	3.07	0.01
3.60	0.00	199	3.06	0.01
3.70	0.00	197	3.05	0.01
3.80	0.00	194	3.04	0.01
3.90	0.00	192	3.02	0.01
4.00	0.00	190	3.01	0.01
4.10	0.00	187	3.00	0.01
4.20	0.00	185	2.96	0.01
4.30	0.00	183	2.91	0.01
4.40	0.00	180	2.86	0.01
4.50	0.00	178	2.81	0.01

Hydrograph for Pond 2P: Biofiltration Area F.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	176	2.77	0.01
4.70	0.00	173	2.72	0.01
4.80	0.00	171	2.67	0.01
4.90	0.00	169	2.63	0.01
5.00	0.00	167	2.58	0.01
5.10	0.00	165	2.54	0.01
5.20	0.00	162	2.49	0.01
5.30	0.00	160	2.45	0.01
5.40	0.00	158	2.41	0.01
5.50	0.00	156	2.37	0.01
5.60	0.00	154	2.32	0.01
5.70	0.00	152	2.28	0.01
5.80	0.00	150	2.24	0.01
5.90	0.00	148	2.20	0.01
6.00	0.00	146	2.16	0.01
6.10	0.00	144	2.12	0.01
6.20	0.00	142	2.08	0.01
6.30	0.00	140	2.04	0.01
6.40	0.00	139	2.00	0.01
6.50	0.00	137	1.97	0.01
6.60	0.00	135	1.93	0.00
6.70	0.00	133	1.89	0.00
6.80	0.00	131	1.86	0.00
6.90	0.00	130	1.82	0.00
7.00	0.00	128	1.79	0.00
7.10	0.00	126	1.75	0.00
7.20	0.00	125	1.72	0.00
7.30	0.00	123	1.68	0.00
7.40	0.00	121	1.65	0.00
7.50	0.00	120	1.62	0.00
7.60	0.00	118	1.58	0.00
7.70	0.00	117	1.55	0.00
7.80	0.00	115	1.52	0.00
7.90	0.00	114	1.49	0.00
8.00	0.00	112	1.47	0.00
8.10	0.00	111	1.45	0.00
8.20	0.00	109	1.44	0.00
8.30	0.00	108	1.42	0.00
8.40	0.00	106	1.40	0.00
8.50	0.00	105	1.38	0.00
8.60	0.00	103	1.36	0.00
8.70	0.00	102	1.34	0.00
8.80	0.00	101	1.32	0.00
8.90	0.00	99	1.31	0.00
9.00	0.00	98	1.29	0.00
9.10	0.00	97	1.27	0.00

Hydrograph for Pond 2P: Biofiltration Area F.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	95	1.25	0.00
9.30	0.00	94	1.24	0.00
9.40	0.00	93	1.22	0.00
9.50	0.00	92	1.20	0.00
9.60	0.00	90	1.19	0.00
9.70	0.00	89	1.17	0.00
9.80	0.00	88	1.16	0.00
9.90	0.00	87	1.14	0.00
10.00	0.00	85	1.12	0.00
10.10	0.00	84	1.11	0.00
10.20	0.00	83	1.09	0.00
10.30	0.00	82	1.08	0.00
10.40	0.00	81	1.06	0.00
10.50	0.00	80	1.05	0.00
10.60	0.00	79	1.03	0.00
10.70	0.00	78	1.02	0.00
10.80	0.00	77	1.01	0.00
10.90	0.00	75	0.99	0.00
11.00	0.00	74	0.98	0.00
11.10	0.00	73	0.97	0.00
11.20	0.00	72	0.95	0.00
11.30	0.00	71	0.94	0.00
11.40	0.00	70	0.93	0.00
11.50	0.00	69	0.91	0.00
11.60	0.00	69	0.90	0.00
11.70	0.00	68	0.89	0.00
11.80	0.00	67	0.88	0.00
11.90	0.00	66	0.87	0.00
12.00	0.00	65	0.85	0.00
12.10	0.00	64	0.84	0.00
12.20	0.00	63	0.83	0.00
12.30	0.00	62	0.82	0.00
12.40	0.00	61	0.81	0.00
12.50	0.00	61	0.80	0.00
12.60	0.00	60	0.79	0.00
12.70	0.00	59	0.78	0.00
12.80	0.00	58	0.77	0.00
12.90	0.00	58	0.76	0.00
13.00	0.00	57	0.75	0.00
13.10	0.00	56	0.74	0.00
13.20	0.00	55	0.73	0.00
13.30	0.00	55	0.72	0.00
13.40	0.00	54	0.71	0.00
13.50	0.00	53	0.70	0.00
13.60	0.00	53	0.69	0.00
13.70	0.00	52	0.69	0.00

Hydrograph for Pond 2P: Biofiltration Area F.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	52	0.68	0.00
13.90	0.00	51	0.67	0.00
14.00	0.00	50	0.66	0.00
14.10	0.00	50	0.65	0.00
14.20	0.00	49	0.65	0.00
14.30	0.00	49	0.64	0.00
14.40	0.00	48	0.63	0.00
14.50	0.00	48	0.63	0.00
14.60	0.00	47	0.62	0.00
14.70	0.00	47	0.61	0.00
14.80	0.00	46	0.61	0.00
14.90	0.00	46	0.60	0.00
15.00	0.00	45	0.60	0.00
15.10	0.00	45	0.59	0.00
15.20	0.00	45	0.59	0.00
15.30	0.00	44	0.58	0.00
15.40	0.00	44	0.58	0.00
15.50	0.00	43	0.57	0.00
15.60	0.00	43	0.57	0.00
15.70	0.00	43	0.56	0.00
15.80	0.00	42	0.56	0.00
15.90	0.00	42	0.55	0.00
16.00	0.00	42	0.55	0.00
16.10	0.00	42	0.55	0.00
16.20	0.00	41	0.54	0.00
16.30	0.00	41	0.54	0.00
16.40	0.00	41	0.54	0.00
16.50	0.00	41	0.54	0.00
16.60	0.00	40	0.53	0.00
16.70	0.00	40	0.53	0.00
16.80	0.00	40	0.53	0.00
16.90	0.00	40	0.53	0.00
17.00	0.00	40	0.52	0.00
17.10	0.00	40	0.52	0.00
17.20	0.00	40	0.52	0.00
17.30	0.00	39	0.52	0.00
17.40	0.00	39	0.52	0.00
17.50	0.00	39	0.52	0.00
17.60	0.00	39	0.52	0.00
17.70	0.00	39	0.51	0.00
17.80	0.00	39	0.51	0.00
17.90	0.00	39	0.51	0.00
18.00	0.00	39	0.51	0.00
18.10	0.00	39	0.51	0.00
18.20	0.00	39	0.51	0.00
18.30	0.00	39	0.51	0.00

Hydrograph for Pond 2P: Biofiltration Area F.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	39	0.51	0.00
18.50	0.00	39	0.51	0.00
18.60	0.00	39	0.51	0.00
18.70	0.00	39	0.51	0.00
18.80	0.00	38	0.51	0.00
18.90	0.00	38	0.51	0.00
19.00	0.00	38	0.51	0.00
19.10	0.00	38	0.51	0.00
19.20	0.00	38	0.50	0.00
19.30	0.00	38	0.50	0.00
19.40	0.00	38	0.50	0.00
19.50	0.00	38	0.50	0.00
19.60	0.00	38	0.50	0.00
19.70	0.00	38	0.50	0.00
19.80	0.00	38	0.50	0.00
19.90	0.00	38	0.50	0.00
20.00	0.00	38	0.50	0.00
20.10	0.00	38	0.50	0.00
20.20	0.00	38	0.50	0.00
20.30	0.00	38	0.50	0.00
20.40	0.00	38	0.50	0.00
20.50	0.00	38	0.50	0.00
20.60	0.00	38	0.50	0.00
20.70	0.00	38	0.50	0.00
20.80	0.00	38	0.50	0.00
20.90	0.00	38	0.50	0.00
21.00	0.00	38	0.50	0.00
21.10	0.00	38	0.50	0.00
21.20	0.00	38	0.50	0.00
21.30	0.00	38	0.50	0.00
21.40	0.00	38	0.50	0.00
21.50	0.00	38	0.50	0.00
21.60	0.00	38	0.50	0.00
21.70	0.00	38	0.50	0.00
21.80	0.00	38	0.50	0.00
21.90	0.00	38	0.50	0.00
22.00	0.00	38	0.50	0.00
22.10	0.00	38	0.50	0.00
22.20	0.00	38	0.50	0.00
22.30	0.00	38	0.50	0.00
22.40	0.00	38	0.50	0.00
22.50	0.00	38	0.50	0.00
22.60	0.00	38	0.50	0.00
22.70	0.00	38	0.50	0.00
22.80	0.00	38	0.50	0.00
22.90	0.00	38	0.50	0.00

Hydrograph for Pond 2P: Biofiltration Area F.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	38	0.50	0.00
23.10	0.00	38	0.50	0.00
23.20	0.00	38	0.50	0.00
23.30	0.00	38	0.50	0.00
23.40	0.00	38	0.50	0.00
23.50	0.00	38	0.50	0.00
23.60	0.00	38	0.50	0.00
23.70	0.00	38	0.50	0.00
23.80	0.00	38	0.50	0.00
23.90	0.00	38	0.50	0.00
24.00	0.00	38	0.50	0.00

Stage-Discharge for Pond 2P: Biofiltration Area F.1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.01
0.05	0.00	2.35	0.01
0.10	0.00	2.40	0.01
0.15	0.00	2.45	0.01
0.20	0.00	2.50	0.01
0.25	0.00	2.55	0.01
0.30	0.00	2.60	0.01
0.35	0.00	2.65	0.01
0.40	0.00	2.70	0.01
0.45	0.00	2.75	0.01
0.50	0.00	2.80	0.01
0.55	0.00	2.85	0.01
0.60	0.00	2.90	0.01
0.65	0.00	2.95	0.01
0.70	0.00	3.00	0.01
0.75	0.00	3.05	0.01
0.80	0.00	3.10	0.01
0.85	0.00	3.15	0.01
0.90	0.00	3.20	0.01
0.95	0.00	3.25	0.01
1.00	0.00	3.30	0.01
1.05	0.00	3.35	0.01
1.10	0.00	3.40	0.01
1.15	0.00	3.45	0.01
1.20	0.00	3.50	0.01
1.25	0.00	3.55	0.01
1.30	0.00	3.60	0.01
1.35	0.00	3.65	0.01
1.40	0.00	3.70	0.01
1.45	0.00	3.75	0.01
1.50	0.00	3.80	0.01
1.55	0.00	3.85	0.01
1.60	0.00	3.90	0.01
1.65	0.00	3.95	0.01
1.70	0.00	4.00	0.01
1.75	0.00	4.05	0.20
1.80	0.00	4.10	0.54
1.85	0.00	4.15	0.98
1.90	0.00		
1.95	0.01		
2.00	0.01		
2.05	0.01		
2.10	0.01		
2.15	0.01		
2.20	0.01		
2.25	0.01		

Stage-Area-Storage for Pond 2P: Biofiltration Area F.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	153
0.05	4	2.35	155
0.10	8	2.40	158
0.15	11	2.45	160
0.20	15	2.50	163
0.25	19	2.55	165
0.30	23	2.60	168
0.35	27	2.65	170
0.40	30	2.70	172
0.45	34	2.75	175
0.50	38	2.80	177
0.55	42	2.85	180
0.60	46	2.90	182
0.65	49	2.95	185
0.70	53	3.00	187
0.75	57	3.05	197
0.80	61	3.10	208
0.85	65	3.15	218
0.90	68	3.20	229
0.95	72	3.25	242
1.00	76	3.30	254
1.05	80	3.35	266
1.10	84	3.40	279
1.15	87	3.45	292
1.20	91	3.50	305
1.25	95	3.55	319
1.30	99	3.60	334
1.35	103	3.65	348
1.40	106	3.70	364
1.45	110	3.75	382
1.50	114	3.80	399
1.55	116	3.85	416
1.60	119	3.90	434
1.65	121	3.95	451
1.70	124	4.00	469
1.75	126	4.05	488
1.80	129	4.10	508
1.85	131	4.15	527
1.90	133		
1.95	136		
2.00	138		
2.05	141		
2.10	143		
2.15	146		
2.20	148		
2.25	151		

Summary for Pond 5P: Biofiltration Area G.1

Inflow Area = 19,407 sf, 0.00% Impervious, Inflow Depth = 0.43" for P6=2.9 event
 Inflow = 2.25 cfs @ 0.08 hrs, Volume= 699 cf
 Outflow = 0.02 cfs @ 0.17 hrs, Volume= 582 cf, Atten= 99%, Lag= 5.5 min
 Primary = 0.02 cfs @ 0.17 hrs, Volume= 582 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs / 8
 Peak Elev= 3.20' @ 0.17 hrs Storage= 694 cf

Plug-Flow detention time= 412.2 min calculated for 581 cf (83% of inflow)
 Center-of-Mass det. time= 412.0 min (417.0 - 5.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,454 cf	Custom Stage Data Listed below

Elevation (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.00	0	0
1.50	349	349
3.00	220	569
3.17	102	671
3.33	110	781
3.50	118	899
3.67	126	1,025
3.83	134	1,159
4.00	143	1,302
4.17	152	1,454

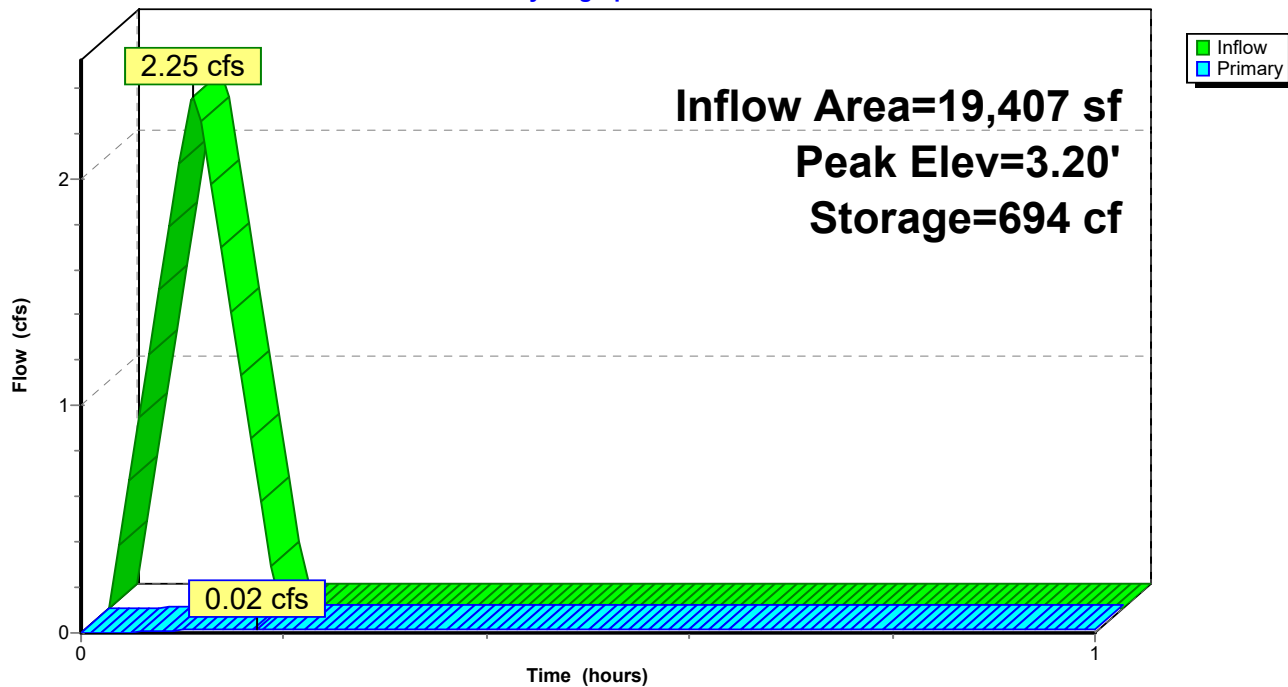
Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	0.6" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	4.00'	6.0' long x 0.5' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32

Primary OutFlow Max=0.02 cfs @ 0.17 hrs HW=3.20' (Free Discharge)

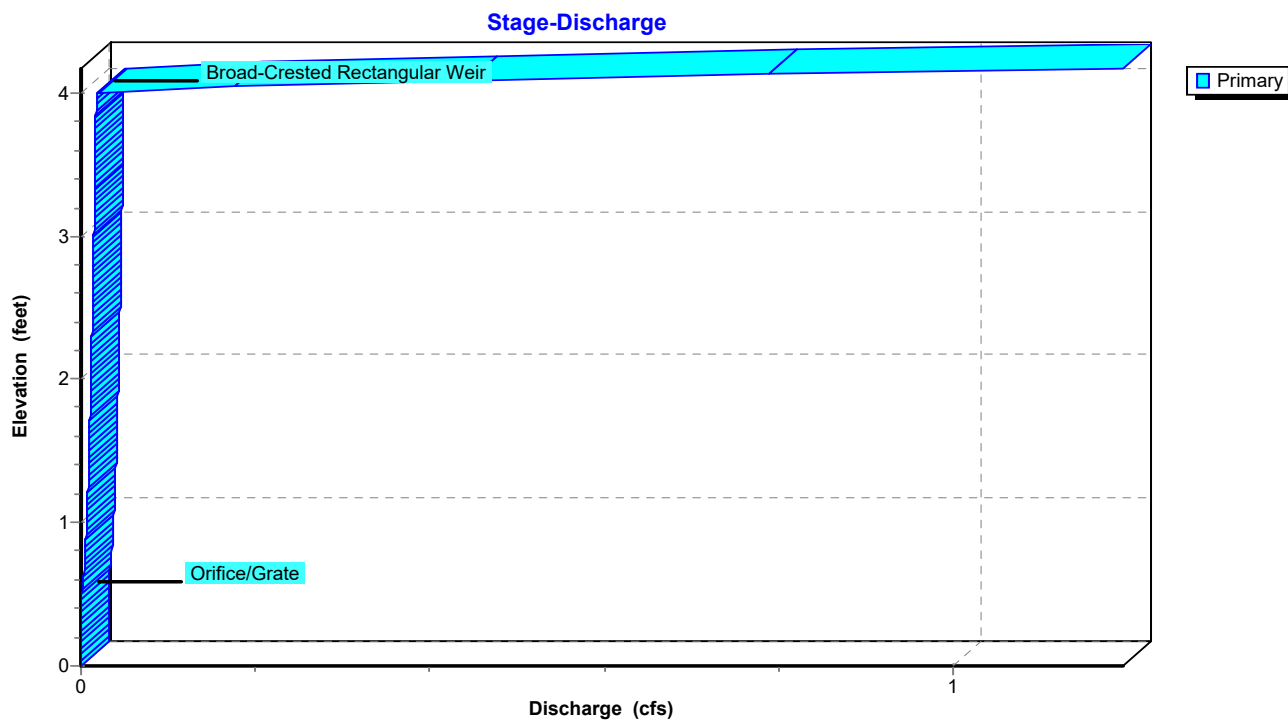
1=Orifice/Grate (Orifice Controls 0.02 cfs @ 7.88 fps)
 2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond 5P: Biofiltration Area G.1

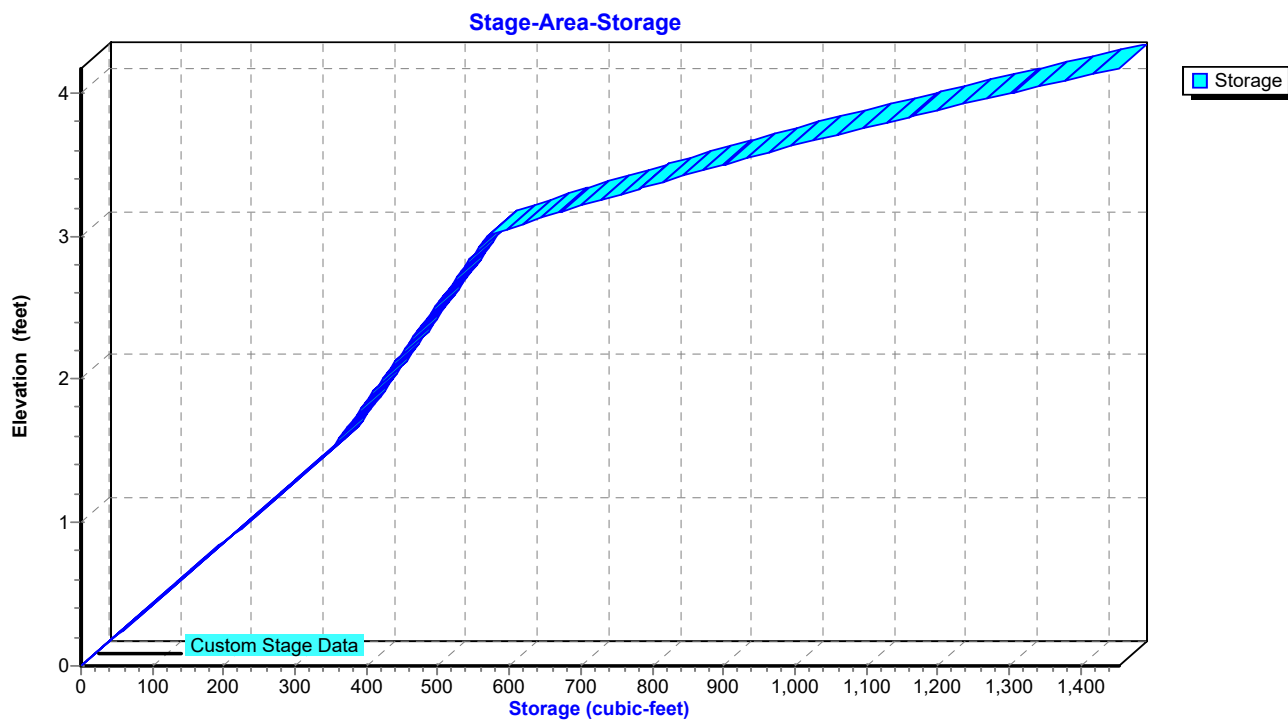
Hydrograph



Pond 5P: Biofiltration Area G.1



Pond 5P: Biofiltration Area G.1



Hydrograph for Pond 5P: Biofiltration Area G.1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	0.00	0.00
0.10	1.87	473	2.34	0.01
0.20	0.00	692	3.20	0.02
0.30	0.00	687	3.19	0.02
0.40	0.00	681	3.18	0.02
0.50	0.00	676	3.18	0.02
0.60	0.00	670	3.17	0.02
0.70	0.00	665	3.16	0.02
0.80	0.00	659	3.15	0.02
0.90	0.00	654	3.14	0.02
1.00	0.00	648	3.13	0.02
1.10	0.00	643	3.12	0.02
1.20	0.00	637	3.11	0.02
1.30	0.00	632	3.10	0.02
1.40	0.00	626	3.10	0.02
1.50	0.00	621	3.09	0.02
1.60	0.00	615	3.08	0.02
1.70	0.00	610	3.07	0.02
1.80	0.00	604	3.06	0.02
1.90	0.00	599	3.05	0.02
2.00	0.00	594	3.04	0.01
2.10	0.00	588	3.03	0.01
2.20	0.00	583	3.02	0.01
2.30	0.00	578	3.01	0.01
2.40	0.00	572	3.01	0.01
2.50	0.00	567	2.98	0.01
2.60	0.00	561	2.95	0.01
2.70	0.00	556	2.91	0.01
2.80	0.00	551	2.88	0.01
2.90	0.00	546	2.84	0.01
3.00	0.00	541	2.81	0.01
3.10	0.00	535	2.77	0.01
3.20	0.00	530	2.74	0.01
3.30	0.00	525	2.70	0.01
3.40	0.00	520	2.67	0.01
3.50	0.00	515	2.63	0.01
3.60	0.00	510	2.60	0.01
3.70	0.00	506	2.57	0.01
3.80	0.00	501	2.53	0.01
3.90	0.00	496	2.50	0.01
4.00	0.00	491	2.47	0.01
4.10	0.00	486	2.44	0.01
4.20	0.00	482	2.41	0.01
4.30	0.00	477	2.37	0.01
4.40	0.00	473	2.34	0.01
4.50	0.00	468	2.31	0.01

Hydrograph for Pond 5P: Biofiltration Area G.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
4.60	0.00	463	2.28	0.01
4.70	0.00	459	2.25	0.01
4.80	0.00	454	2.22	0.01
4.90	0.00	450	2.19	0.01
5.00	0.00	446	2.16	0.01
5.10	0.00	441	2.13	0.01
5.20	0.00	437	2.10	0.01
5.30	0.00	433	2.07	0.01
5.40	0.00	429	2.04	0.01
5.50	0.00	424	2.01	0.01
5.60	0.00	420	1.99	0.01
5.70	0.00	416	1.96	0.01
5.80	0.00	412	1.93	0.01
5.90	0.00	408	1.90	0.01
6.00	0.00	404	1.88	0.01
6.10	0.00	400	1.85	0.01
6.20	0.00	396	1.82	0.01
6.30	0.00	392	1.80	0.01
6.40	0.00	389	1.77	0.01
6.50	0.00	385	1.74	0.01
6.60	0.00	381	1.72	0.01
6.70	0.00	377	1.69	0.01
6.80	0.00	374	1.67	0.01
6.90	0.00	370	1.64	0.01
7.00	0.00	367	1.62	0.01
7.10	0.00	363	1.60	0.01
7.20	0.00	360	1.57	0.01
7.30	0.00	356	1.55	0.01
7.40	0.00	353	1.52	0.01
7.50	0.00	349	1.50	0.01
7.60	0.00	346	1.49	0.01
7.70	0.00	343	1.47	0.01
7.80	0.00	339	1.46	0.01
7.90	0.00	336	1.44	0.01
8.00	0.00	333	1.43	0.01
8.10	0.00	330	1.42	0.01
8.20	0.00	326	1.40	0.01
8.30	0.00	323	1.39	0.01
8.40	0.00	320	1.38	0.01
8.50	0.00	317	1.36	0.01
8.60	0.00	314	1.35	0.01
8.70	0.00	311	1.34	0.01
8.80	0.00	308	1.32	0.01
8.90	0.00	305	1.31	0.01
9.00	0.00	302	1.30	0.01
9.10	0.00	299	1.28	0.01

Hydrograph for Pond 5P: Biofiltration Area G.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
9.20	0.00	296	1.27	0.01
9.30	0.00	293	1.26	0.01
9.40	0.00	290	1.25	0.01
9.50	0.00	287	1.23	0.01
9.60	0.00	284	1.22	0.01
9.70	0.00	281	1.21	0.01
9.80	0.00	279	1.20	0.01
9.90	0.00	276	1.19	0.01
10.00	0.00	273	1.17	0.01
10.10	0.00	270	1.16	0.01
10.20	0.00	268	1.15	0.01
10.30	0.00	265	1.14	0.01
10.40	0.00	262	1.13	0.01
10.50	0.00	260	1.12	0.01
10.60	0.00	257	1.10	0.01
10.70	0.00	254	1.09	0.01
10.80	0.00	252	1.08	0.01
10.90	0.00	249	1.07	0.01
11.00	0.00	247	1.06	0.01
11.10	0.00	244	1.05	0.01
11.20	0.00	242	1.04	0.01
11.30	0.00	239	1.03	0.01
11.40	0.00	237	1.02	0.01
11.50	0.00	235	1.01	0.01
11.60	0.00	232	1.00	0.01
11.70	0.00	230	0.99	0.01
11.80	0.00	228	0.98	0.01
11.90	0.00	225	0.97	0.01
12.00	0.00	223	0.96	0.01
12.10	0.00	221	0.95	0.01
12.20	0.00	219	0.94	0.01
12.30	0.00	217	0.93	0.01
12.40	0.00	214	0.92	0.01
12.50	0.00	212	0.91	0.01
12.60	0.00	210	0.90	0.01
12.70	0.00	208	0.89	0.01
12.80	0.00	206	0.89	0.01
12.90	0.00	204	0.88	0.01
13.00	0.00	202	0.87	0.01
13.10	0.00	200	0.86	0.01
13.20	0.00	198	0.85	0.01
13.30	0.00	196	0.84	0.01
13.40	0.00	194	0.83	0.01
13.50	0.00	192	0.83	0.01
13.60	0.00	190	0.82	0.01
13.70	0.00	189	0.81	0.01

Hydrograph for Pond 5P: Biofiltration Area G.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
13.80	0.00	187	0.80	0.00
13.90	0.00	185	0.80	0.00
14.00	0.00	183	0.79	0.00
14.10	0.00	182	0.78	0.00
14.20	0.00	180	0.77	0.00
14.30	0.00	178	0.77	0.00
14.40	0.00	177	0.76	0.00
14.50	0.00	175	0.75	0.00
14.60	0.00	173	0.74	0.00
14.70	0.00	172	0.74	0.00
14.80	0.00	170	0.73	0.00
14.90	0.00	169	0.72	0.00
15.00	0.00	167	0.72	0.00
15.10	0.00	166	0.71	0.00
15.20	0.00	164	0.71	0.00
15.30	0.00	163	0.70	0.00
15.40	0.00	161	0.69	0.00
15.50	0.00	160	0.69	0.00
15.60	0.00	159	0.68	0.00
15.70	0.00	157	0.68	0.00
15.80	0.00	156	0.67	0.00
15.90	0.00	155	0.66	0.00
16.00	0.00	153	0.66	0.00
16.10	0.00	152	0.65	0.00
16.20	0.00	151	0.65	0.00
16.30	0.00	150	0.64	0.00
16.40	0.00	149	0.64	0.00
16.50	0.00	147	0.63	0.00
16.60	0.00	146	0.63	0.00
16.70	0.00	145	0.62	0.00
16.80	0.00	144	0.62	0.00
16.90	0.00	143	0.62	0.00
17.00	0.00	142	0.61	0.00
17.10	0.00	141	0.61	0.00
17.20	0.00	140	0.60	0.00
17.30	0.00	139	0.60	0.00
17.40	0.00	138	0.60	0.00
17.50	0.00	138	0.59	0.00
17.60	0.00	137	0.59	0.00
17.70	0.00	136	0.58	0.00
17.80	0.00	135	0.58	0.00
17.90	0.00	134	0.58	0.00
18.00	0.00	134	0.57	0.00
18.10	0.00	133	0.57	0.00
18.20	0.00	132	0.57	0.00
18.30	0.00	131	0.56	0.00

Hydrograph for Pond 5P: Biofiltration Area G.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
18.40	0.00	131	0.56	0.00
18.50	0.00	130	0.56	0.00
18.60	0.00	130	0.56	0.00
18.70	0.00	129	0.55	0.00
18.80	0.00	128	0.55	0.00
18.90	0.00	128	0.55	0.00
19.00	0.00	127	0.55	0.00
19.10	0.00	127	0.55	0.00
19.20	0.00	126	0.54	0.00
19.30	0.00	126	0.54	0.00
19.40	0.00	126	0.54	0.00
19.50	0.00	125	0.54	0.00
19.60	0.00	125	0.54	0.00
19.70	0.00	124	0.53	0.00
19.80	0.00	124	0.53	0.00
19.90	0.00	124	0.53	0.00
20.00	0.00	123	0.53	0.00
20.10	0.00	123	0.53	0.00
20.20	0.00	123	0.53	0.00
20.30	0.00	123	0.53	0.00
20.40	0.00	122	0.53	0.00
20.50	0.00	122	0.52	0.00
20.60	0.00	122	0.52	0.00
20.70	0.00	121	0.52	0.00
20.80	0.00	121	0.52	0.00
20.90	0.00	121	0.52	0.00
21.00	0.00	121	0.52	0.00
21.10	0.00	121	0.52	0.00
21.20	0.00	120	0.52	0.00
21.30	0.00	120	0.52	0.00
21.40	0.00	120	0.52	0.00
21.50	0.00	120	0.52	0.00
21.60	0.00	120	0.51	0.00
21.70	0.00	120	0.51	0.00
21.80	0.00	119	0.51	0.00
21.90	0.00	119	0.51	0.00
22.00	0.00	119	0.51	0.00
22.10	0.00	119	0.51	0.00
22.20	0.00	119	0.51	0.00
22.30	0.00	119	0.51	0.00
22.40	0.00	119	0.51	0.00
22.50	0.00	119	0.51	0.00
22.60	0.00	119	0.51	0.00
22.70	0.00	118	0.51	0.00
22.80	0.00	118	0.51	0.00
22.90	0.00	118	0.51	0.00

Hydrograph for Pond 5P: Biofiltration Area G.1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
23.00	0.00	118	0.51	0.00
23.10	0.00	118	0.51	0.00
23.20	0.00	118	0.51	0.00
23.30	0.00	118	0.51	0.00
23.40	0.00	118	0.51	0.00
23.50	0.00	118	0.51	0.00
23.60	0.00	118	0.51	0.00
23.70	0.00	118	0.51	0.00
23.80	0.00	118	0.51	0.00
23.90	0.00	118	0.51	0.00
24.00	0.00	118	0.51	0.00

Stage-Discharge for Pond 5P: Biofiltration Area G.1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	2.30	0.01
0.05	0.00	2.35	0.01
0.10	0.00	2.40	0.01
0.15	0.00	2.45	0.01
0.20	0.00	2.50	0.01
0.25	0.00	2.55	0.01
0.30	0.00	2.60	0.01
0.35	0.00	2.65	0.01
0.40	0.00	2.70	0.01
0.45	0.00	2.75	0.01
0.50	0.00	2.80	0.01
0.55	0.00	2.85	0.01
0.60	0.00	2.90	0.01
0.65	0.00	2.95	0.01
0.70	0.00	3.00	0.01
0.75	0.00	3.05	0.02
0.80	0.00	3.10	0.02
0.85	0.01	3.15	0.02
0.90	0.01	3.20	0.02
0.95	0.01	3.25	0.02
1.00	0.01	3.30	0.02
1.05	0.01	3.35	0.02
1.10	0.01	3.40	0.02
1.15	0.01	3.45	0.02
1.20	0.01	3.50	0.02
1.25	0.01	3.55	0.02
1.30	0.01	3.60	0.02
1.35	0.01	3.65	0.02
1.40	0.01	3.70	0.02
1.45	0.01	3.75	0.02
1.50	0.01	3.80	0.02
1.55	0.01	3.85	0.02
1.60	0.01	3.90	0.02
1.65	0.01	3.95	0.02
1.70	0.01	4.00	0.02
1.75	0.01	4.05	0.21
1.80	0.01	4.10	0.55
1.85	0.01	4.15	0.99
1.90	0.01		
1.95	0.01		
2.00	0.01		
2.05	0.01		
2.10	0.01		
2.15	0.01		
2.20	0.01		
2.25	0.01		

Stage-Area-Storage for Pond 5P: Biofiltration Area G.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
0.00	0	2.30	466
0.05	12	2.35	474
0.10	23	2.40	481
0.15	35	2.45	488
0.20	47	2.50	496
0.25	58	2.55	503
0.30	70	2.60	510
0.35	81	2.65	518
0.40	93	2.70	525
0.45	105	2.75	532
0.50	116	2.80	540
0.55	128	2.85	547
0.60	140	2.90	554
0.65	151	2.95	562
0.70	163	3.00	569
0.75	175	3.05	599
0.80	186	3.10	629
0.85	198	3.15	659
0.90	209	3.20	692
0.95	221	3.25	726
1.00	233	3.30	760
1.05	244	3.35	795
1.10	256	3.40	830
1.15	268	3.45	864
1.20	279	3.50	899
1.25	291	3.55	936
1.30	302	3.60	973
1.35	314	3.65	1,010
1.40	326	3.70	1,050
1.45	337	3.75	1,092
1.50	349	3.80	1,134
1.55	356	3.85	1,176
1.60	364	3.90	1,218
1.65	371	3.95	1,260
1.70	378	4.00	1,302
1.75	386	4.05	1,347
1.80	393	4.10	1,391
1.85	400	4.15	1,436
1.90	408		
1.95	415		
2.00	422		
2.05	430		
2.10	437		
2.15	444		
2.20	452		
2.25	459		

Secret Hills - Area F & G IMPs

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Appendix C – Drainage System Component Evaluations

Grated Inlet Evaluations

NDS PART NO.	DESCRIPTION	PRODUCT LINE	COLOR	OPEN AREA	HEAD (inches)	MAX FLOW (GPM)	MAX FLOW (CFS)
1215	12" X 12" SQUARE CAST IRON GRATE	12" CATCH BASIN SERIES	GALVANIZED STEEL	122.3	2	748.26	1.6671
1815	18" SQUARE GALVANIZED STEEL GRATE	18" CATCH BASIN SERIES	GALVANIZED STEEL	291	2	1780.41	3.9668
2415	24" X 24" SQUARE GALVANIZED STEEL GRATE	24" CATCH BASIN SERIES	GALVANIZED STEEL	332.06	2	2031.63	4.5265

ASSUMED VALUES / UNITS USED IN SPREADSHEET CALCULATION:

Q = FLOW RATE (GALLONS PER MINUTE)

$Q = Cd * (A / 144) * \text{SQRT}(2 * g * (h / 12))$

1 cfs = 448.2 gpm

Cd = DISCHARGE COEFFICIENT (0.6 ASSUMED)

A = OPEN AREA OF GRATE (SQUARE INCHES)

g = ACCELERATION (32 ft/sec/sec)

h = HEAD ABOVE FLOOR (INCHES)

Drainage Component Evaluations

Pipe and Open Channel Flow Characteristics

$$Q=VA$$

Q=flow rate (ft³/sec)

V= Velocity (ft/sec)

A= Cross Sectional Area of Water in Pipe/Channel (ft²)

$$V = 1.49 * 1/n * R^{2/3} * S^{1/2} \text{ (from Manning), where}$$

V = Average cross-sectional velocity (ft/sec)

n = Manning roughness coefficient

R = Hydraulic radius (Area/Wetted Perimeter - ft)

S = Slope of water surface (ft height/ft length)

Pipe Serving Area B.1+B.2+B.3 (Discharging to Riprap) - 8" Closed Conduit - PVC @ 6%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
8	0.011
Slope (FT/FT)	Q (CFS)
0.0600	3.690000507489
Depth (feet)	Depth/Diameter
0.58453	87.6802%
Velocity (ft/sec)	Velocity Head (feet)
11.37450297	2.008995618
Area	
0.324409824	

Riprap Serving Area B.1+B.2+B.3 - 4 Ft. Wide Channel (1/4 TON RIPRAP) @10%	
	Manning N
Invert Width (feet)	35. 1/4 TON RIPRAP
4	0.044
Slope	Q (CFS)
0.1	4.760
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.28194	4.00
Velocity (ft/sec)	Velocity Head (feet)
4.220772818	0.276629242
Area (ft ²)	
1.127754039	

Pipe Serving Area C.1 (Por. Of House Pad-Discharging to Riprap) - 6" Closed Conduit - PVC @ 12.88%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.1288	1.319999434013
Depth (feet)	Depth/Diameter
0.26555	53.1100%
Velocity (ft/sec)	Velocity Head (feet)
12.45930981	2.410472064
Area	
0.105944828	

Riprap Serving Area C.1 (Por. Of House Pad-Discharging to Riprap) - 4 Ft. Wide Channel (1/4 TON RIPRAP) @10%	
	Manning N
Invert Width (feet)	35. 1/4 TON RIPRAP
4	0.044
Slope	Q (CFS)
0.1	1.320
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.12694	4.00
Velocity (ft/sec)	Velocity Head (feet)
2.599710702	0.104945586
Area (ft ²)	
0.507748509	

Pipe Serving Area D.1 (Por. Of House Pad-Discharging to Riprap) - 6" Closed Conduit - PVC @ 12%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.1200	1.800000307156
Depth (feet)	Depth/Diameter
0.33260	66.5199%
Velocity (ft/sec)	Velocity Head (feet)
12.97668462	2.614819
Area	
0.138710338	

Riprap Serving Area D.1 (Por. Of House Pad-Discharging to Riprap) - 4 Ft. Wide Channel (1/4 TON RIPRAP) @2%	
	Manning N
Invert Width (feet)	35. 1/4 TON RIPRAP
4	0.044
Slope	Q (CFS)
0.02	1.800
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.25367	4.00
Velocity (ft/sec)	Velocity Head (feet)
1.773982708	0.048866687
Area (ft ²)	
1.014666339	

Pipe Serving Biofiltration Area D.1 - 8" Closed Conduit - PVC @ 20%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
8	0.011
Slope (FT/FT)	Q (CFS)
0.2000	1.800000097838
Depth (feet)	Depth/Diameter
0.24177	36.2652%
Velocity (ft/sec)	Velocity Head (feet)
15.75271285	3.853229226
Area	
0.114266039	

Riprap Serving Biofiltration Area D.1 - 4 Ft. Wide Channel (1 TON RIPRAP) @30%	
	Manning N
Invert Width (feet)	37. 1 TON RIPRAP
4	0.047
Slope	Q (CFS)
0.3	1.800
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.11413	4.00
Velocity (ft/sec)	Velocity Head (feet)
3.942943392	0.241409978
Area (ft ²)	
0.456511581	

Pipe Serving Area D.2 (Por. Of House Pad) - 6" Closed Conduit - PVC @ 19%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.1900	3.060001946166
Depth (feet)	Depth/Diameter
0.44121	88.2427%
Velocity (ft/sec)	Velocity Head (feet)
16.68523447	4.322935549
Area	
0.183395801	

Riprap Serving Area D.2 (Por. Of House Pad) - 4 Ft. Wide Channel (1 TON RIPRAP) @2%	
	Manning N
Invert Width (feet)	37. 1 TON RIPRAP
4	0.047
Slope	Q (CFS)
0.02	3.060
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.37029	4.00
Velocity (ft/sec)	Velocity Head (feet)
2.065951799	0.066275727
Area (ft ²)	
1.481157734	

Pipe Serving Bioretention Area D.2 - 8" Closed Conduit - PVC @ 12%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
8	0.011
Slope (FT/FT)	Q (CFS)
0.1200	3.060002288433
Depth (feet)	Depth/Diameter
0.37871	56.8062%
Velocity (ft/sec)	Velocity Head (feet)
14.94952221	3.470313885
Area	
0.204688969	

Riprap Serving Bioretention Area D.2 - 4 Ft. Wide Channel (1/2 TON RIPRAP) @17%	
	Manning N
Invert Width (feet)	36. 1/2 TON RIPRAP
4	0.045
Slope	Q (CFS)
0.17	3.060
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.18367	4.00
Velocity (ft/sec)	Velocity Head (feet)
4.165145577	0.269385678
Area (ft ²)	
0.734666359	

Pipe Serving Area D.3 - 6" Closed Conduit - PVC @ 13%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.1300	1.389999976432
Depth (feet)	Depth/Diameter
0.27329	54.6573%
Velocity (ft/sec)	Velocity Head (feet)
12.65923873	2.488452254
Area	
0.109801229	

Riprap Serving Area D.3 (inflow to biofilter) - 4 Ft. Wide Channel (1/4 TON RIPRAP) @2%	
	Manning N
Invert Width (feet)	35. 1/4 TON RIPRAP
4	0.044
Slope	Q (CFS)
0.02	1.390
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.21574	4.00
Velocity (ft/sec)	Velocity Head (feet)
1.610718344	0.040285925
Area (ft ²)	
0.862969017	

Pipe Serving Area F.1 - 6" Closed Conduit - PVC @ 11%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.1100	0.949999918807
Depth (feet)	Depth/Diameter
0.22934	45.8683%
Velocity (ft/sec)	Velocity Head (feet)
10.81300458	1.815544535
Area	
0.087857164	

Riprap Serving Area F.1 - 4 Ft. Wide Channel (LIGHT ROCK RIPRAP) @2%	
	Manning N
Invert Width (feet)	34. LIGHT ROCK RIPRAP
4	0.041
Slope	Q (CFS)
0.02	0.950
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.16298	4.00
Velocity (ft/sec)	Velocity Head (feet)
1.457255913	0.032975074
Area (ft ²)	
0.651910138	

Pipe Serving Biofiltration Area F.1 - 6" Closed Conduit - PVC @ 2.88%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.0288	0.950000099260
Depth (feet)	Depth/Diameter
0.35150	70.2993%
Velocity (ft/sec)	Velocity Head (feet)
6.441012106	0.644202437
Area	
0.147492364	

Riprap Serving Biofiltration Area F.1 - 4 Ft. Wide Channel (NO.3 BACKING RIPRAP) @18%	
	Manning N
Invert Width (feet)	31. NO.3 BACKING RIPRAP
4	0.034
Slope	Q (CFS)
0.18	0.950
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.07407	4.00
Velocity (ft/sec)	Velocity Head (feet)
3.206361365	0.159639025
Area (ft ²)	
0.296285816	

Pipe Serving Area G.1 - 8" Closed Conduit - PVC @ 8.45%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
8	0.011
Slope (FT/FT)	Q (CFS)
0.0845	2.310000728869
Depth (feet)	Depth/Diameter
0.35476	53.2138%
Velocity (ft/sec)	Velocity Head (feet)
12.2347488	2.324364569
Area	
0.188806551	

Riprap Serving Area G.1 - 4 Ft. Wide Channel (1/4 TON RIPRAP) @2%	
	Manning N
Invert Width (feet)	35. 1/4 TON RIPRAP
4	0.044
Slope	Q (CFS)
0.02	2.310
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.29689	4.00
Velocity (ft/sec)	Velocity Head (feet)
1.945185923	0.058753855
Area (ft ²)	
1.187547141	

Pipe Serving Biofiltration Area G.1 - 8" Closed Conduit - PVC @ 4.74%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
8	0.011
Slope (FT/FT)	Q (CFS)
0.0474	2.310001445982
Depth (feet)	Depth/Diameter
0.42716	64.0735%
Velocity (ft/sec)	Velocity Head (feet)
9.777966468	1.484606029
Area	
0.236245589	

Riprap Serving Biofiltration Area G.1 - 4 Ft. Wide Channel (LIGHT ROCK RIPRAP) @15%	
	Manning N
Invert Width (feet)	34. LIGHT ROCK RIPRAP
4	0.041
Slope	Q (CFS)
0.15	2.310
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.15143	4.00
Velocity (ft/sec)	Velocity Head (feet)
3.813741859	0.225848245
Area (ft ²)	
0.605703023	

Pipe Serving Area E.3 (Discharging to Bioretention Area) - 6" Closed Conduit - PVC @ 26%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.2600	0.969999957590
Depth (feet)	Depth/Diameter
0.18305	36.6107%
Velocity (ft/sec)	Velocity Head (feet)
14.89880563	3.446807596
Area	
0.065105887	

Riprap Serving Area E.3 (Discharging to Bioretention Area) - 4 Ft. Wide Channel (1/2 TON RIPRAP) @2%	
	Manning N
Invert Width (feet)	36. 1/2 TON RIPRAP
4	0.045
Slope	Q (CFS)
0.02	0.970
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.17490	4.00
Velocity (ft/sec)	Velocity Head (feet)
1.386538367	0.029852308

Ditch Serving Areas E.1+E.2+E.3 - 39" .Closed Conduit - Concrete RCP @ 3%	
	Manning N
Diameter (inches)	10.Closed Conduit - Concrete RCP
39	0.012
Slope (FT/FT)	Q (CFS)
0.0300	3.559927980053
Depth (feet)	Depth/Diameter
0.33974	10.4536%
Velocity (ft/sec)	Velocity Head (feet)
7.725869053	0.926848643
Area	
0.460780264	

Pipe Serving Area A.5 (Discharging to Bioretention Area) - 6" Closed Conduit - PVC @ 15%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
6	0.011
Slope (FT/FT)	Q (CFS)
0.1500	2.390001869772
Depth (feet)	Depth/Diameter
0.38083	76.1652%
Velocity (ft/sec)	Velocity Head (feet)
14.89415829	3.444657626
Area	
0.160465722	

Riprap Serving Area A.5 (Discharging to Bioretention Area) - 4 Ft. Wide Channel (1/2 TON RIPRAP) @2%	
	Manning N
Invert Width (feet)	36. 1/2 TON RIPRAP
4	0.045
Slope	Q (CFS)
0.02	2.390
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.30771	4.00
Velocity (ft/sec)	Velocity Head (feet)
1.941768341	0.058547582
Area (ft ²)	
1.230835455	

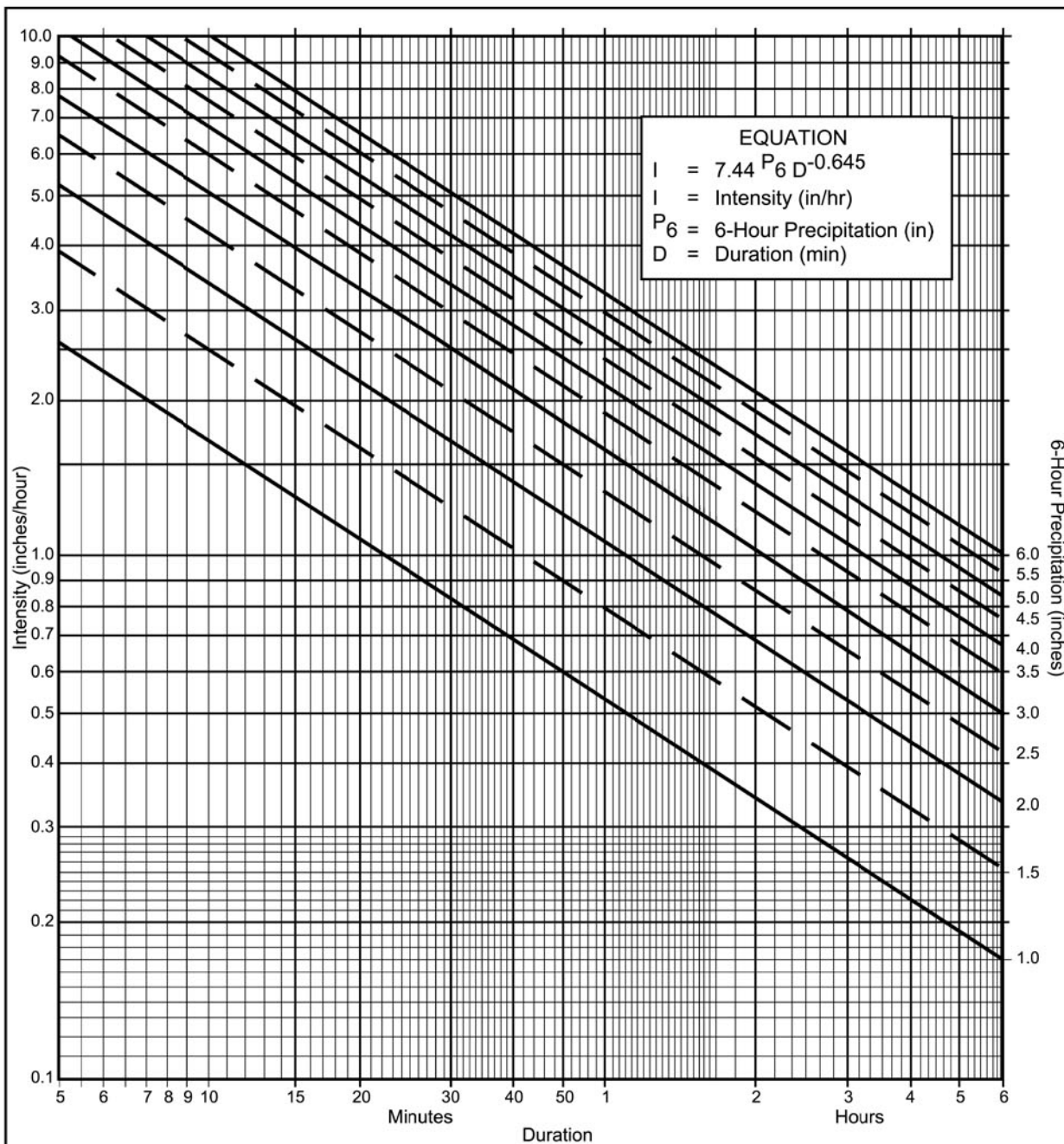
Pipe Serving Area A.3 (Discharging to Bioretention Area) - 12" Closed Conduit - PVC @ 5%	
	Manning N
Diameter (inches)	1.Closed Conduit - PVC
12	0.011
Slope (FT/FT)	Q (CFS)
0.0500	6.500000970329
Depth (feet)	Depth/Diameter
0.60975	60.9752%
Velocity (ft/sec)	Velocity Head (feet)
12.95947169	2.607886745
Area	
0.501563731	

Riprap Serving Area A.3 (Discharging to Bioretention Area) - 4 Ft. Wide Channel (1/4 TON RIPRAP) @2%	
	Manning N
Invert Width (feet)	35. 1/4 TON RIPRAP
4	0.044
Slope	Q (CFS)
0.02	6.500
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.57858	4.00
Velocity (ft/sec)	Velocity Head (feet)
2.808597005	0.122487844
Area (ft ²)	
2.314323217	

Ditch Serving Area A.2 - 39" .Closed Conduit - Concrete RCP @ 13%	
	Manning N
Diameter (inches)	10.Closed Conduit - Concrete RCP
39	0.012
Slope (FT/FT)	Q (CFS)
0.1300	3.229993829472
Depth (feet)	Depth/Diameter
0.22923	7.0532%
Velocity (ft/sec)	Velocity Head (feet)
12.51201038	2.430906889
Area	
0.258151467	

Riprap Serving Ditch Serving Area A.2 - 4 Ft. Wide Channel (LIGHT ROCK RIPRAP) @13%	
	Manning N
Invert Width (feet)	34. LIGHT ROCK RIPRAP
4	0.041
Slope	Q (CFS)
0.13	3.230
Left Side Slope (X to 1)	Right Side Slope (X to 1)
0	0
Depth (feet)	Top Width
0.19485	4.00
Velocity (ft/sec)	Velocity Head (feet)
4.144111721	0.266671769
Area (ft ²)	
0.779419351	

Appendix D – Reference Tables & Figures (County of San Diego Hydrology Manual)



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 _____ year
- (b) $P_6 =$ _____ in., $P_{24} =$ _____, $\frac{P_6}{P_{24}} =$ _____ %⁽²⁾
- (c) Adjusted $P_6^{(2)} =$ _____ in.
- (d) $t_x =$ _____ min.
- (e) $I =$ _____ 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 - Template

FIGURE

3-1

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

Land Use		Runoff Coefficient "C"				
NRCS Elements	County Elements	% IMPER.	Soil Type			
			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

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

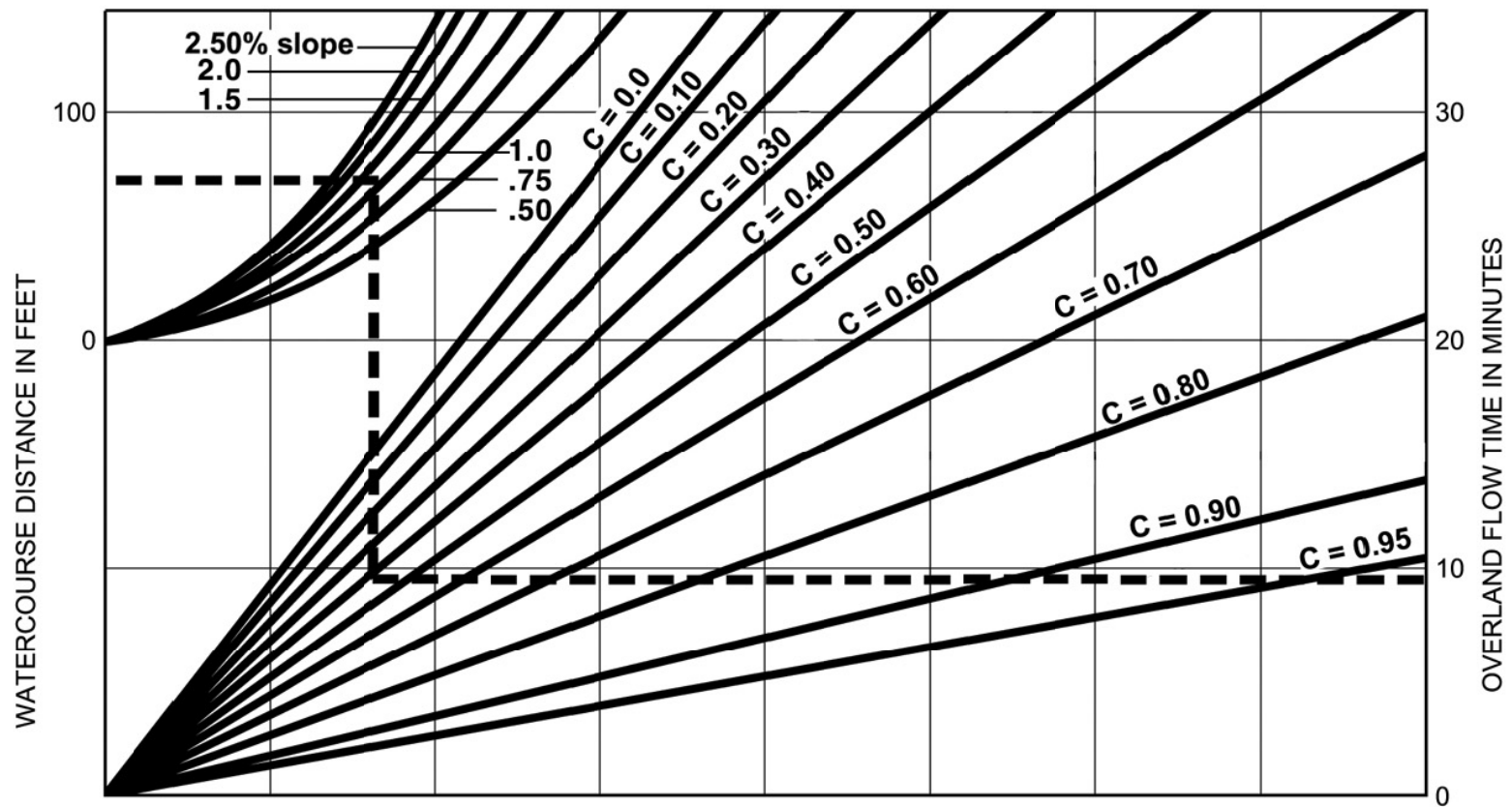
Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the “Regulating Agency” when submitted with a detailed study.

Table 3-2

**MAXIMUM OVERLAND FLOW LENGTH (L_M)
& INITIAL TIME OF CONCENTRATION (T_i)**

Element*	DU/ Acre	.5%		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	10.7	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	4.2	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

*See Table 3-1 for more detailed description



EXAMPLE:

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

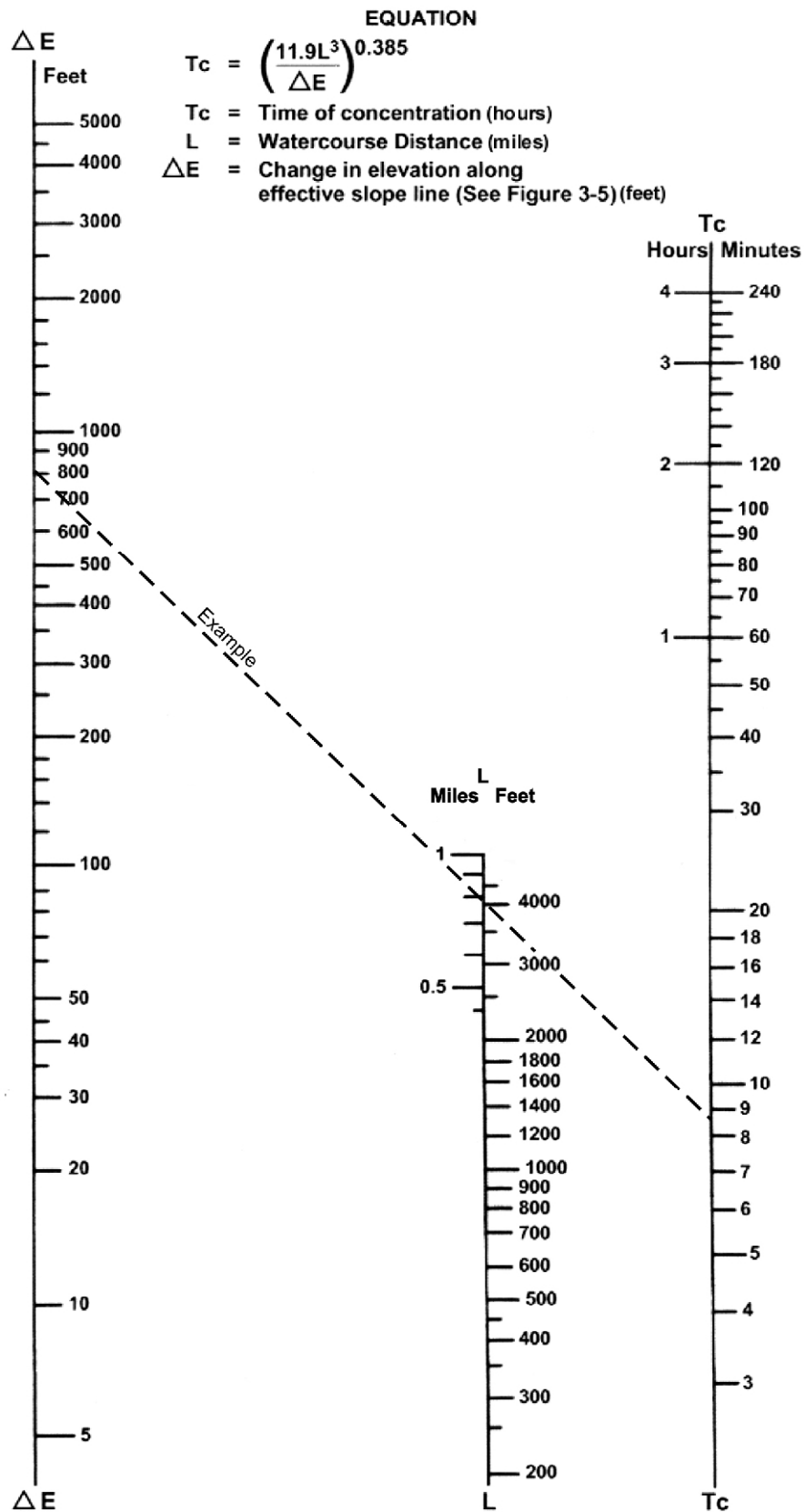
$$T = \frac{1.8 (1.1-C) \sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

F I G U R E

Rational Formula - Overland Time of Flow Nomograph

3-3



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

Nomograph for Determination of
Time of Concentration (T_c) or Travel Time (T_t) for Natural Watersheds

F I G U R E

3-4

County of San Diego Hydrology Manual



Soil Hydrologic Groups

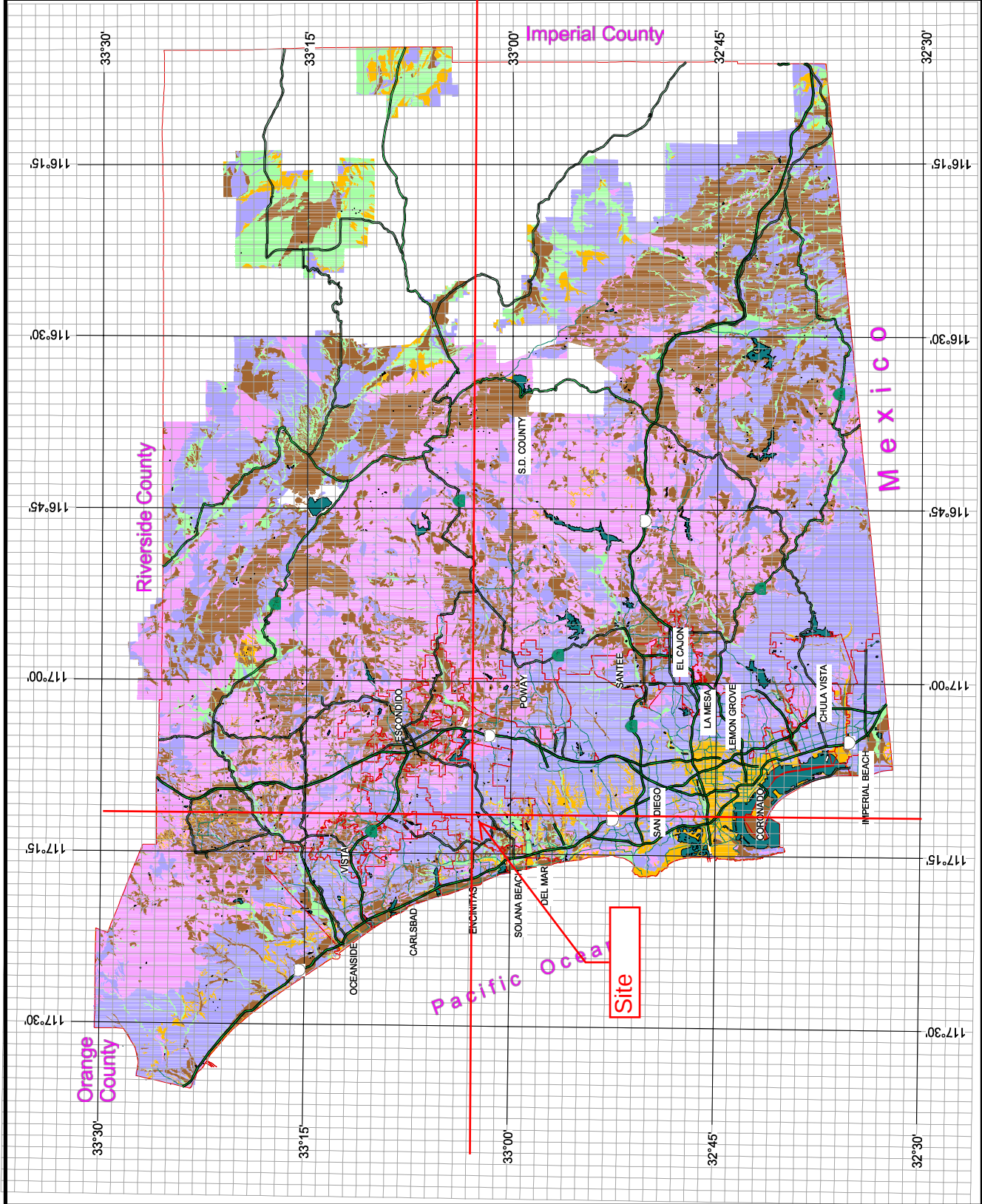
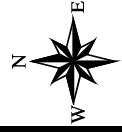
Legend

Soil Groups

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



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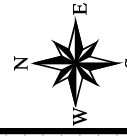
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Rainfall Isopleths

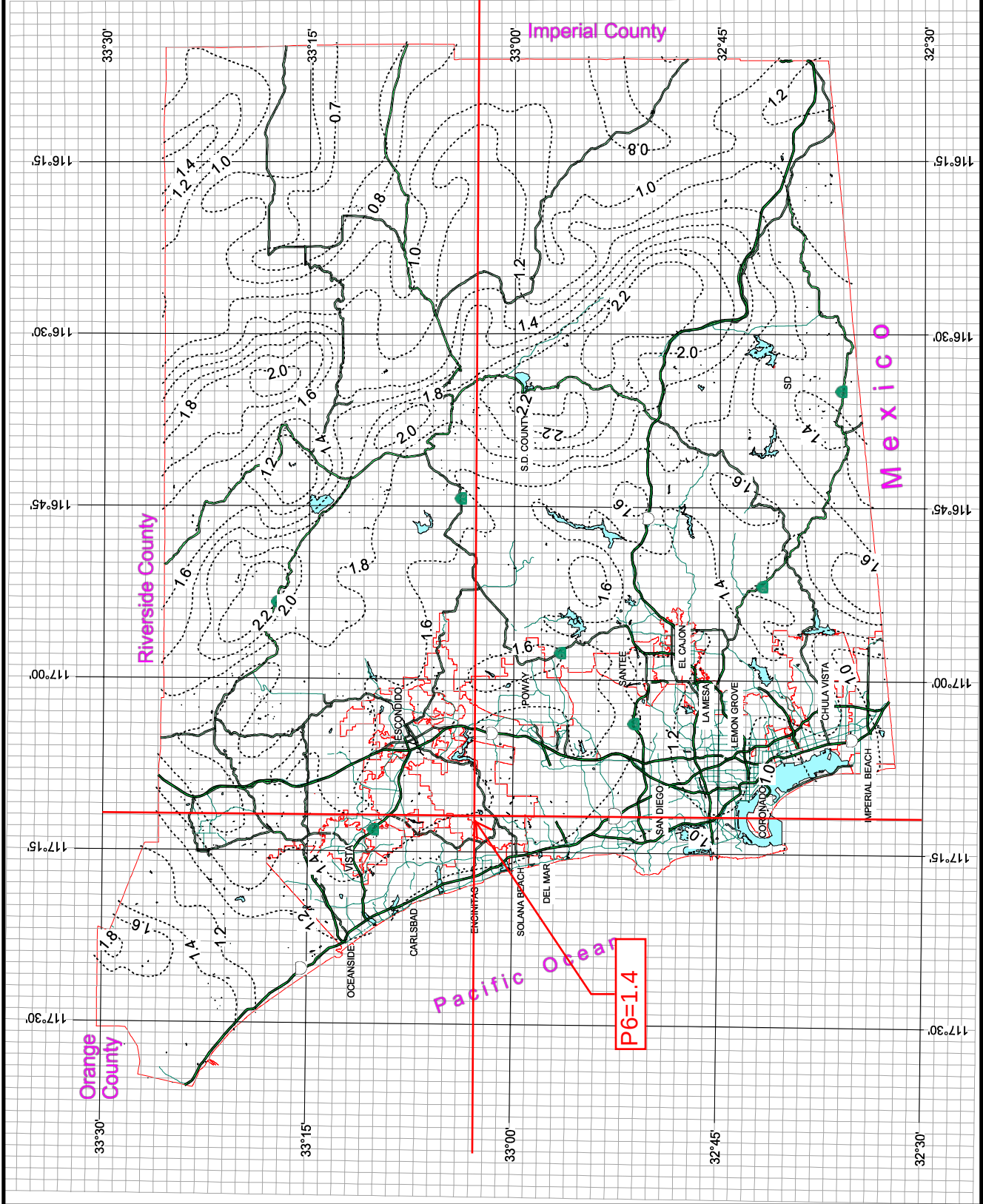
2 Year Rainfall Event - 6 Hours

Isopleth (inches)



3 0 3 Miles

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Rainfall Isoplethals

2 Year Rainfall Event - 24 Hours

Isoplethial (inches)

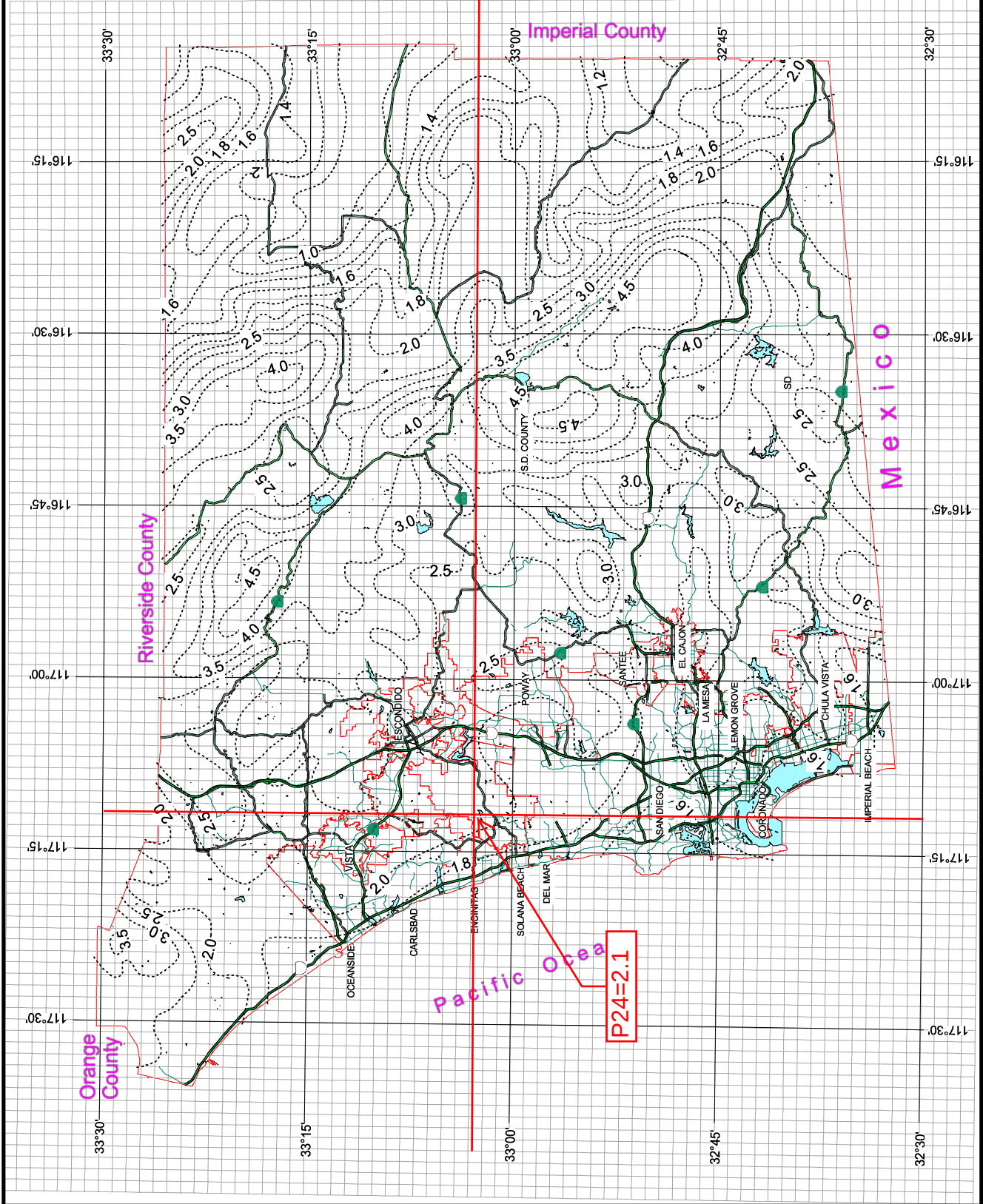


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3 0 3 Miles



County of San Diego Hydrology Manual



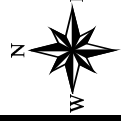
Rainfall Isopleths

100 Year Rainfall Event - 6 Hours

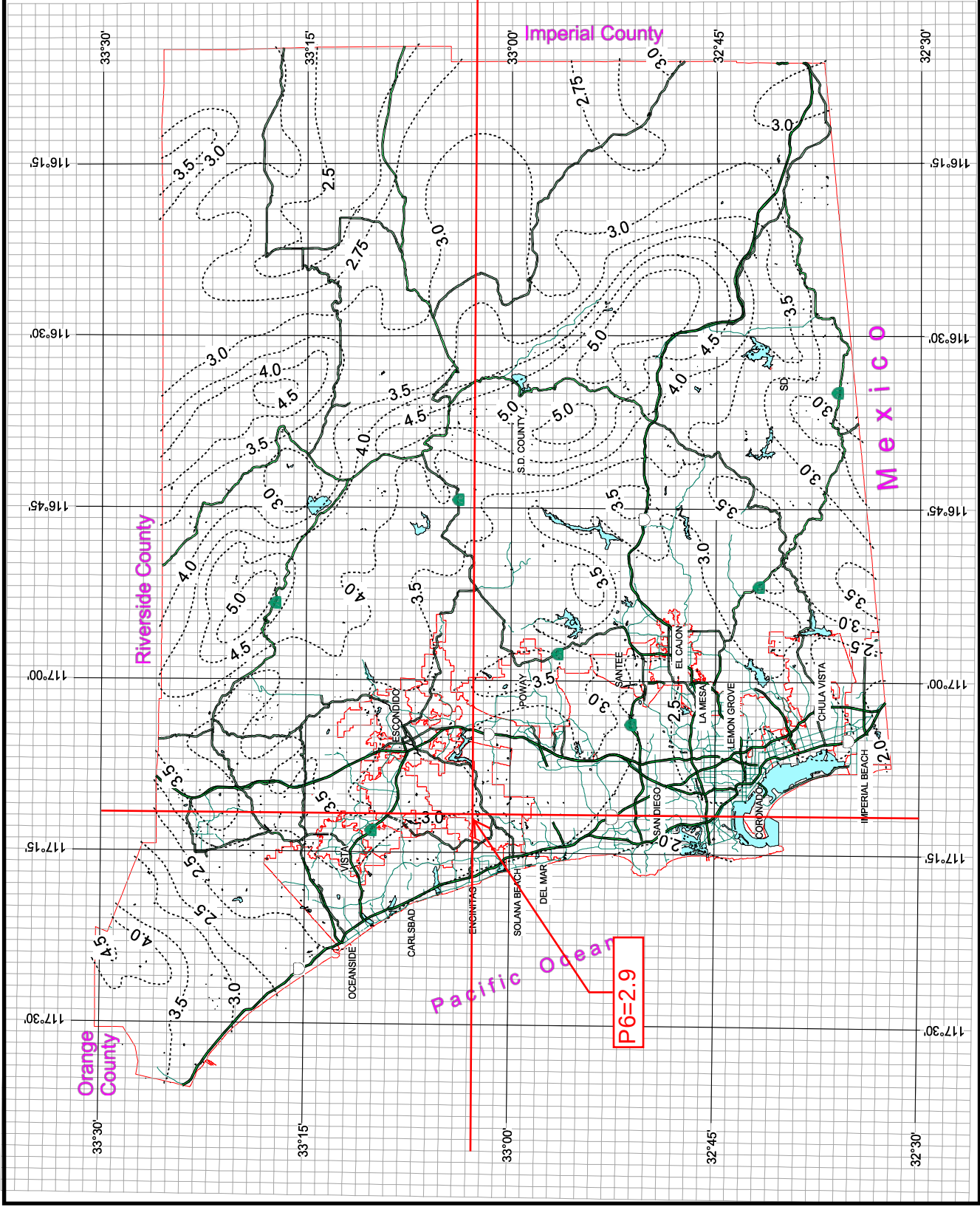
..... Isopleth (inches)



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3 0 3 Miles



County of San Diego Hydrology Manual



Rainfall Isoplethals

100 Year Rainfall Event - 24 Hours

Isopleth (inches)



3 0 3 Miles

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