A CEQA LEVEL PRELIMINARY HYDROMODIFICATION MANAGEMENT PLAN (HMP) FOR:

Lilac Hills Ranch
Implementing TM 5572 RPL-3
San Diego County, California

PREPARED FOR:

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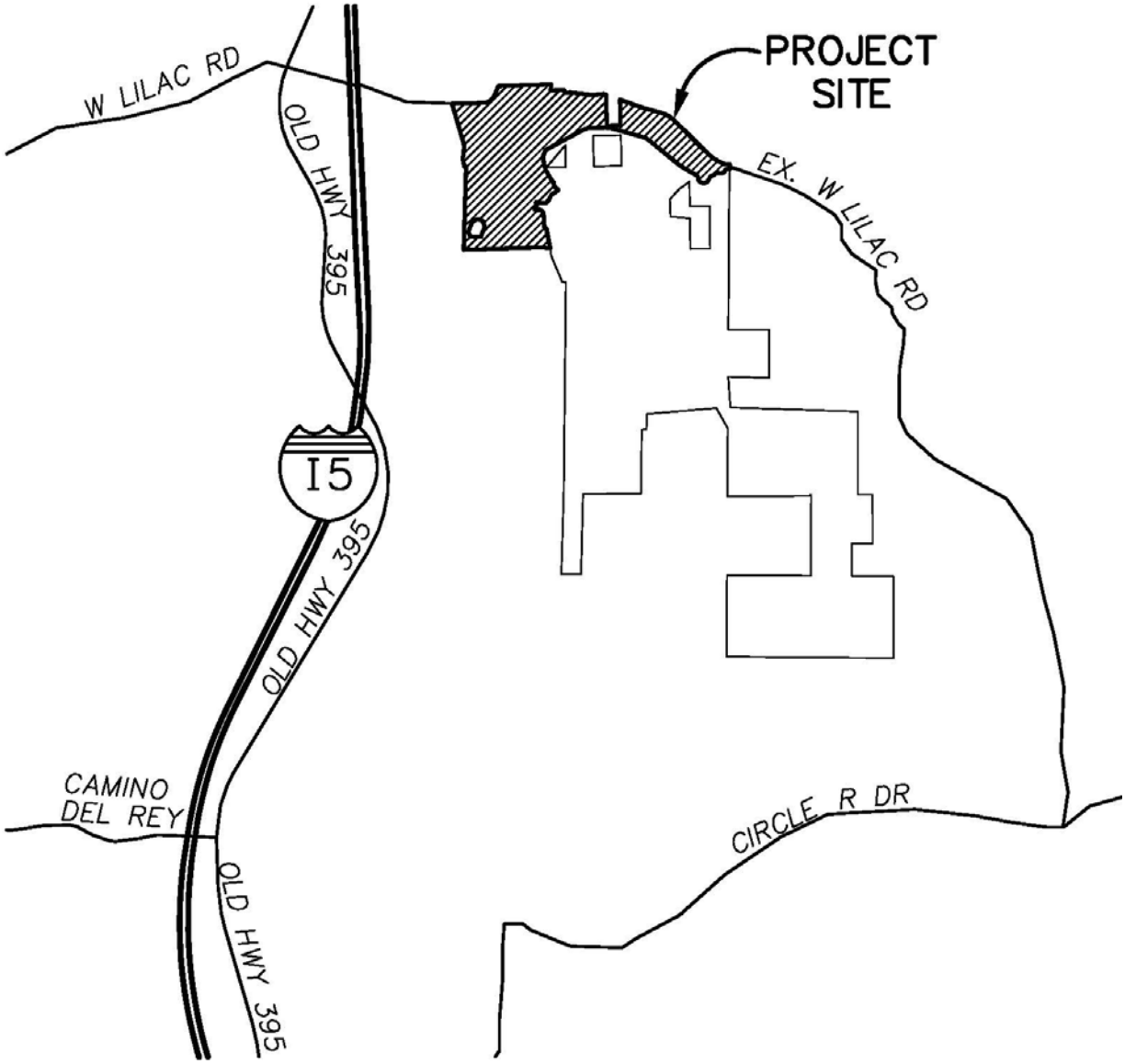
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VICINITY MAP

NOT TO SCALE

INTRODUCTION

Hydromodification is due to the changes in the natural flow pattern of surface and ground water as a result of development such as increases in impervious areas, decreases in natural vegetation, grading and compacting of soil and construction of drainage facilities.

Hydromodification impacts downstream facilities due to less infiltration as a result of increases in impervious areas such as roads, roof areas, driveways and hardscaped areas. This results in increases in peak flow and volume and the likelihood of newly constructed drainage system discharging runoff directly into downstream creeks and water bodies.

The impact to the receiving water can include stream bank erosion due to increased flow velocity and volume, sediment transport and deposition further downstream.

This project proposes extensive hardscaped areas such as roadways, roof tops and driveways in addition to the grading activities necessary to construct the required roadways and home pads. It is anticipated that the proposed project will have significant increase in impervious areas that will lead to significant increases in increase of peak flow volume. Hydromodification mitigation measures must be employed in this proposed development to reduce and eliminate additional impact to downstream facilities.

PROJECT DESCRIPTION

The project is located on the east side of Interstate 15, southerly of W. Lilac Road in the County of San Diego, State of California.

This project is the first implementing portion of a 1746 lot master-planned community – Lilac Hills Ranch. The project proposes the construction of 344 dwelling units with paved roadways and parks and a sewer treatment plant on the northerly tip of the future master-planned community. The implementing TM consists of 114.9 Acres within the project boundary and approximately 11.0 acres outside of the project boundary that includes approximately the additional grading for the construction of the access road, sewer treatment plant and a detention basin. The total project disturbance footprint is approximately 125.9 acres.

There are three sub drainage basins – Basin 100, Basin 200 and Basin 300 that discharge the runoff from the project site to the downstream Points of Compliance (POC's). Basin 100 encompasses the westerly portion of the site. Basin 200 encompasses the central portion and Basin 300 encompasses the easterly tip of the project.

The project site is situated within the northerly sub drainage basin – one of three sub basins that flow through the overall master-planned project boundary. The northerly sub drainage basin is approximately 395 acres. Under the pre-development conditions, the runoff from this sub-basin flows into a series of natural channels in a general northeasterly to southwesterly direction. These natural channels confluence into a major natural channel approximately 1300' southerly of the southerly project tip. This confluence point is designated as the project Point of Compliance (POC).

Under the post-development conditions, the sub-drainage basin is divided into three drainage tributary areas – Basin 100, Basin 200 and Basin 300 that basically conform to the existing basins footprints. The pre-development drainage pattern within each basin is preserved under the post-development condition by grading design that follows the existing land forms. There is a temporary on-site diversion from Basins 100 and 300 to Basin 200, the total diversion is approximately 5 acres. The proposed HMP mitigation facility for Basin 200 is adequate to handle the increased volume. And furthermore, the discharge from Basins 100, 200 and 300 will eventually confluence at the same point – approximately 200 southwesterly downstream of the POC1. Thus, the temporary on-site diversion will not alter the overall drainage pattern of the site.

Due to the increase in impervious area in the proposed development, it is anticipated that detention basin will be required to mitigate the runoff. The detention basin is design both for 100-year storm detention as well as HMP mitigation thus is over sized for HMP purposes. The outlet structure discharges the detention basin into the natural drainage change located southerly of the project tip where it confluences with the runoff from the bypass basin, Basin 200, and reaches the Point of Compliance (POC 1) further south. The outlet structure consists of a riser with a notch and an orifice opening at the bottom of the detention basin and is designed to mitigate the peak flow and duration of the HMP storm events. Since the basin outlet point is approximately 200' upstream from the existing natural stream bed, a riprap will be placed at the outlet point to dissipate the energy and velocity to prevent erosion of the existing natural terrain.

Even though no home construction is proposed as part of this implementing TM, this hydromodification analysis is based on the project ultimate build-out conditions where homes were built on graded pads along with associated driveways, hardscape, landscape, etc. such that the proposed HMP mitigation detention basin is sized adequately.

METHOD OF ANALYSIS

Per County of San Diego requirements, hydrograph modification analysis is required for this project. Hydrograph modification is caused by the increases in the frequency and duration of runoff as a result of watershed development. An increase in runoff is caused by additional imperious areas and more hydraulically efficient drainage facilities in developed watersheds. The increase can cause or accelerate erosion of existing downstream streambeds and/or banks.

San Diego Hydrology Model (SDHM) published by Clear Creek Solutions, Inc. was used in this hydro-modification analysis. The version of the software is V2012/5/18, published 5-18-2012.

The purpose of the hydrograph modification analysis is to certify that the post-construction hydrologic characteristics of the project simulates the pre-development hydrologic characteristics at the identified point of compliance (POC). For this project, the POC was established at one discharge point where the runoff leaves the site. The limit of the analysis is at the project boundary since only the increase in impervious areas within the project boundary as well as the disturbance limits will contribute to the hydromodification effects from the site. The area within the project boundary and disturbance limits is approximately 183.3 acres.

Under the pre-development conditions, the project site consists of agricultural operation and large rural estate single family residences and areas of undisturbed natural terrain. The project is located on the upper end of a tributary to the San Luis Rey River. The general topography of is site is of moderate to steep southwesterly sloping terrain. The entire drainage sub-basin is approximately 395.5 acre. The land use areas are based on aerial surveys, and Google Earth imageries. Based on the Soils Group Map in the current County of San Diego Hydrology Manual, the entire project site sits on Group 'C' soil, and it is characterized as "Soils have slow infiltration rate when thoroughly wetted; chiefly soils that have a layer impeding downward movement of water, or moderately fine to fine textured soils that have a slow infiltration rate. Rate of water transmission is slow."

The proposed impervious areas are estimates based on the lot size, where the areas within the building envelop is assumed to be impervious, the roadway areas are calculated based on the measure length and width of the roads along with the length of proposed sidewalks. The impervious areas of multi-family residences, is based on the lot size and projected impervious percentage – 70%. Within the development footprint, the proposed slopes and areas outside of building envelopes are anticipated to be landscaped thus, the top layer of the soil is expected to be soft to promote plant growth and water infiltration. The soil type within the proposed landscaped areas is anticipated to be similar to Type 'B' soil in accordance to the current County of San Diego Hydrology Manual and is characterized to as "soils have moderate infiltration rate when thoroughly wetted; chiefly soils that are moderately deep to deep, moderately well drained to well drained, and moderately coarse textured. Rate of water transmission is moderate." It is anticipated that the soft top layers of the landscaped areas will retain portions of the first flush runoff volume, even though the underlying soil may be Type C which are not conductive to infiltration, the landscape areas' top layer will still retain the first flush runoff volume and essentially reducing portions of the runoff that will eventually reach the downstream detention basins.

Under the post-development conditions, the sub-basin will have an interim hydromodification pond to mitigate the anticipated excess runoff as a result of the increase in impervious areas. The pond is located near the temporary sewer treatment plan at the south side of the access road.

The rainfall data used in the hydrograph modification analysis is based on the annual gauge data at the Lake Wohlford Station. The rainfall data was obtained from the www.projectcleanwater.org web site. The Lake Wohlford Station data was used based on the County of San Diego's average annual precipitation Isopluvial Maps in the San Diego County Hydrology Manual. The project site and the Lake Wohlford Station are on the same rain curve - instead of the nearby Fallbrook Station, which is at a lower rain curve. The rainfall data was obtained from the www.projectcleanwater.org web site. No scaling factor is considered.

HYDROMODIFICATION ANALYSIS

PRE-DEVELOPMENT LANDUSE AREA BREAKDOWN

PRE-DEVELOPMENT		
POC 1		
LAND COVER	SLOPE	AREA (Ac)
CROP/GRASS/VEGETATION(C-SOIL)	0-5%	9.32
	5-10%	28.36
	>10%	153.02
IMPERVIOUS/ROOF TOP/ROADS	0-5%	3.26
	5-10%	6.47
TOTAL		**200.43**
POC 2		
LAND COVER	SLOPE	AREA (Ac)
CROP/GRASS/VEGETATION(C-SOIL)	0-5%	1.73
	5-10%	3.18
	>10%	10.15
IMPERVIOUS/ROOF TOP/ROADS	0-5%	0.79
	5-10%	1.09
TOTAL		**16.94**
POC 3		
LAND COVER	SLOPE	AREA (Ac)
CROP/GRASS/VEGETATION(C-SOIL)	0-5%	0.46
	5-10%	0.72
	>10%	5.14
IMPERVIOUS/ROOF TOP/ROADS	0-5%	0.05
	5-10%	0.38
TOTAL		**6.75**

POST-DEVELOPMENT LANDUSE AREA BREAKDOWN

POST-DEV		OUTSIDE OF DEV FOOTPRINT		INSIDE OF DEV FOOTPRINT		BYPASSING SUBTOTAL	ROUTED SUBTOTAL
		BYPASSING HMP FACILITIES	ROUTED TO HMP FACILITIES	BYPASSING HMP FACILITIES	ROUTED TO HMP FACILITIES		
		SEE EXHIBIT 3 & 4	SEE EXHIBIT 5 & 6	Measured from design file			
BASIN 100/POC1	SLOPE						
LAND COVER							
CROP/GRASS/VEGETATION	0-5%	5.15	1.39	14.69	11.43	19.84	12.82
	5-10%	15.14	6.67	0.00	0.00	15.14	6.67
	>10%	74.27	9.34	10.47	8.65	84.74	17.99
IMPERVIOUS/ROOF TOP/ROADS	0-5%	1.13	2.61	2.13	11.08	3.26	13.69
	5-10%	1.27	0.85	3.09	6.51	6.47	7.36
	>10%	2.11	0.82				
				TOTAL BYPASS	TOTAL ROUTED		
				129.44	58.53	TOTAL AREA	187.97
BASIN 200/POC 2							
LAND COVER	SLOPE						
CROP/GRASS/VEGETATION	0-5%	0.01	0	0	4.03	0.01	4.03
	5-10%	0.16	0	0	4.2	0.16	4.20
	>10%	0.37	0	0	9.8	0.37	9.80
IMPERVIOUS/ROOF TOP/ROADS	0-5%	0	0	0	1.85	0.00	1.85
	5-10%	0	0	0	1.5	0.00	1.50
	>10%	0	0				
				TOTAL BYPASS	TOTAL ROUTED		
				0.54	21.38	TOTAL AREA	21.92
BASIN 300/POC 3				0			0
LAND COVER	SLOPE			0			
CROP/GRASS/VEGETATION	0-5%	0.17	0.09	0	0.34	0.17	0.43
	5-10%	0.09	0.08	0	0	0.09	0.08
	>10%	0.92	0.34	0	0.65	0.92	0.99
IMPERVIOUS/ROOF TOP/ROADS	0-5%	0.02	0	0	1.49	0.02	1.49
	5-10%	0.08	0	0	0.85	0.08	0.85
	>10%	0.08	0				
				TOTAL BYPASS	TOTAL ROUTED		
				1.28	3.84	TOTAL AREA	5.12

BASINS 100



BASIN 200



BASIN 300

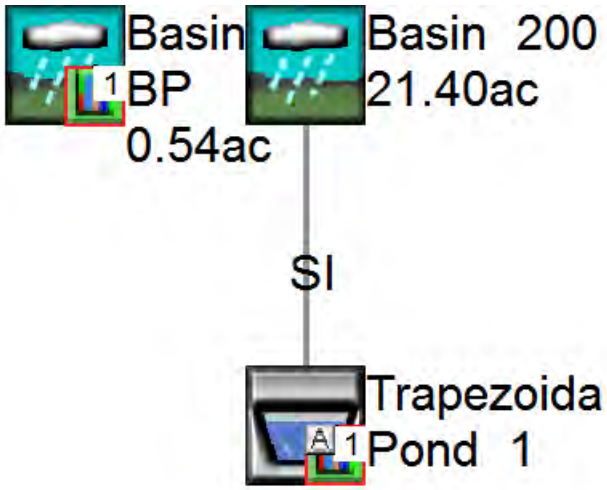


POST-DEVELOPMENT SCHEMATICS

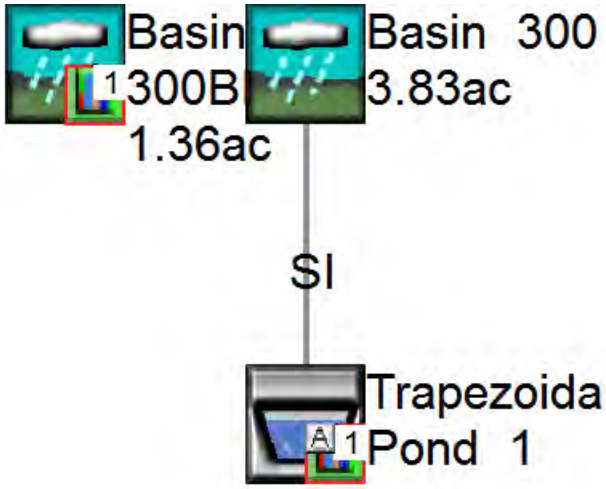
BASINS 100



BASINS 200



BASIN 300



BASINS 100 RESULTS

SDHM2011

PROJECT REPORT

Project Name: 1037IMPTMPOC1b
Site Name: Lilac Hills Ranch
Site Address: West Lilac Road
City :
Report Date: 5/13/2013
Gage : LAKE WOH
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2013/04/29

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1: 10 year

PREDEVELOPED LAND USE

Name : Basin 100
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	9.32
C,Grass,MOD(5-10%)	28.36
C,Grass,STEEP(10-20	153.02
Pervious Total	190.7

Impervious Land Use	Acres
IMPERVIOUS-FLAT	3.26
IMPERVIOUS-MOD	6.47
Impervious Total	9.73
Basin Total	200.43

Element Flows To:
Surface Interflow Groundwater

MITIGATED LAND USE

Name : Basin 100BP
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	19.84
C,Grass,MOD(5-10%)	15.14
C,Grass,STEEP(10-20	84.74
Pervious Total	119.72

Impervious Land Use	Acres
IMPERVIOUS-FLAT	3.26
IMPERVIOUS-MOD	6.47
Impervious Total	9.73

Basin Total 129.45

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Basin 100
Bypass: No

GroundWater: No

Pervious Land Use	Acres
B,Grass,FLAT(0-5%)	14.56
B,Grass,STEEP(10-20	9.65
C,Grass,FLAT(0-5%)	4.21
C,Grass,MOD(5-10%)	6.67
C,Grass,STEEP(10-20	9.34
Pervious Total	44.43

Impervious Land Use	Acres
IMPERVIOUS-FLAT	15.45
IMPERVIOUS-MOD	9.58
Impervious Total	25.03

Basin Total **69.46**

Element Flows To:

Surface	**Interflow**	**Groundwater**
Trapezoidal Pond 1	Trapezoidal Pond 1	

Name : Trapezoidal Pond 1
Bottom Length: 150.00 ft.
Bottom Width: 100.00 ft.
Depth: 7 ft.
Volume at riser head: 2.0501 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 5 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 1.500 ft.
Notch Height: 0.100 ft.
Orifice 1 Diameter: 5.5 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	**Outlet 2**

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.344	0.000	0.000	0.000
0.0778	0.346	0.026	0.221	0.000
0.1556	0.347	0.053	0.313	0.000
0.2333	0.349	0.081	0.383	0.000
0.3111	0.351	0.108	0.443	0.000
0.3889	0.353	0.135	0.495	0.000
0.4667	0.355	0.163	0.542	0.000
0.5444	0.357	0.190	0.586	0.000
0.6222	0.358	0.218	0.626	0.000
0.7000	0.360	0.246	0.664	0.000
0.7778	0.362	0.274	0.700	0.000
0.8556	0.364	0.303	0.734	0.000
0.9333	0.366	0.331	0.767	0.000
1.0111	0.367	0.360	0.798	0.000
1.0889	0.369	0.388	0.829	0.000
1.1667	0.371	0.417	0.858	0.000

1.2444	0.373	0.446	0.886	0.000
1.3222	0.375	0.475	0.913	0.000
1.4000	0.377	0.504	0.940	0.000
1.4778	0.379	0.534	0.965	0.000
1.5556	0.381	0.563	0.990	0.000
1.6333	0.382	0.593	1.015	0.000
1.7111	0.384	0.623	1.039	0.000
1.7889	0.386	0.653	1.062	0.000
1.8667	0.388	0.683	1.085	0.000
1.9444	0.390	0.713	1.107	0.000
2.0222	0.392	0.744	1.129	0.000
2.1000	0.394	0.774	1.151	0.000
2.1778	0.396	0.805	1.172	0.000
2.2556	0.398	0.836	1.193	0.000
2.3333	0.399	0.867	1.213	0.000
2.4111	0.401	0.898	1.233	0.000
2.4889	0.403	0.930	1.253	0.000
2.5667	0.405	0.961	1.272	0.000
2.6444	0.407	0.993	1.292	0.000
2.7222	0.409	1.024	1.310	0.000
2.8000	0.411	1.056	1.329	0.000
2.8778	0.413	1.088	1.347	0.000
2.9556	0.415	1.121	1.365	0.000
3.0333	0.417	1.153	1.383	0.000
3.1111	0.419	1.186	1.401	0.000
3.1889	0.421	1.218	1.418	0.000
3.2667	0.423	1.251	1.435	0.000
3.3444	0.425	1.284	1.452	0.000
3.4222	0.427	1.317	1.469	0.000
3.5000	0.429	1.351	1.486	0.000
3.5778	0.431	1.384	1.502	0.000
3.6556	0.433	1.418	1.519	0.000
3.7333	0.435	1.451	1.535	0.000
3.8111	0.437	1.485	1.551	0.000
3.8889	0.439	1.519	1.566	0.000
3.9667	0.441	1.554	1.582	0.000
4.0444	0.443	1.588	1.597	0.000
4.1222	0.445	1.623	1.613	0.000
4.2000	0.447	1.657	1.628	0.000
4.2778	0.449	1.692	1.643	0.000
4.3556	0.451	1.727	1.658	0.000
4.4333	0.453	1.762	1.672	0.000
4.5111	0.455	1.798	1.687	0.000
4.5889	0.457	1.833	1.701	0.000
4.6667	0.459	1.869	1.716	0.000
4.7444	0.461	1.905	1.730	0.000
4.8222	0.463	1.941	1.744	0.000
4.9000	0.465	1.977	1.758	0.000
4.9778	0.467	2.013	1.880	0.000
5.0556	0.469	2.050	2.135	0.000
5.1333	0.471	2.086	2.669	0.000
5.2111	0.474	2.123	3.388	0.000
5.2889	0.476	2.160	4.253	0.000
5.3667	0.478	2.197	5.242	0.000

5.4444	0.480	2.234	6.340	0.000
5.5222	0.482	2.272	7.538	0.000
5.6000	0.484	2.309	8.827	0.000
5.6778	0.486	2.347	10.20	0.000
5.7556	0.488	2.385	11.65	0.000
5.8333	0.490	2.423	13.19	0.000
5.9111	0.492	2.461	14.79	0.000
5.9889	0.495	2.500	16.46	0.000
6.0667	0.497	2.538	18.20	0.000
6.1444	0.499	2.577	20.01	0.000
6.2222	0.501	2.616	21.87	0.000
6.3000	0.503	2.655	23.80	0.000
6.3778	0.505	2.694	25.79	0.000
6.4556	0.507	2.734	27.83	0.000
6.5333	0.510	2.773	29.92	0.000
6.6111	0.512	2.813	32.07	0.000
6.6889	0.514	2.853	34.27	0.000
6.7667	0.516	2.893	36.52	0.000
6.8444	0.518	2.933	38.83	0.000
6.9222	0.520	2.974	41.18	0.000
7.0000	0.523	3.014	43.57	0.000
7.0778	0.525	3.055	46.02	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area:190.7
Total Impervious Area:9.73

Mitigated Landuse Totals for POC #1
Total Pervious Area:164.15
Total Impervious Area:34.76

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	55.396999
5 year	85.086908
10 year	102.73363
25 year	117.033783

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	49.841717
5 year	76.039868
10 year	99.808925
25 year	113.804924

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
5.5397	785	865	110	Pass
6.5215	676	741	109	Pass
7.5032	613	668	108	Pass
8.4850	567	594	104	Pass
9.4667	536	522	97	Pass
10.4485	506	473	93	Pass
11.4302	466	439	94	Pass
12.4120	437	389	89	Pass
13.3938	413	360	87	Pass
14.3755	397	341	85	Pass
15.3573	381	323	84	Pass
16.3390	366	305	83	Pass
17.3208	350	294	84	Pass
18.3025	325	276	84	Pass
19.2843	310	260	83	Pass
20.2661	295	246	83	Pass
21.2478	286	233	81	Pass
22.2296	274	219	79	Pass
23.2113	255	201	78	Pass
24.1931	241	187	77	Pass
25.1748	223	171	76	Pass
26.1566	208	158	75	Pass
27.1384	189	152	80	Pass
28.1201	176	143	81	Pass
29.1019	171	137	80	Pass
30.0836	157	132	84	Pass
31.0654	150	127	84	Pass
32.0471	146	121	82	Pass
33.0289	141	112	79	Pass
34.0106	134	104	77	Pass
34.9924	129	102	79	Pass
35.9742	124	99	79	Pass
36.9559	118	95	80	Pass
37.9377	111	90	81	Pass
38.9194	105	89	84	Pass
39.9012	102	85	83	Pass
40.8829	96	82	85	Pass
41.8647	89	78	87	Pass
42.8465	84	70	83	Pass
43.8282	80	67	83	Pass
44.8100	77	65	84	Pass
45.7917	75	65	86	Pass
46.7735	71	64	90	Pass
47.7552	69	60	86	Pass
48.7370	65	57	87	Pass

49.7188	63	56	88	Pass
50.7005	60	54	90	Pass
51.6823	59	54	91	Pass
52.6640	59	51	86	Pass
53.6458	59	49	83	Pass
54.6275	57	45	78	Pass
55.6093	54	45	83	Pass
56.5911	52	44	84	Pass
57.5728	51	43	84	Pass
58.5546	50	38	76	Pass
59.5363	49	33	67	Pass
60.5181	47	32	68	Pass
61.4998	44	31	70	Pass
62.4816	41	30	73	Pass
63.4634	40	28	70	Pass
64.4451	39	26	66	Pass
65.4269	37	25	67	Pass
66.4086	34	24	70	Pass
67.3904	33	24	72	Pass
68.3721	30	24	80	Pass
69.3539	28	22	78	Pass
70.3357	28	21	75	Pass
71.3174	26	19	73	Pass
72.2992	26	18	69	Pass
73.2809	25	17	68	Pass
74.2627	24	17	70	Pass
75.2444	22	14	63	Pass
76.2262	22	12	54	Pass
77.2080	21	12	57	Pass
78.1897	20	11	55	Pass
79.1715	18	11	61	Pass
80.1532	16	10	62	Pass
81.1350	15	9	60	Pass
82.1167	13	9	69	Pass
83.0985	13	9	69	Pass
84.0802	12	9	75	Pass
85.0620	11	9	81	Pass
86.0438	11	9	81	Pass
87.0255	10	7	70	Pass
88.0073	9	7	77	Pass
88.9890	8	7	87	Pass
89.9708	8	6	75	Pass
90.9525	8	6	75	Pass
91.9343	8	5	62	Pass
92.9161	8	5	62	Pass
93.8978	8	5	62	Pass
94.8796	7	5	71	Pass
95.8613	7	5	71	Pass
96.8431	7	5	71	Pass
97.8248	7	5	71	Pass
98.8066	6	5	83	Pass
99.7884	6	5	83	Pass
100.7701	6	3	50	Pass
101.7519	6	2	33	Pass

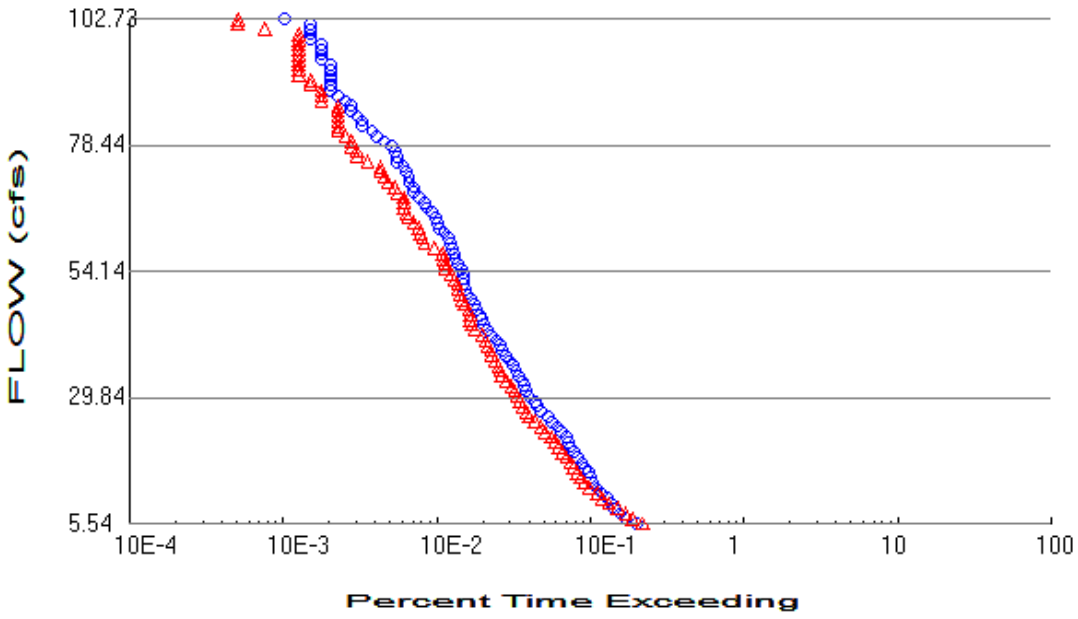
102.7336 4 2 50 Pass

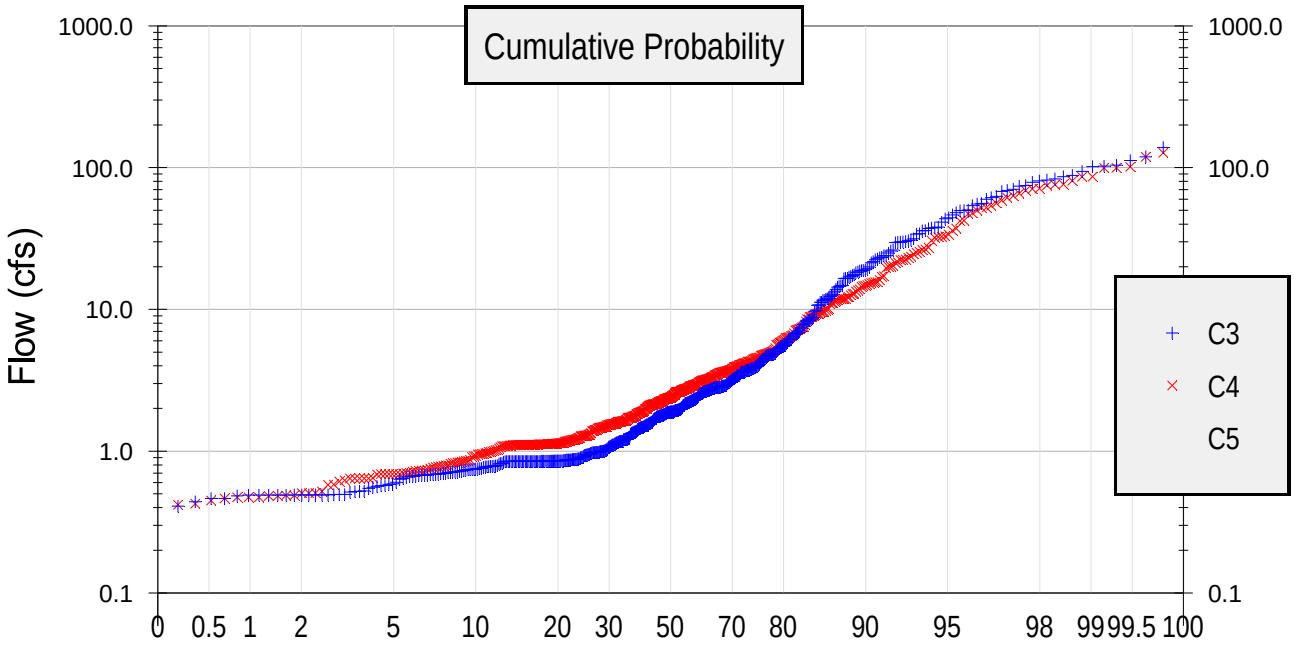
Drawdown Time Results
Pond: Trapezoidal Pond 1

Days	Stage(feet)	Percent of Total Run Time
1	7.000	0.0007
2	7.000	0.0007
3	7.000	0.0007
4	7.000	0.0007
5	7.000	0.0007

Maximum Stage: 99.80
Drawdown Time: 05 00:00:10

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Cumulative Probability
Flow (cfs)
1000.0
100.0
10.0
1.0
0.1
0
0.5
1
2
5
10
20
30
50
70
80
90
95
98
99
99.5
100
C3
C4
C5

BASINS 200 RESULTS

SDHM2011
PROJECT REPORT

Project Name: 1037IMPTMPOC2
Site Name : LHR IMP TM
Site Address: W. LILAC ROAD
City : VALLEY CENTER
Report Date : 4/18/2013
Gage : LAKE WOH
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/05/18

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1 : 10 year

PREDEVELOPED LAND USE

Name : Basin 200
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	1.73
C,Grass,MOD(5-10%)	3.18
C,Grass,STEEP(10-20	10.15
Pervious Total	15.06

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.79
IMPERVIOUS-MOD	1.09
Impervious Total	1.88
Basin Total	16.94

Element Flows To:
Surface **Interflow** **Groundwater**

MITIGATED LAND USE

Name : Basin 200 BP
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	.01
C,Grass,MOD(5-10%)	.16
C,Grass,STEEP(10-20	.37
Pervious Total	0.54

Impervious Land Use	Acres
Impervious Total	0
Basin Total	0.54

Element Flows To:

Surface	Interflow	Groundwater

Name : Basin 200
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C,Grass,MOD(5-10%)	4.2
B,Grass,FLAT(0-5%)	4.03
B,Grass,STEEP(10-20	9.8
Pervious Total	18.03

Impervious Land Use	Acres
IMPERVIOUS-FLAT	1.85
IMPERVIOUS-MOD	1.5
Impervious Total	3.35
Basin Total	21.38

Element Flows To:

Surface	Interflow	Groundwater

Name : Trapezoidal Pond 1
Bottom Length: 150.00 ft.
Bottom Width: 110.00 ft.
Depth : 5 ft.
Volume at riser head : 1.7407 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 4 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.493 ft.
Notch Height: 0.131 ft.
Orifice 1 Diameter: 3 in. **Elevation:** 0 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.378	0.000	0.000	0.000
0.0556	0.380	0.021	0.055	0.000
0.1111	0.381	0.042	0.078	0.000
0.1667	0.382	0.063	0.096	0.000
0.2222	0.384	0.084	0.111	0.000
0.2778	0.385	0.106	0.124	0.000
0.3333	0.386	0.127	0.136	0.000
0.3889	0.388	0.149	0.147	0.000
0.4444	0.389	0.170	0.157	0.000
0.5000	0.390	0.192	0.167	0.000
0.5556	0.392	0.214	0.176	0.000
0.6111	0.393	0.236	0.184	0.000
0.6667	0.394	0.257	0.193	0.000
0.7222	0.396	0.279	0.200	0.000
0.7778	0.397	0.301	0.208	0.000
0.8333	0.398	0.324	0.215	0.000
0.8889	0.400	0.346	0.222	0.000
0.9444	0.401	0.368	0.229	0.000
1.0000	0.403	0.390	0.236	0.000
1.0556	0.404	0.413	0.242	0.000
1.1111	0.405	0.435	0.249	0.000
1.1667	0.407	0.458	0.255	0.000
1.2222	0.408	0.481	0.261	0.000
1.2778	0.409	0.503	0.267	0.000

1.3333	0.411	0.526	0.272	0.000
1.3889	0.412	0.549	0.278	0.000
1.4444	0.414	0.572	0.284	0.000
1.5000	0.415	0.595	0.289	0.000
1.5556	0.416	0.618	0.294	0.000
1.6111	0.418	0.641	0.300	0.000
1.6667	0.419	0.665	0.305	0.000
1.7222	0.421	0.688	0.310	0.000
1.7778	0.422	0.711	0.315	0.000
1.8333	0.423	0.735	0.320	0.000
1.8889	0.425	0.758	0.324	0.000
1.9444	0.426	0.782	0.329	0.000
2.0000	0.428	0.806	0.334	0.000
2.0556	0.429	0.830	0.338	0.000
2.1111	0.430	0.854	0.343	0.000
2.1667	0.432	0.878	0.347	0.000
2.2222	0.433	0.902	0.352	0.000
2.2778	0.435	0.926	0.356	0.000
2.3333	0.436	0.950	0.361	0.000
2.3889	0.437	0.974	0.365	0.000
2.4444	0.439	0.999	0.369	0.000
2.5000	0.440	1.023	0.373	0.000
2.5556	0.442	1.048	0.377	0.000
2.6111	0.443	1.072	0.382	0.000
2.6667	0.445	1.097	0.386	0.000
2.7222	0.446	1.122	0.390	0.000
2.7778	0.447	1.146	0.394	0.000
2.8333	0.449	1.171	0.397	0.000
2.8889	0.450	1.196	0.401	0.000
2.9444	0.452	1.221	0.405	0.000
3.0000	0.453	1.247	0.409	0.000
3.0556	0.455	1.272	0.413	0.000
3.1111	0.456	1.297	0.416	0.000
3.1667	0.458	1.323	0.420	0.000
3.2222	0.459	1.348	0.424	0.000
3.2778	0.461	1.374	0.427	0.000
3.3333	0.462	1.399	0.431	0.000
3.3889	0.463	1.425	0.435	0.000
3.4444	0.465	1.451	0.438	0.000
3.5000	0.466	1.477	0.442	0.000
3.5556	0.468	1.503	0.445	0.000
3.6111	0.469	1.529	0.449	0.000
3.6667	0.471	1.555	0.452	0.000
3.7222	0.472	1.581	0.456	0.000
3.7778	0.474	1.607	0.459	0.000
3.8333	0.475	1.634	0.462	0.000
3.8889	0.477	1.660	0.480	0.000
3.9444	0.478	1.687	0.572	0.000
4.0000	0.480	1.714	0.709	0.000
4.0556	0.481	1.740	0.903	0.000
4.1111	0.483	1.767	1.256	0.000
4.1667	0.484	1.794	1.712	0.000
4.2222	0.486	1.821	2.252	0.000
4.2778	0.487	1.848	2.864	0.000

4.3333	0.489	1.875	3.539	0.000
4.3889	0.490	1.902	4.274	0.000
4.4444	0.492	1.930	5.063	0.000
4.5000	0.493	1.957	5.902	0.000
4.5556	0.495	1.984	6.790	0.000
4.6111	0.496	2.012	7.722	0.000
4.6667	0.498	2.040	8.698	0.000
4.7222	0.499	2.067	9.716	0.000
4.7778	0.501	2.095	10.77	0.000
4.8333	0.502	2.123	11.86	0.000
4.8889	0.504	2.151	13.00	0.000
4.9444	0.505	2.179	14.17	0.000
5.0000	0.507	2.207	15.37	0.000
5.0556	0.508	2.235	16.61	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area : 15.06
Total Impervious Area : 1.88

Mitigated Landuse Totals for POC #1
Total Pervious Area : 18.57
Total Impervious Area : 3.35

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	4.726828
5 year	7.238093
10 year	8.721725
25 year	9.947936

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.496119
5 year	3.515274
10 year	7.835698
25 year	10.18619

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4727	1033	533	51	Pass
0.5560	855	341	39	Pass
0.6393	735	281	38	Pass
0.7227	650	244	37	Pass
0.8060	587	227	38	Pass
0.8893	537	211	39	Pass
0.9726	492	193	39	Pass
1.0559	469	175	37	Pass
1.1393	439	162	36	Pass
1.2226	412	159	38	Pass
1.3059	391	153	39	Pass
1.3892	375	147	39	Pass
1.4726	359	141	39	Pass
1.5559	340	139	40	Pass
1.6392	321	132	41	Pass
1.7225	303	126	41	Pass
1.8059	290	119	41	Pass
1.8892	277	115	41	Pass
1.9725	257	111	43	Pass
2.0558	244	104	42	Pass
2.1392	227	101	44	Pass
2.2225	209	98	46	Pass
2.3058	191	92	48	Pass
2.3891	177	90	50	Pass
2.4725	170	86	50	Pass
2.5558	162	84	51	Pass
2.6391	153	79	51	Pass
2.7224	148	73	49	Pass
2.8057	146	69	47	Pass
2.8891	137	66	48	Pass
2.9724	132	63	47	Pass
3.0557	128	57	44	Pass
3.1390	123	57	46	Pass
3.2224	117	55	47	Pass
3.3057	110	54	49	Pass
3.3890	106	53	50	Pass
3.4723	97	51	52	Pass
3.5557	91	49	53	Pass
3.6390	86	48	55	Pass
3.7223	81	45	55	Pass
3.8056	77	43	55	Pass
3.8890	75	43	57	Pass
3.9723	71	41	57	Pass
4.0556	68	41	60	Pass
4.1389	64	39	60	Pass
4.2222	63	39	61	Pass
4.3056	61	39	63	Pass
4.3889	60	35	58	Pass
4.4722	59	33	55	Pass
4.5555	59	33	55	Pass
4.6389	57	32	56	Pass
4.7222	55	32	58	Pass
4.8055	53	32	60	Pass

4.8888	51	31	60	Pass
4.9722	50	30	60	Pass
5.0555	49	28	57	Pass
5.1388	47	27	57	Pass
5.2221	45	26	57	Pass
5.3055	41	25	60	Pass
5.3888	41	24	58	Pass
5.4721	39	24	61	Pass
5.5554	37	24	64	Pass
5.6387	34	24	70	Pass
5.7221	31	24	77	Pass
5.8054	31	23	74	Pass
5.8887	30	22	73	Pass
5.9720	29	21	72	Pass
6.0554	28	20	71	Pass
6.1387	27	17	62	Pass
6.2220	26	16	61	Pass
6.3053	26	16	61	Pass
6.3887	24	15	62	Pass
6.4720	23	14	60	Pass
6.5553	22	13	59	Pass
6.6386	20	11	55	Pass
6.7220	20	10	50	Pass
6.8053	17	10	58	Pass
6.8886	15	10	66	Pass
6.9719	13	10	76	Pass
7.0553	13	10	76	Pass
7.1386	12	10	83	Pass
7.2219	11	10	90	Pass
7.3052	11	10	90	Pass
7.3885	10	10	100	Pass
7.4719	9	9	100	Pass
7.5552	8	8	100	Pass
7.6385	8	8	100	Pass
7.7218	8	8	100	Pass
7.8052	8	7	87	Pass
7.8885	8	7	87	Pass
7.9718	8	7	87	Pass
8.0551	7	7	100	Pass
8.1385	7	7	100	Pass
8.2218	7	7	100	Pass
8.3051	7	6	85	Pass
8.3884	6	6	100	Pass
8.4718	6	5	83	Pass
8.5551	6	4	66	Pass
8.6384	6	4	66	Pass
8.7217	4	3	75	Pass

Drawdown Time Results
Pond: Trapezoidal Pond 1

Days	**Stage(feet)**	**Percent of Total Run Time**
1	**0.273**	**8.4802**
2	**0.488**	**6.4069**

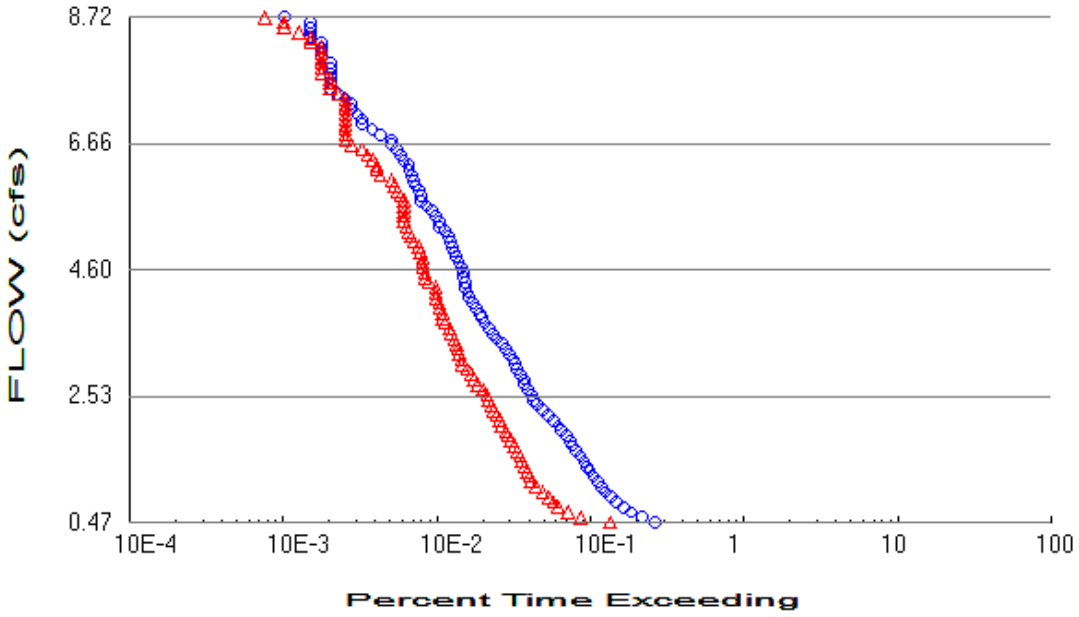
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4         1.067         3.2278
5         1.424         2.2558

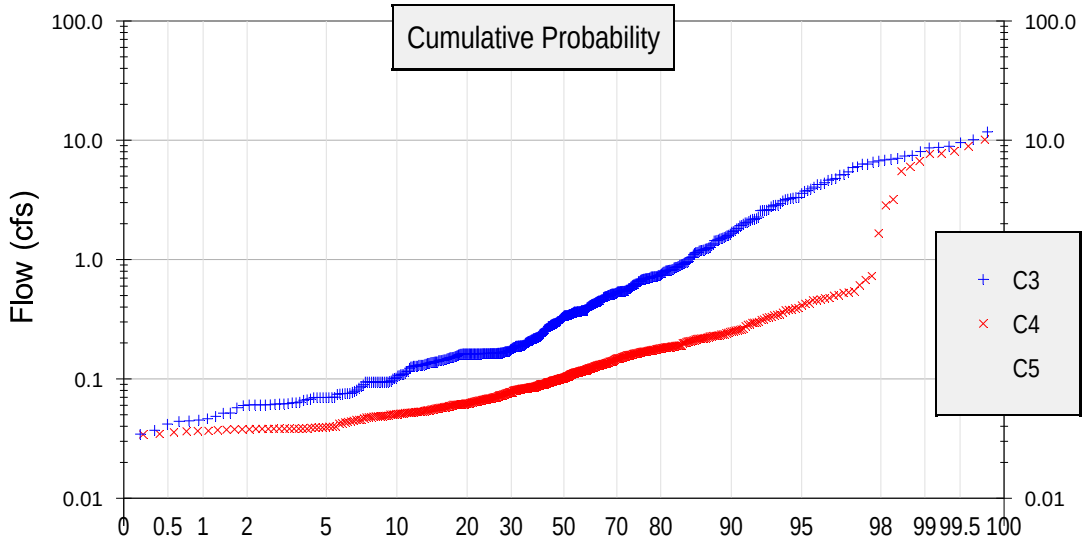
Maximum Stage:  4.265
Drawdown Time:  05 00:00:10
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Perlnd and Implnd Changes

No changes have been made.

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Cumulative Probability
Flow (cfs)
100.0
10.0
1.0
0.1
0.01
0
0.5
1
2
5
10
20
30
50
70
80
90
95
98
99
99.5
100
C3
C4
C5

BASIN 300 RESULTS

SDHM2011

PROJECT REPORT

Project Name: 1037IMPTMPOC3
Site Name : LHR POC 3
Site Address: W. LILAC RD.
City : VALLEY CENTER
Report Date : 9/9/2012
Gage : LAKE WOH
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2012/05/18

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1 : 10 year

PREDEVELOPED LAND USE

Name : Basin 300
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	.5
C,Grass,MOD(5-10%)	.57
C,Grass,STEEP(10-20	5.37
Pervious Total	6.44

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.05
IMPERVIOUS-MOD	0.38
Impervious Total	0.43
Basin Total	6.87

Element Flows To:
Surface **Interflow** **Groundwater**

MITIGATED LAND USE

Name : Basin 300BP
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	.17
C,Grass,MOD(5-10%)	.09
C,Grass,STEEP(10-20	.92
Pervious Total	1.18

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.02
IMPERVIOUS-MOD	0.16
Impervious Total	0.18
Basin Total	1.36

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Basin 300
Bypass: No

GroundWater: No

Pervious Land Use	Acres
B,Grass,FLAT(0-5%)	.34
B,Grass,STEEP(10-20	.65
C,Grass,FLAT(0-5%)	.08
C,Grass,MOD(5-10%)	.02
C,Grass,STEEP(10-20	.28
Pervious Total	1.37

Impervious Land Use	Acres
IMPERVIOUS-FLAT	1.49
IMPERVIOUS-MOD	0.97
Impervious Total	2.46
Basin Total	3.83

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Name : Trapezoidal Pond 1
Bottom Length: 60.00 ft.
Bottom Width: 30.00 ft.
Depth : 5 ft.
Volume at riser head : 0.2437 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 4 ft.
Riser Diameter: 18 in.
Notch Type : Rectangular
Notch Width : 1.369 ft.
Notch Height: 0.098 ft.
Orifice 1 Diameter: 1.03895 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.041	0.000	0.000	0.000
0.0556	0.041	0.002	0.006	0.000
0.1111	0.042	0.004	0.009	0.000
0.1667	0.042	0.007	0.011	0.000
0.2222	0.043	0.009	0.013	0.000
0.2778	0.043	0.011	0.014	0.000
0.3333	0.044	0.014	0.016	0.000
0.3889	0.044	0.016	0.017	0.000
0.4444	0.045	0.019	0.018	0.000
0.5000	0.045	0.021	0.020	0.000
0.5556	0.046	0.024	0.021	0.000
0.6111	0.046	0.026	0.022	0.000
0.6667	0.047	0.029	0.023	0.000
0.7222	0.047	0.032	0.024	0.000
0.7778	0.048	0.034	0.025	0.000
0.8333	0.048	0.037	0.025	0.000
0.8889	0.049	0.040	0.026	0.000
0.9444	0.049	0.042	0.027	0.000
1.0000	0.050	0.045	0.028	0.000
1.0556	0.050	0.048	0.029	0.000

1.1111	0.051	0.051	0.029	0.000
1.1667	0.051	0.054	0.030	0.000
1.2222	0.052	0.056	0.031	0.000
1.2778	0.052	0.059	0.032	0.000
1.3333	0.053	0.062	0.032	0.000
1.3889	0.053	0.065	0.033	0.000
1.4444	0.054	0.068	0.034	0.000
1.5000	0.054	0.071	0.034	0.000
1.5556	0.055	0.074	0.035	0.000
1.6111	0.055	0.077	0.036	0.000
1.6667	0.056	0.080	0.036	0.000
1.7222	0.056	0.084	0.037	0.000
1.7778	0.057	0.087	0.037	0.000
1.8333	0.057	0.090	0.038	0.000
1.8889	0.058	0.093	0.039	0.000
1.9444	0.058	0.096	0.039	0.000
2.0000	0.059	0.100	0.040	0.000
2.0556	0.059	0.103	0.040	0.000
2.1111	0.060	0.106	0.041	0.000
2.1667	0.061	0.110	0.041	0.000
2.2222	0.061	0.113	0.042	0.000
2.2778	0.062	0.117	0.042	0.000
2.3333	0.062	0.120	0.043	0.000
2.3889	0.063	0.124	0.043	0.000
2.4444	0.063	0.127	0.044	0.000
2.5000	0.064	0.131	0.044	0.000
2.5556	0.064	0.134	0.045	0.000
2.6111	0.065	0.138	0.045	0.000
2.6667	0.066	0.141	0.046	0.000
2.7222	0.066	0.145	0.046	0.000
2.7778	0.067	0.149	0.047	0.000
2.8333	0.067	0.153	0.047	0.000
2.8889	0.068	0.156	0.048	0.000
2.9444	0.068	0.160	0.048	0.000
3.0000	0.069	0.164	0.049	0.000
3.0556	0.070	0.168	0.049	0.000
3.1111	0.070	0.172	0.050	0.000
3.1667	0.071	0.176	0.050	0.000
3.2222	0.071	0.180	0.050	0.000
3.2778	0.072	0.184	0.051	0.000
3.3333	0.073	0.188	0.051	0.000
3.3889	0.073	0.192	0.052	0.000
3.4444	0.074	0.196	0.052	0.000
3.5000	0.074	0.200	0.053	0.000
3.5556	0.075	0.204	0.053	0.000
3.6111	0.076	0.208	0.053	0.000
3.6667	0.076	0.213	0.054	0.000
3.7222	0.077	0.217	0.054	0.000
3.7778	0.077	0.221	0.055	0.000
3.8333	0.078	0.226	0.055	0.000
3.8889	0.079	0.230	0.055	0.000
3.9444	0.079	0.234	0.096	0.000
4.0000	0.080	0.239	0.196	0.000
4.0556	0.080	0.243	0.388	0.000

4.1111	0.081	0.248	0.738	0.000
4.1667	0.082	0.252	1.191	0.000
4.2222	0.082	0.257	1.728	0.000
4.2778	0.083	0.262	2.337	0.000
4.3333	0.084	0.266	3.010	0.000
4.3889	0.084	0.271	3.741	0.000
4.4444	0.085	0.276	4.528	0.000
4.5000	0.086	0.280	5.364	0.000
4.5556	0.086	0.285	6.249	0.000
4.6111	0.087	0.290	7.179	0.000
4.6667	0.087	0.295	8.152	0.000
4.7222	0.088	0.300	9.167	0.000
4.7778	0.089	0.305	10.22	0.000
4.8333	0.089	0.310	11.31	0.000
4.8889	0.090	0.315	12.44	0.000
4.9444	0.091	0.320	13.61	0.000
5.0000	0.091	0.325	14.81	0.000
5.0556	0.092	0.330	16.04	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area : 6.44
Total Impervious Area : 0.43

Mitigated Landuse Totals for POC #1
Total Pervious Area : 2.55
Total Impervious Area : 2.64

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.915375
5 year	2.931998
10 year	3.544594
25 year	4.024805

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	1.515229
5 year	2.251578
10 year	2.595279
25 year	3.151403

POC #1

The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1915	834	801	96	Pass
0.2254	717	736	102	Pass
0.2593	627	654	104	Pass
0.2931	589	589	100	Pass
0.3270	545	540	99	Pass
0.3609	514	482	93	Pass
0.3948	477	433	90	Pass
0.4286	445	402	90	Pass
0.4625	423	371	87	Pass
0.4964	402	339	84	Pass
0.5302	385	317	82	Pass
0.5641	369	294	79	Pass
0.5980	356	281	78	Pass
0.6318	335	267	79	Pass
0.6657	314	249	79	Pass
0.6996	296	235	79	Pass
0.7334	286	220	76	Pass
0.7673	273	200	73	Pass
0.8012	254	189	74	Pass
0.8351	240	166	69	Pass
0.8689	226	156	69	Pass
0.9028	208	144	69	Pass
0.9367	191	139	72	Pass
0.9705	176	134	76	Pass
1.0044	170	125	73	Pass
1.0383	160	119	74	Pass
1.0721	151	112	74	Pass
1.1060	145	107	73	Pass
1.1399	143	102	71	Pass
1.1737	135	99	73	Pass
1.2076	131	95	72	Pass
1.2415	125	88	70	Pass
1.2754	118	85	72	Pass
1.3092	113	77	68	Pass
1.3431	106	76	71	Pass
1.3770	102	72	70	Pass
1.4108	97	67	69	Pass
1.4447	89	62	69	Pass
1.4786	84	55	65	Pass
1.5124	80	54	67	Pass
1.5463	77	50	64	Pass
1.5802	75	46	61	Pass
1.6140	71	46	64	Pass
1.6479	69	44	63	Pass
1.6818	65	42	64	Pass
1.7157	63	40	63	Pass
1.7495	61	38	62	Pass
1.7834	59	38	64	Pass
1.8173	59	32	54	Pass

1.8511	59	28	47	Pass
1.8850	57	26	45	Pass
1.9189	54	25	46	Pass
1.9527	52	24	46	Pass
1.9866	51	23	45	Pass
2.0205	50	21	42	Pass
2.0543	49	20	40	Pass
2.0882	47	19	40	Pass
2.1221	45	17	37	Pass
2.1560	41	16	39	Pass
2.1898	40	15	37	Pass
2.2237	39	14	35	Pass
2.2576	37	12	32	Pass
2.2914	34	11	32	Pass
2.3253	32	11	34	Pass
2.3592	31	11	35	Pass
2.3930	29	9	31	Pass
2.4269	28	9	32	Pass
2.4608	26	9	34	Pass
2.4946	26	9	34	Pass
2.5285	25	7	28	Pass
2.5624	24	7	29	Pass
2.5963	23	5	21	Pass
2.6301	22	4	18	Pass
2.6640	21	4	19	Pass
2.6979	20	4	20	Pass
2.7317	18	4	22	Pass
2.7656	16	3	18	Pass
2.7995	15	3	20	Pass
2.8333	13	2	15	Pass
2.8672	13	2	15	Pass
2.9011	12	2	16	Pass
2.9349	11	2	18	Pass
2.9688	11	2	18	Pass
3.0027	10	2	20	Pass
3.0366	8	2	25	Pass
3.0704	8	2	25	Pass
3.1043	8	2	25	Pass
3.1382	8	2	25	Pass
3.1720	8	2	25	Pass
3.2059	8	2	25	Pass
3.2398	8	2	25	Pass
3.2736	7	2	28	Pass
3.3075	7	1	14	Pass
3.3414	7	1	14	Pass
3.3752	6	1	16	Pass
3.4091	6	1	16	Pass
3.4430	6	1	16	Pass
3.4769	6	1	16	Pass
3.5107	5	0	0	Pass
3.5446	4	0	0	Pass

Drawdown Time Results
Pond: Trapezoidal Pond 1

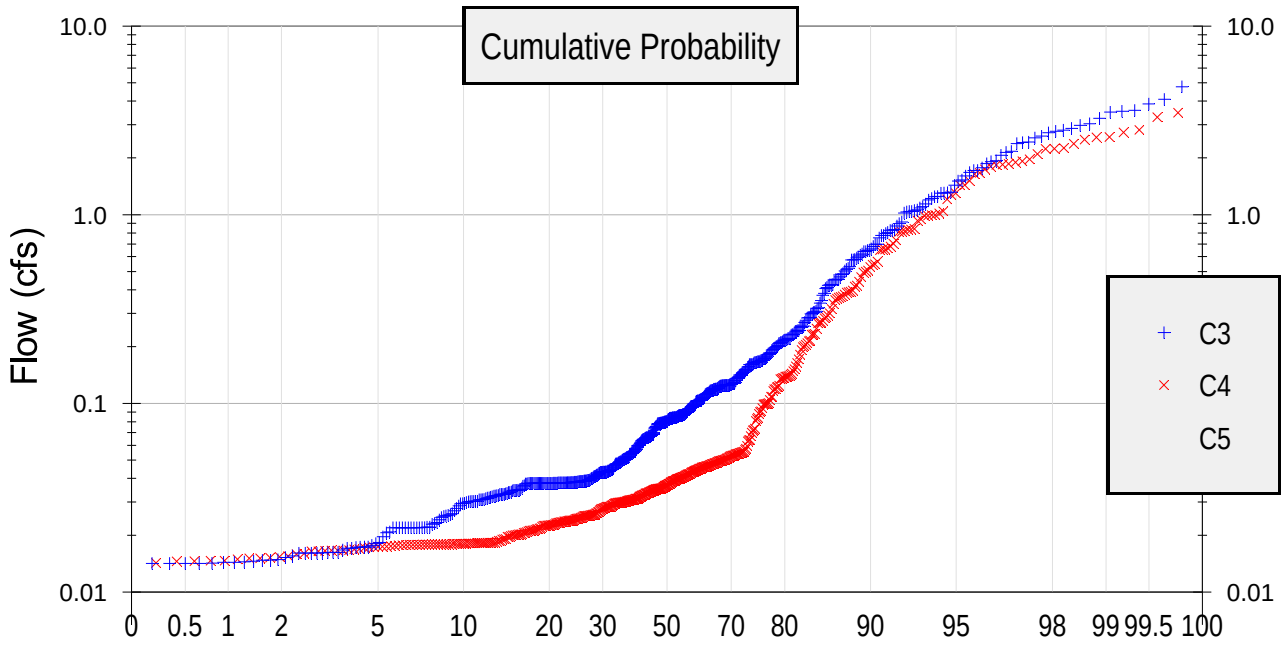
Days	Stage(feet)	Percent of Total Run Time
1	0.997	2.7560
2	2.291	0.8869
3	3.702	0.1531
4	5.000	0.0000
5	5.000	0.0000

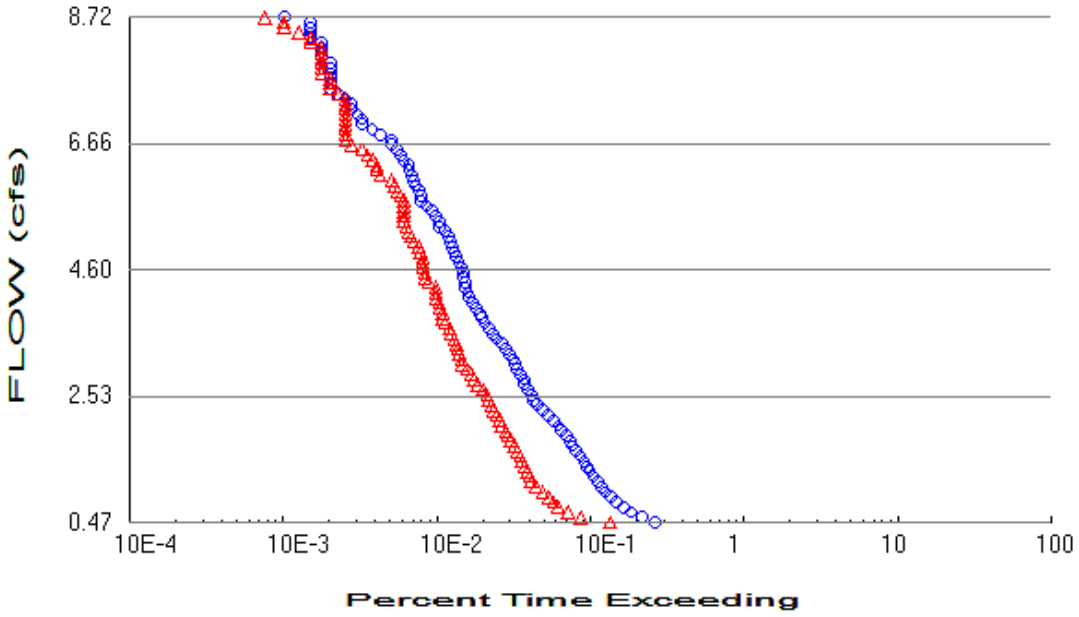
Maximum Stage: 4.109
Drawdown Time: 02 23:55:50

Perlnd and Implnd Changes

No changes have been made.

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8.72
6.66
4.60
2.53
0.47
FLOW (cfs)
10E-4
10E-3
10E-2
10E-1
1
10
100
Percent Time Exceeding

SUMMARY

PEAK FLOW

BASIN 100

	10% Q2	Q2	Q5	Q10
	(CFS)	(CFS)	(CFS)	(CFS)
PRE-DEV	5.5	55.4	85.1	107.7
POST-DEV	4.3	43.2	70.8	106.0

BASIN 200

	10% Q2	Q2	Q5	Q10
	(CFS)	(CFS)	(CFS)	(CFS)
PRE-DEV	0.5	4.7	7.2	8.7
POST-DEV	0.04	0.4	3.0	7.7

BASIN 300

	10% Q2	Q2	Q5	Q10
	(CFS)	(CFS)	(CFS)	(CFS)
PRE-DEV	0.2	1.9	2.9	3.9
POST-DEV	0.1	1.5	2.2	3.1

MITIGATION DEVICE	PROPOSED VOL (AC-FT)	DETAIL DESCRIPTION
DETENTION BASIN 100	12.5	2.1 Ac-Ft trapezoidal pond at 7' deep with a 1' freeboard. 18" diameter riser at 5' high with 18" wide notch at 0.1' high and 5.5" diameter orifice at bottom of pond. **Drawdown time <72 hours, no vector control required**
DETENTION BASIN 200	2.6	2.6 Ac-Ft trapezoidal pond at 5' deep with a 1' freeboard. 18" diameter riser at 4' high with 17.9" wide notch at 0.13' high and 3" diameter orifice at bottom of pond. **Drawdown time <72 hours, no vector control required.**
DETENTION BASIN 300	0.24	0.24 Ac-Ft trapezoidal pond at 5' deep with a 1' freeboard. 18" diameter riser at 4' high with 16.4" wide notch at 0.098' high and 1.04" diameter orifice at bottom

		of pond. **Drawdown time > 72 hours, vector control required – a quick release drain cover will be installed at the outlet structure such that after 96 hour has passed the rain event, trained and authorized staff will open the cover and allow the remaining water to discharge.**

As presented in this report, the post-development discharge durations will not deviate above the pre-development durations from 0.1Q2 to Q10. The flow rates from 0.1Q2 to Q10, under the post-development conditions, will not deviate above those under the pre-development conditions. The proposed detention basin is sized for 100-year storm mitigation and is verified to be more than adequate to mitigate the anticipated hydromodification peak flow and duration as a result of the proposed development's increased impervious areas. The proposed development will not adversely affect downstream drainage facilities.

MAINTENANACE

Immediately after construction, the proposed HMP facilities will be maintained by the developer until a Home Owner's Association is established. The maintenance responsibility will then be transferred to the HOA. The HOA will maintain these HMP facilities into perpetuity.

ADVANCED GEOTECHNICAL SOLUTIONS, INC.
25109 Jefferson Avenue, Suite 220
Murrieta, California 92562
Telephone: (619) 708-1649 Fax: (714) 409-3287

The Accretive Group
12275 El Camino Real, Suite 220
San Diego, CA 92130

March 22, 2012
P/W 1102-01
Report No. 1102-01-B-11

Attention: Mr. Jon Rilling

Subject: Preliminary Infiltration Rates, Lilac Hills Ranch, Valley Center Community Planning Area, County of San Diego, California

Reference: *Feasibility Level Geotechnical Report, Las Lilas Project, Valley Center Area, San Diego, California, prepared by Pacific Soils Engineering, Inc. dated May 23, 2007 (PSE W.O. 401120)*

Gentlemen:

Pursuant to a request from representatives of Landmark Consulting, transmitted herein is Advanced Geotechnical Solutions, Inc.'s (AGS) estimated infiltration rates for use in the preliminary design of infiltration basins for the Lilac Hills Ranch project, Valley Center Community Planning Area, County of San Diego, California. Site specific testing has not been conducted onsite for the determination of infiltration rates. The rates presented herein are based upon USDA Natural Resource Conservation Service (NCRS) mapping, information provided by the County of San Diego, Department of Public Works, and the characteristics of the onsite soils and bedrock.

We have provided you preliminary mapping of the site showing the approximate location of the various geologic units onsite. Based upon the geologic units the following estimated infiltration rates are presented:

- **Artificial Fill, Compacted** (no map symbol)- Soil Group D (rates 0 to 0.05 inches per hour)
- **Artificial Fill, Undocumented** (map symbol afu)- Soil Group D (rates 0 to 0.05 inches per hour)
- **Alluvium** (map symbol Qal)- Soil Group C (rates 0.05 to 0.15 inches per hour)
- **Older Alluvium** (map symbol Qoal)- Soil Group C (rates 0.05 to 0.15 inches per hour)
- **Granitic Rock** (map symbol Kgr)- Soil Group D (rates 0 to 0.05 inches per hour)

The aforementioned rates are highly dependent upon the depth to the underlying relatively impermeable granitic rock and whether the area has been subjected to loading from grading or farming equipment as this will tend to densify the soils and reduce the infiltration rates. Infiltration basins should be located such that the infiltration water is located down gradient from all structural building pads.

Should you desire more accurate design rates than these general rates presented herein, additional testing can be conducted. This testing should be conducted utilizing a Double Ring Infiltrometer apparatus.

Rates determined with the Double Ring Infiltrometer are considered to be more accurate by the local Water Quality Control Board than other methods.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact the undersigned.

Respectfully Submitted,
Advanced Geotechnical Solutions, Inc.

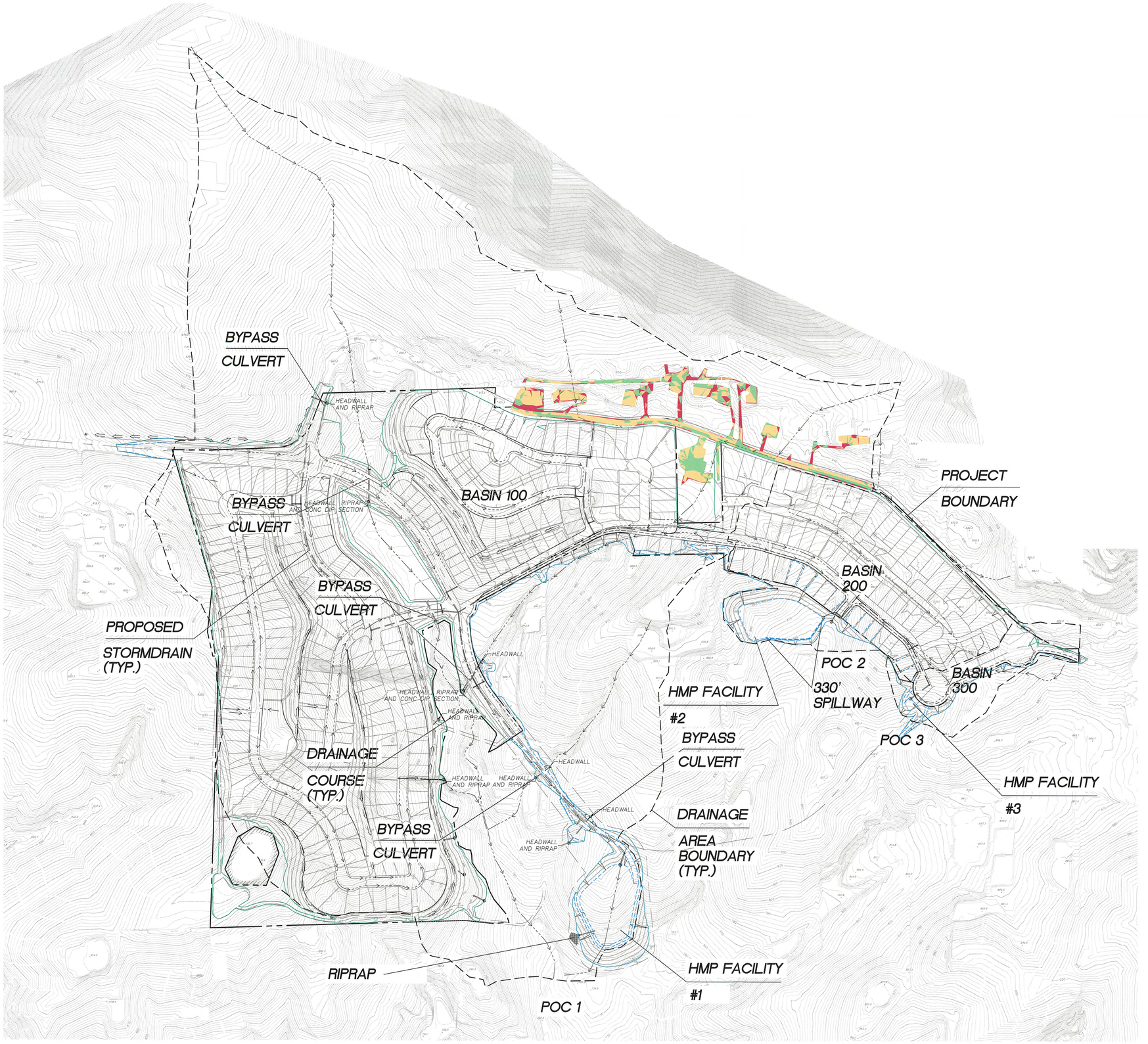
JEFFREY A. CHANEY, Vice President
RCE 46544/ GE 2314

Distribution: (4) Addressee
(1) Landmark Consulting, Attn: Mark Brencick



HMP EXHIBITS

POST-DEVELOPMENT SLOPE ANALYSIS - EXISTING IMPERVIOUS AREAS ROUTED TO HMP FACILITIES



BASIN 100 Slopes Table

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	2.61	
2	5.00%	10.00%	0.85	
3	10.00%	100.00%	0.82	

NOTE: AREAS DIPICTED ON THIS EXHIBIT TO BE SUBSTRACTED FROM AREA DIPICTED ON EXHIBIT 5 FOR EX. PERVIOUS AREAS ROUTED TO HMP FACILITIES TO BE USED FOR SDHM MODELING.

N
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SCALE: 1" = 200'

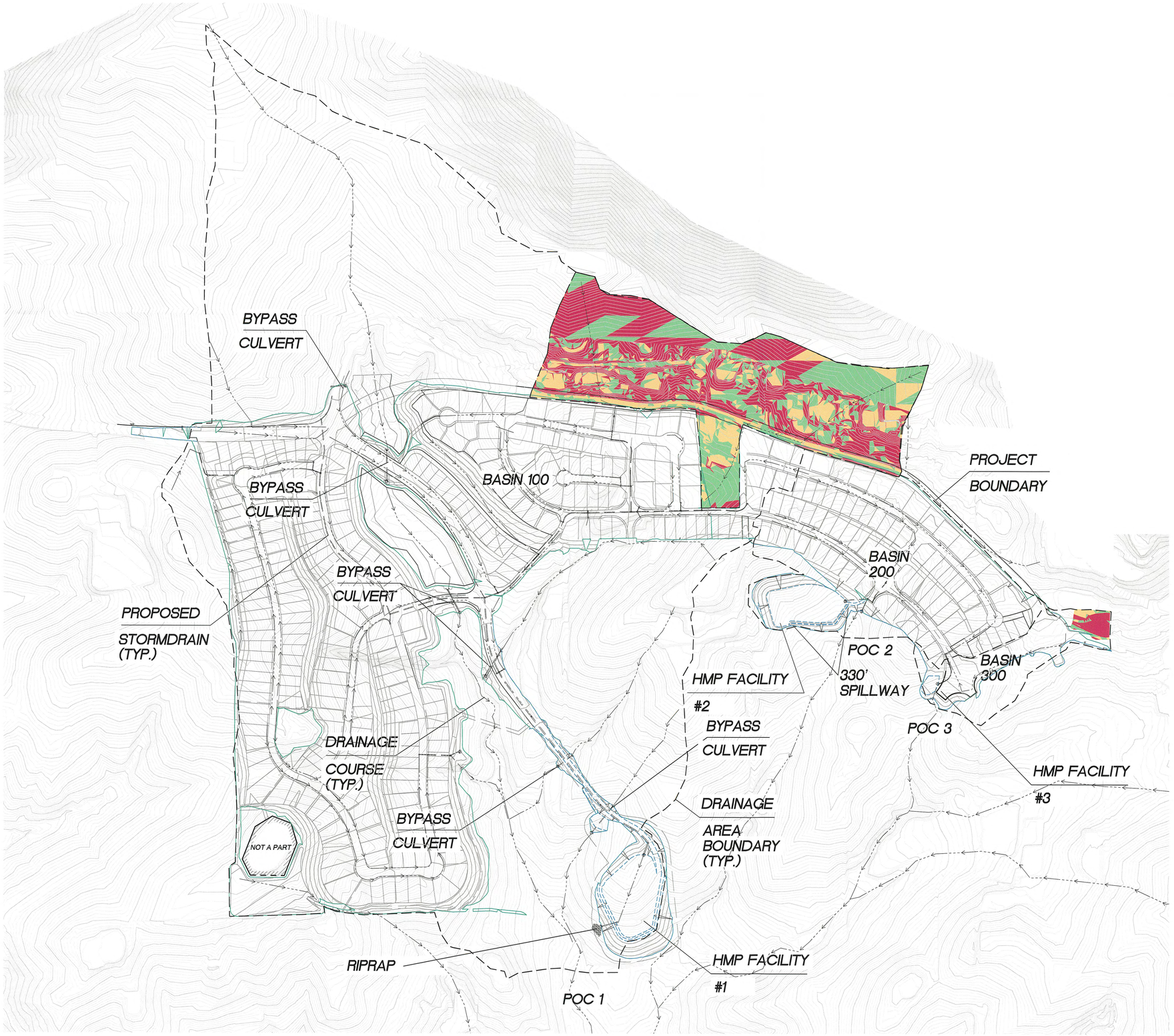
EXHIBIT 6

LANDMARK

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POST-DEVELOPMENT SLOPE ANALYSIS - UNDISTURBED AREA - ROUTED INTO HMP FACILITIES



BASIN 100

Slopes Table

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	4.20	
2	5.00%	10.00%	7.52	
3	10.00%	100.00%	10.16	

BASIN 300 **Slopes Table**

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	0.09	
2	5.00%	10.00%	0.08	
3	10.00%	100.00%	0.34	

NOTE: AREA AS DIPICTED INCLUDES PRE-DEV. IMPERVIOUS AREAS ROUTED TO HMP FACILITIES AS DIPICTED ON EXHIBIT 6.

N

SCALE: 1" = 200'

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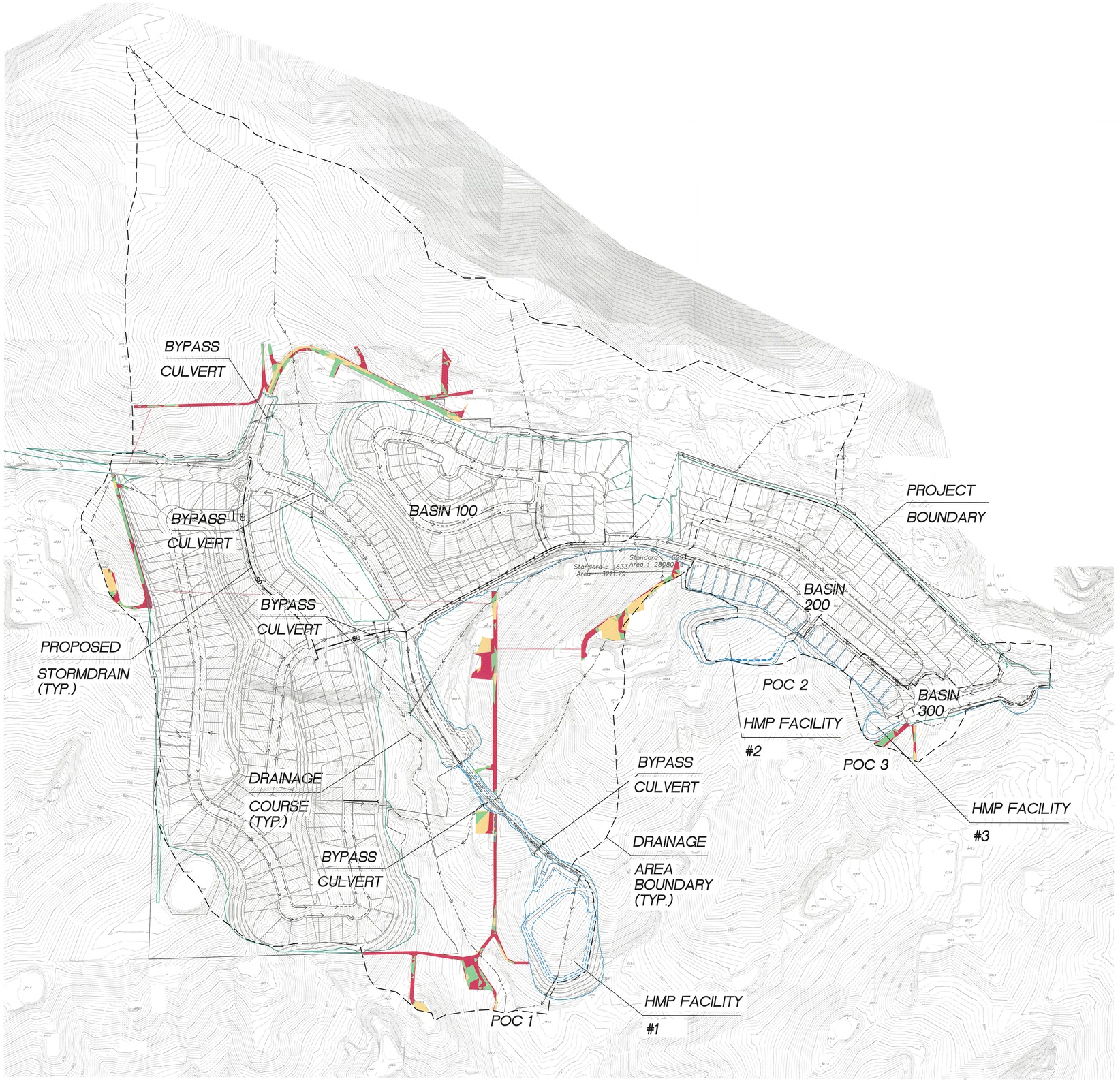
SCALE: 1" = 200'

EXHIBIT 5

LANDMARK

Dwg: S:\103-7\hydro\hydro-surfaces-imp-post.dwg Plot'd: 1/28/2013 7:12:25 AM

POST-DEVELOPMENT SLOPE ANALYSIS - EXISTING IMPERVIOUS AREAS BYPASSING HMP FACILITIES



BASIN 100 Slopes Table

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	1.13	
2	5.00%	10.00%	1.27	
3	10.00%	100.00%	2.11	

BASIN 300 Slopes Table

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	0.02	
2	5.00%	10.00%	0.08	
3	10.00%	100.00%	0.08	

NOTE: AREAS DIPICTED ON THIS EXHIBIT TO BE SUBSTRACTED FROM AREA DIPICTED ON EXHIBIT 3 FOR EX. PERVIOUS AREAS BY-PASSING HMP FACILITIES TO BE USED FOR SDHM MODELING.

N
SCALE: 1" = 200'

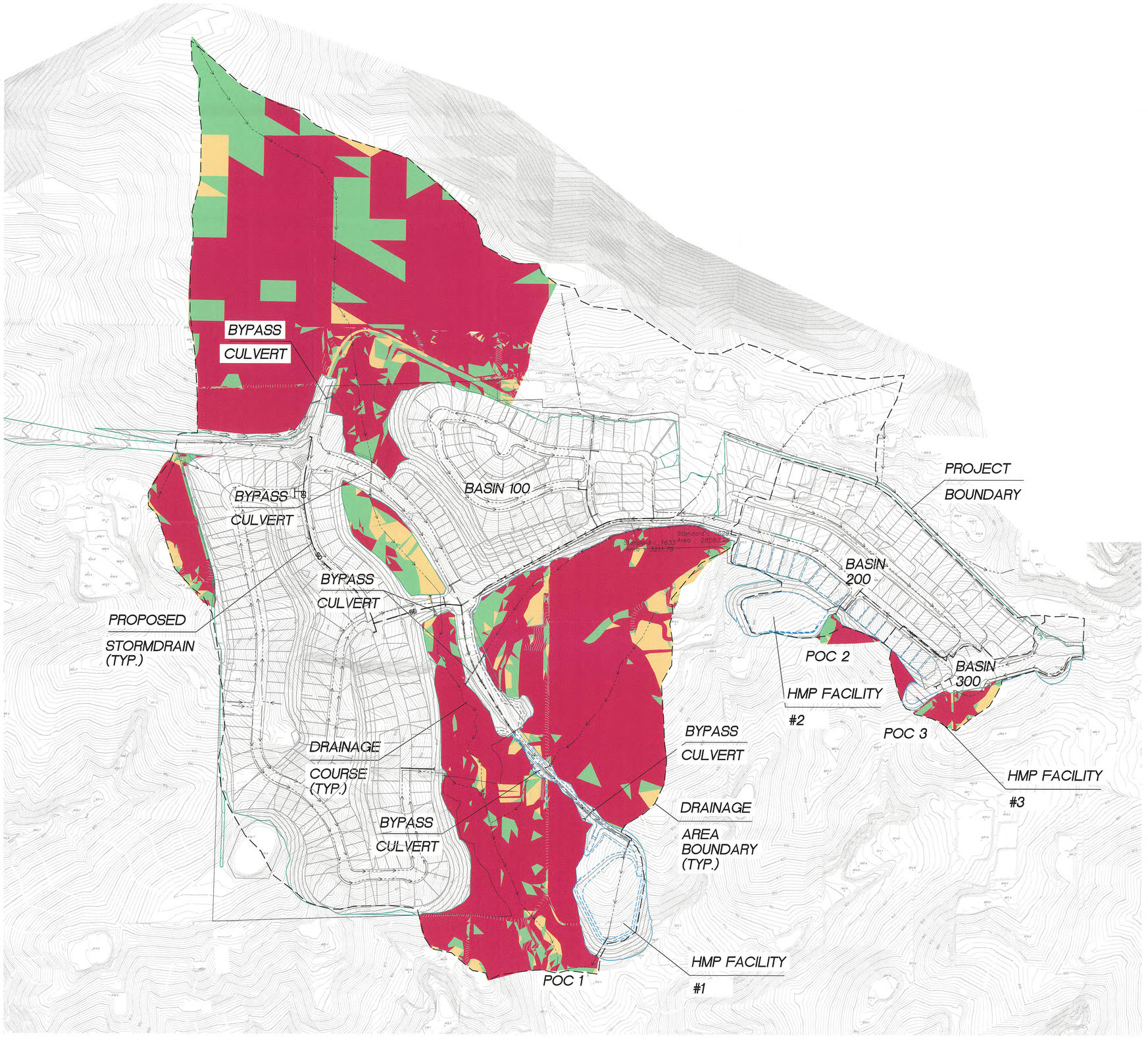
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EXHIBIT 4

LANDMARK

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POST-DEVELOPMENT SLOPE ANALYSIS - UNDISTURBED AREAS BYPASSING HMP FACILITIES



BASIN 100

Slopes Table				
Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	6.28	
2	5.00%	10.00%	16.41	
3	10.00%	100.00%	76.38	

BASIN 200

Slopes Table				
Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	0.01	
2	5.00%	10.00%	0.16	
3	10.00%	100.00%	0.37	

BASIN 300

Slopes Table				
Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	0.19	
2	5.00%	10.00%	0.15	
3	10.00%	100.00%	0.98	

NOTE: AREA AS DIPICTED INCLUDES PRE-DEV. IMPERVIOUS AREAS BY-PASSING HMP FACILITIES AS DIPICTED ON EXHIBIT 4.

N

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SCALE: 1" = 200'

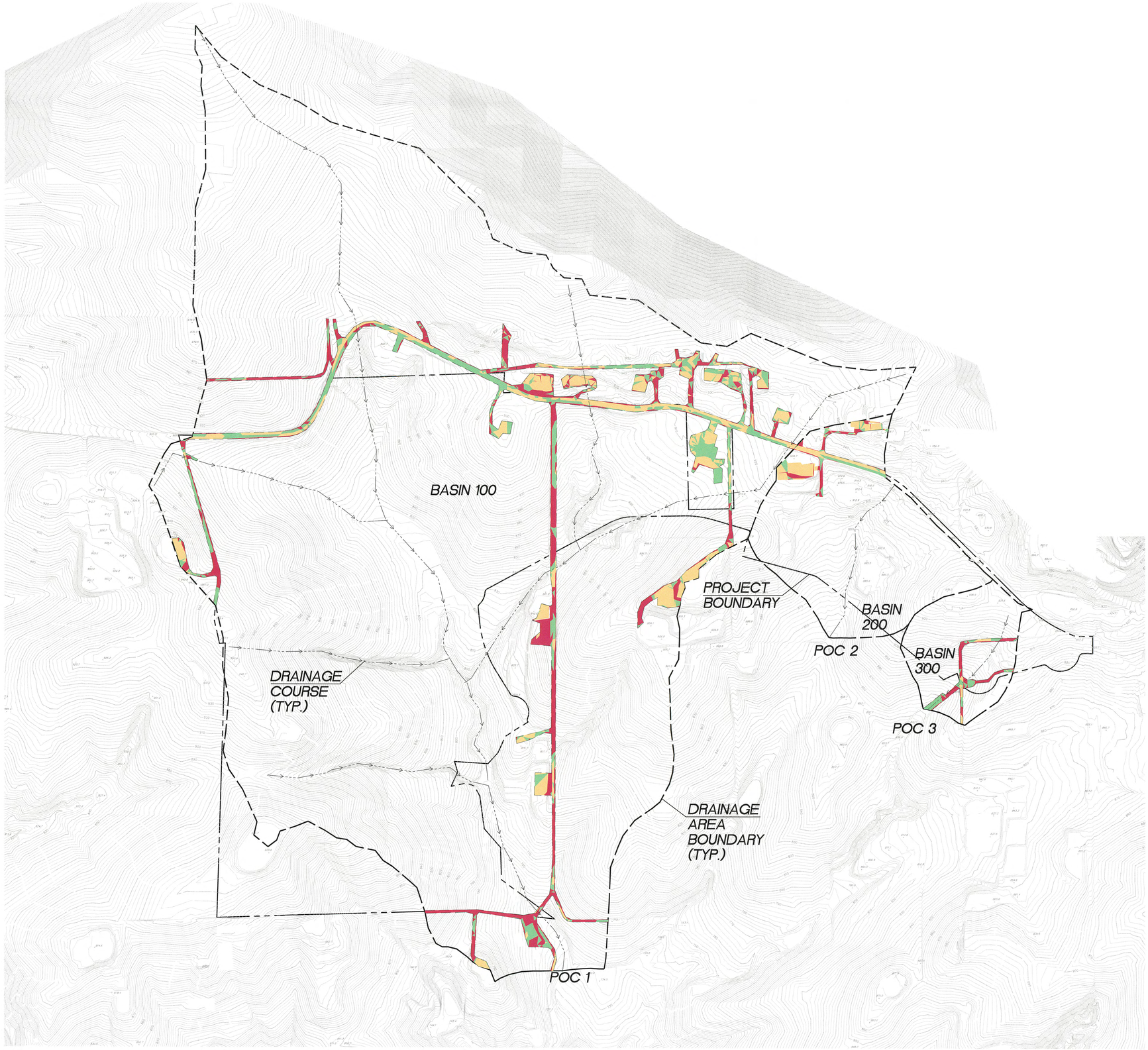
EXHIBIT 3

LANDMARK

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PRE-DEVELOPMENT SLOPE ANALYSIS - EXISTING IMPERVIOUS AREAS



IMPERVIOUS AREAS

BASIN 100

Slopes Table				
Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	3.26	
2	5.00%	10.00%	3.18	
3	10.00%	100.00%	3.29	

BASIN 200

Slopes Table				
Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	0.79	
2	5.00%	10.00%	0.62	
3	10.00%	100.00%	0.47	

BASIN 300

Slopes Table				
Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	0.05	
2	5.00%	10.00%	0.17	
3	10.00%	100.00%	0.21	

NOTE: AREAS DIPICTED ON THIS EXHIBIT TO BE SUBSTRACTED FROM AREA DIPICTED ON EXHIBIT 1 FOR PRE-DEV. PERVIOUS AREAS TO BE USED FOR SDHM MODELING.

N

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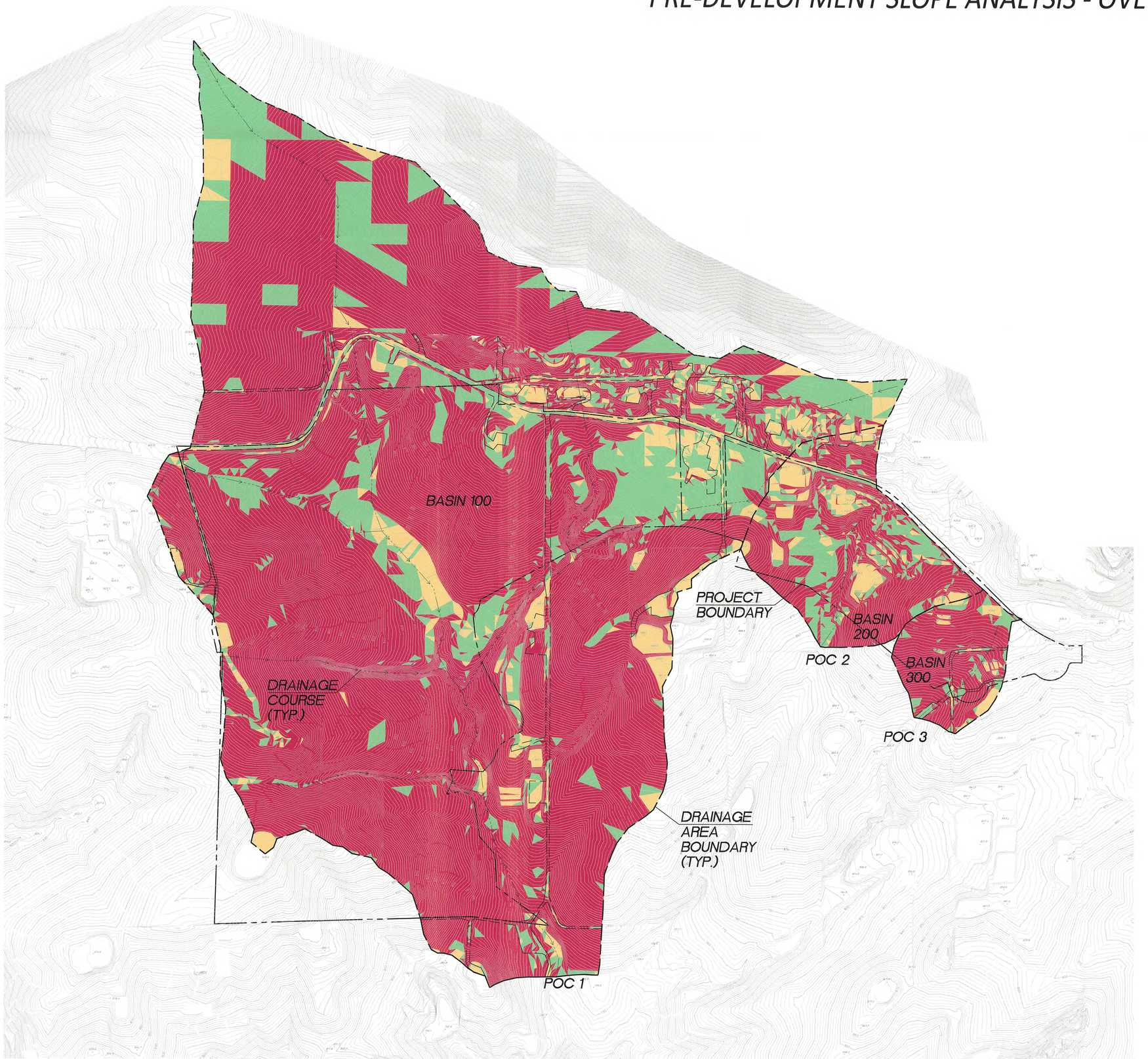
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EXHIBIT 2

LANDMARK

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PRE-DEVELOPMENT SLOPE ANALYSIS - OVERALL



OVERALL AREAS

BASIN 100 Slopes Table

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	12.58	
2	5.00%	10.00%	34.83	
3	10.00%	100.00%	153.02	

BASIN 200 Slopes Table

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	2.52	
2	5.00%	10.00%	4.27	
3	10.00%	100.00%	10.15	

BASIN 300 Slopes Table

Number	Minimum Slope	Maximum Slope	Area	Color
1	0.00%	5.00%	0.51	
2	5.00%	10.00%	0.89	
3	10.00%	100.00%	5.35	

NOTE: OVERALL AREA INCLUDES PRE-DEV. IMPERVIOUS AREAS AS DIPICTED ON EXHIBIT 2

N
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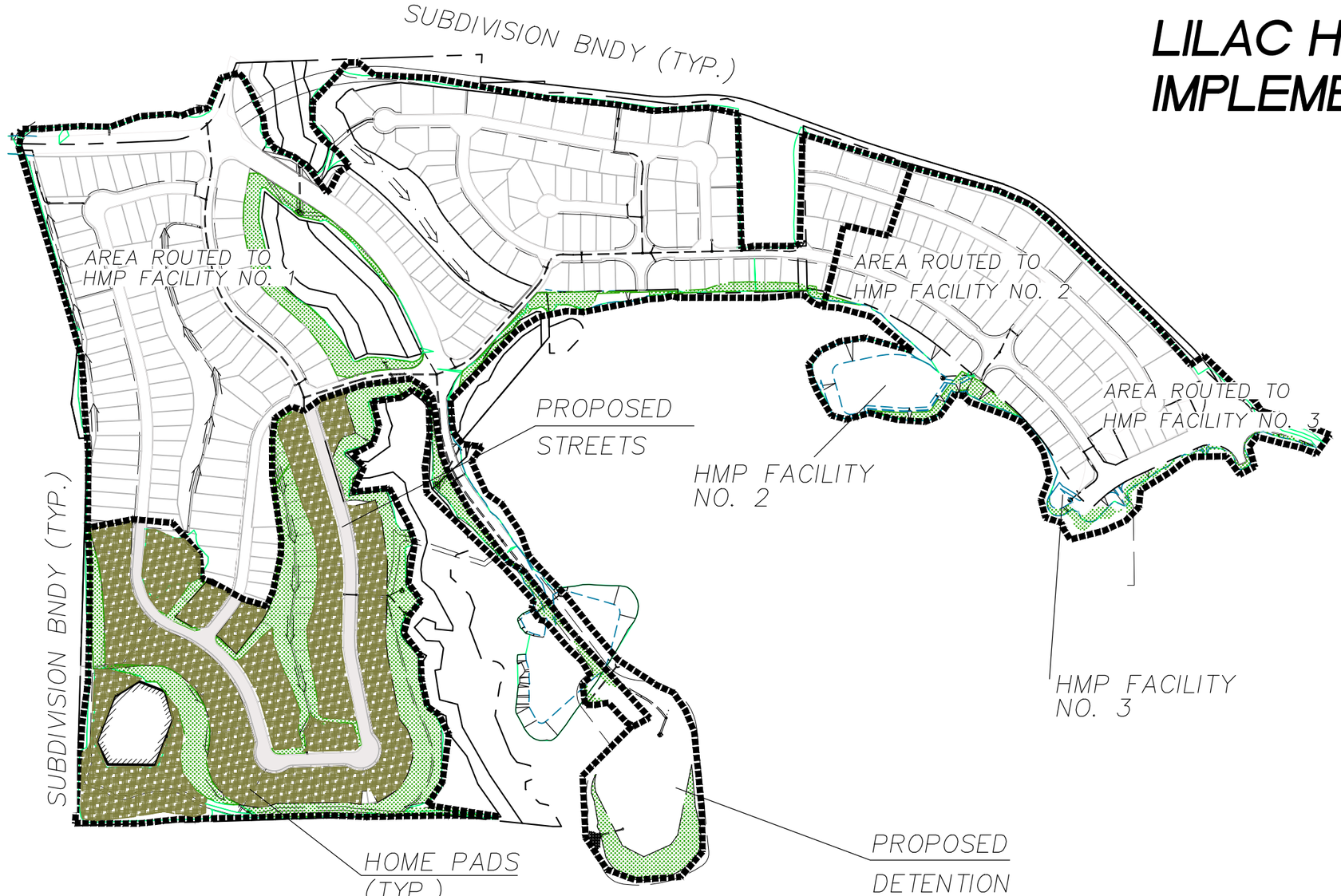
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EXHIBIT 1

LANDMARK

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LAND USE TYPE WITHIN DEVELOPMENT FOOT PRINT
AREAS BYPASSING HMP FACILITEIS
LILAC HILLS RANCH
IMPLEMENTING TM 5572 RPL-1



LEGEND

DRAINAGE AREA BOUDNARY

LANDSCAPED 2:1 SLOPE

FLAT HOME PADS

AC PAVING

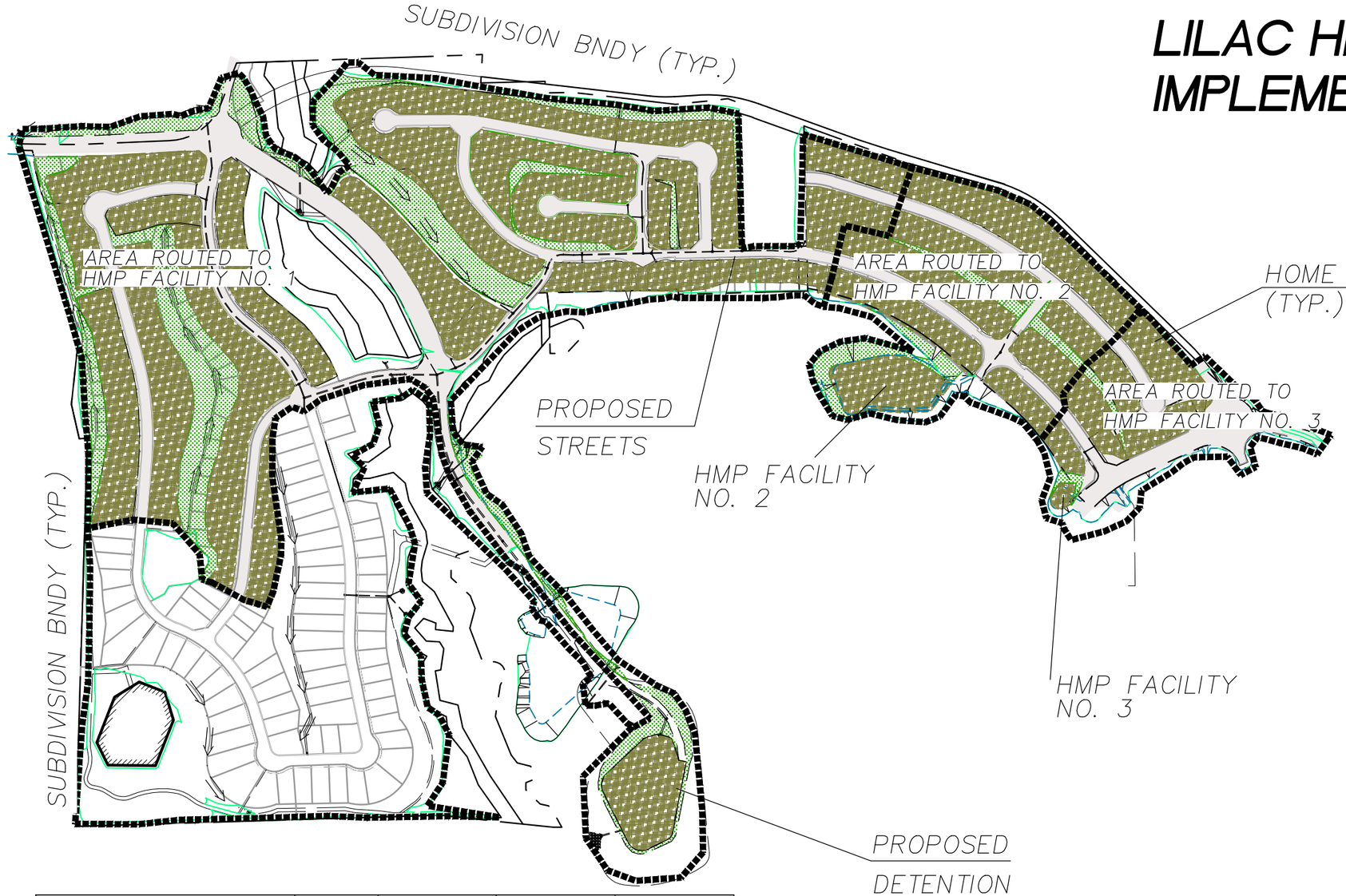
LAND USE TYPE	SLOPE	BASIN 100	BASIN 200	BASIN 300
CROP/GRASS/VEGETATION(C-SOIL)	0-5%	14.69	0	0
	5-10%	0	0	0
	>10%	10.47	0	0
IMPERVIOU (ROOF TOP/ROADS)	0-5%	2.13	0	0
	5-10%	3.09	0	0
	>10%			

SCALE: 1"= 400'

LANDMARK CONSULTING
Planning Engineering Surveying
9555 Genesee Avenue, Suite 200
San Diego, CA 92121, (858) 587-8070

J.N.: 103-7

LAND USE TYPE WITHIN DEVELOPMENT FOOT PRINT
AREAS ROUTED TO HMP FACILITEIS
LILAC HILLS RANCH
IMPLEMENTING TM 5572 RPL-1



LEGEND

DRAINAGE AREA BOUDNARY

LANDSCAPED 2:1 SLOPE

FLAT HOME PADS

AC PAVING

LAND USE TYPE	SLOPE	BASIN 100	BASIN 200	BASIN 300
CROP/GRASS/VEGETATION(C-SOIL)	0-5%	11.43	2.5	0.34
	5-10%	0	0	0
	>10%	8.65	1.32	0.65
IMPERVIOU (ROOF TOP/ROADS)	0-5%	11.08	1.85	1.49
	5-10%	6.51	1.5	0.85
	>10%			

SCALE: 1"= 400'

LANDMARK
CONSULTING
Planning Engineering Surveying
9555 Genesee Avenue, Suite 200
San Diego, CA 92121, (858) 587-8070

J.N.: 103-7

ADDENDUM

ASSUMPTIONS:

Bio-retention:

-Average lot size = 4500 sf

-Average impervious coverage per lot = 1500 sf roof + 300 sf walkways and driveway = 1800 sf

-Typical pervious coverage (bio-retention) per lot = 1000 sf with the top 13” layer providing a minimum of 5”/hour infiltration rate.

-Typical void ratio of engineered infiltration material = 0.55

Rain barrels:

-Typical home rain gutter down spout location = 4

-Typical rain barrel capacity = 50 gal.

Project design:

- Proposed residential units = 352 (Phase 1 only)

ANALYSIS:

Typical Lot rainwater capturing/retention calculations:

Bio-retention volume per typical home:1000 sf x 13”/12 x 0.55 void ratio = 575 cf.

Total bio-retention vol. = 575 cf x 352 SFR homes = 202400 cf = **4.64 Ac-Ft.**

Rain barrel capacity = 4 x 50gal = 200 gal = 27 cf

Total rain barrel capturing capacity = 27 cf x 352 SFR homes = 9500 cf = **0.2 Ac-Ft.**

Total lot rain capturing capacity for the development = 4.64 + 0.2 = **4.84 Ac-Ft.**

Total 10-year runoff volume from 352 homes:

Anticipated 24-hour 10-year runoff volume from the impervious areas of the proposed 352 home lots:

4” / 12 x 1800 sf x 352sfr / 43560 = **4.84 Ac-Ft**

With the deployment of the proposed rain barrels and bio-retention areas around each home, it is anticipated that no runoff will leave the home pad up to and including the 10-year storm. The individual home will become hydrologically invisible up to the upper limit of the HMP required 10-year storm. Thus, the homes are not included in the SDHM model in this Addendum. Only the roadways are modeled into the SDHM program as proposed impervious areas.

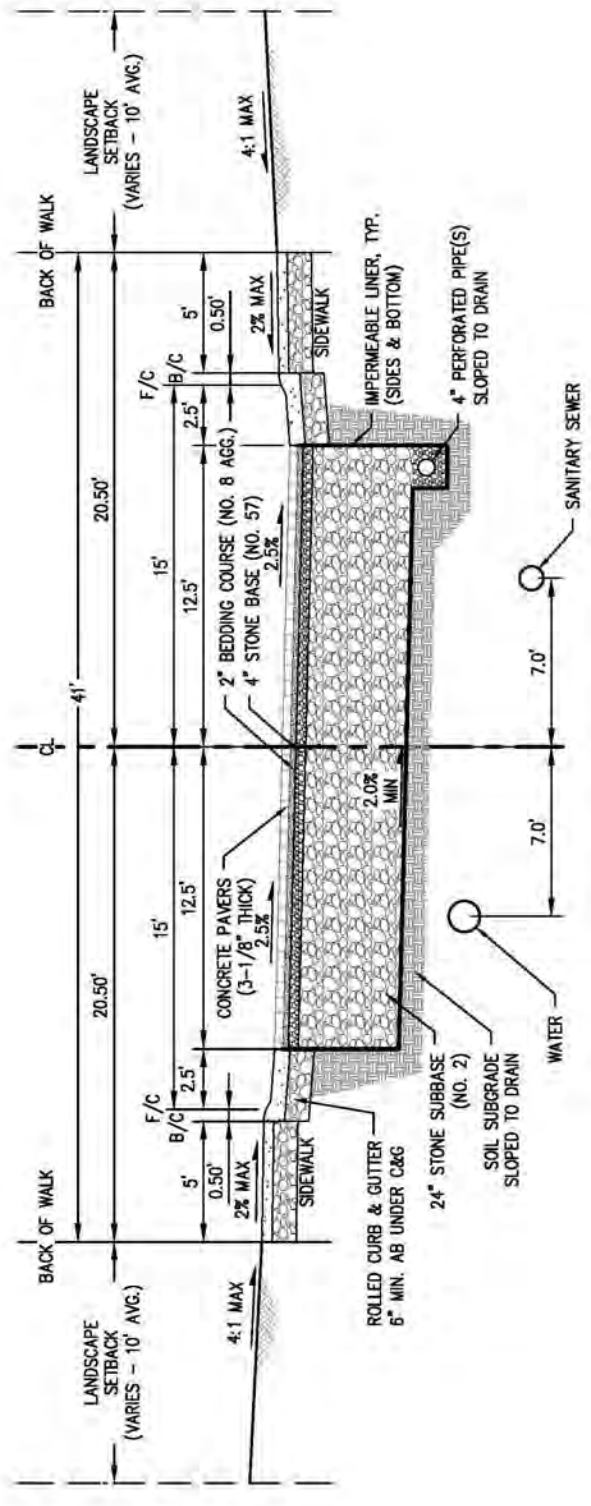
Extensive permeable pavers are proposed for this project as an alternative to the proposed detention basins for both the 100-year storm runoff volume attenuation and HMP mitigation. The permeable pavers will be placed at the low points of streets and roadway to capture and store storm runoff volume before it is eventually released. With the deployment of the permeable pavers and their underlying storage capacity, the proposed detention basins can be significantly reduced along with the development footprint.

The typical section of the permeable pavers consists of 3"thick unit pavers over 2" of bedding material over 4" of base material and over 24" sub-base material (see typical section in the following page). The permeable pavers and the bedding and base materials have an average porosity of 0.4. There will be 1.0 cubic feet of storage volume under each square foot of pavers. The pavers were modeled into the HMP analysis as an alternative to the traditional detention basin.

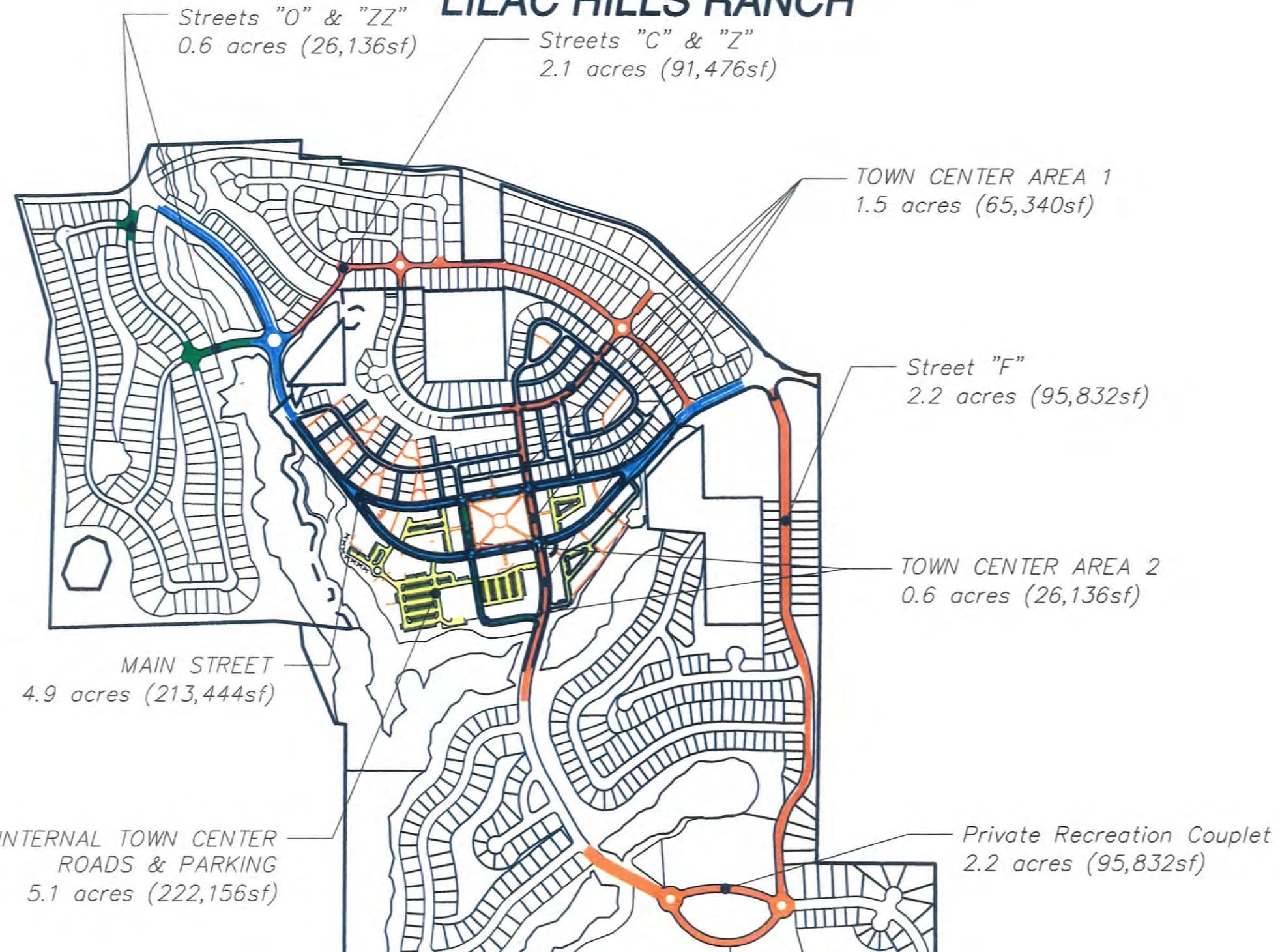
AVERAGE STORAGE VOLUME:

1' x 1' x (2" bedding +4" no. 57 stone base + 24" no. 2 sub base)/12 x 0.4= 1.0cf under each square foot of permeable pavers.

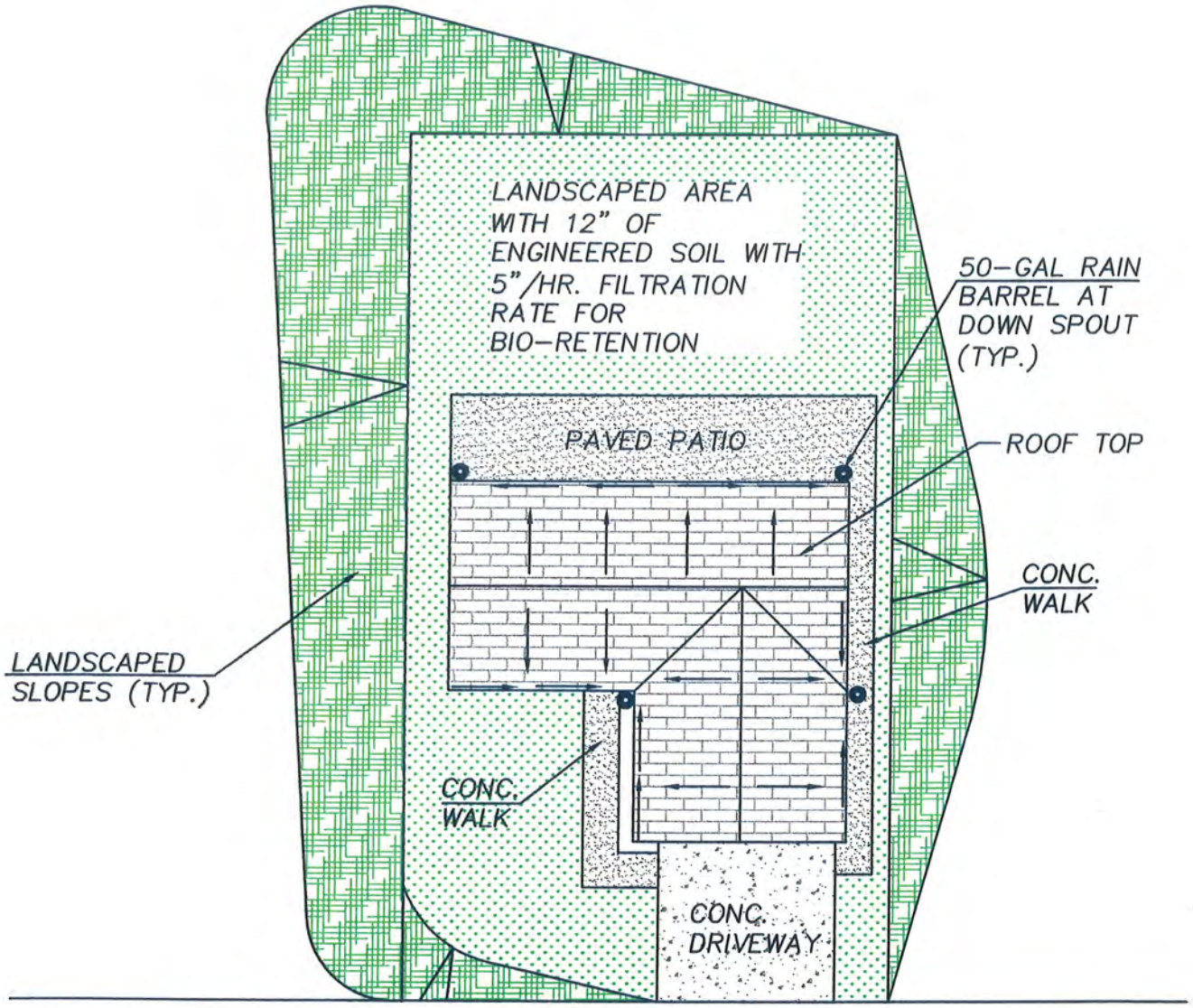
TYPICAL PERMEABLE PAVER SECTION



PERMEABLE PAVERS ANALYSIS
LILAC HILLS RANCH



LILAC HILLS RANCH
TYPICAL RESIDENTIAL LOT RAIN WATER CAPTURING SCHEMATIC



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POST-DEV		OUTSIDE OF DEV FOOTPRINT		INSIDE OF DEV FOOTPRINT		BYPASSING SUBTOTAL	ROUTED SUBTOTAL
		BYPASSING HMP FACILITIES	ROUTED TO HMP FACILITIES	BYPASSING HMP FACILITIES	ROUTED TO HMP FACILITIES		
BASIN 100/POC1	SLOPE						
LAND COVER							
CROP/GRASS/VEGETATION	0-5%	5.15	1.39	14.69	11.43	19.84	12.82
	5-10%	15.14	6.67	0.00	0.00	15.14	6.67
	>10%	74.27	9.34	10.47	8.65	84.74	17.99
IMPERVIOUS/ROOF TOP/ROADS	0-5%	1.13	2.61	2.13	11.08	3.26	3.26*
	5-10%	1.27	0.85	3.09	6.51	6.47	6.47*
	>10%	2.11	0.82				
ROOF AREAS							11.65*
PAVER AREAS							1.00*
				TOTAL BYPASS	TOTAL ROUTED		
				129.44	59.35	TOTAL AREA	188.79
BASIN 200/POC 2							
LAND COVER	SLOPE						
CROP/GRASS/VEGETATION	0-5%	0.01	0	0	4.03	0.01	4.03
	5-10%	0.16	0	0	4.2	0.16	4.20
	>10%	0.37	0	0	9.8	0.37	9.80
IMPERVIOUS/ROOF TOP/ROADS	0-5%	0	0	0	1.85	0.00	0.35*
	5-10%	0	0	0	1.5	0.00	0.93*
	>10%	0	0				
ROOF AREAS							1.57*
PAVER AREAS							0.5*
				TOTAL BYPASS	TOTAL ROUTED		
				0.54	21.38	TOTAL AREA	21.92
BASIN 300/POC 3				0			0
LAND COVER	SLOPE			0			
CROP/GRASS/VEGETATION	0-5%	0.17	0.09	0	0.34	0.17	0.43
	5-10%	0.09	0.08	0	0	0.09	0.08
	>10%	0.92	0.34	0	0.65	0.92	0.99
IMPERVIOUS/ROOF TOP/ROADS	0-5%	0.02	0	0	1.49	0.02	0.24*
	5-10%	0.08	0	0	0.85	0.16	0.53*
	>10%	0.08	0				
ROOF AREAS							1.32*
PAVER AREAS							0.50*
				TOTAL BYPASS	TOTAL ROUTED		
				1.28	3.84	TOTAL AREA	5.12

Land use table note:

Per the rain capturing calculations presented in this Addendum, each lot has adequate runoff retention capacity to retain the 10-year 24-hour storm runoff. For HMP mitigation purposes, these lots are hydrologically invisible and their impervious areas were subtracted from the total impervious areas routed to POC. The areas of the pervious pavers were also subtracted from the overall impervious areas and modeled separately in the software.

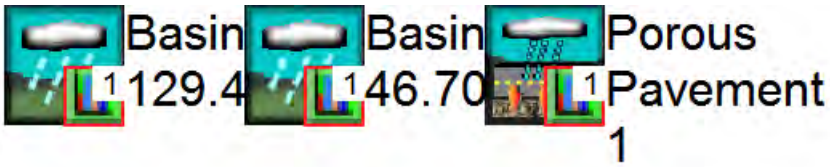
Basin 100
There are 282 homes in Basin 100, this translates to 11.65Ac of impervious areas such as roof tops and hardscaping. The project also proposes 1.0 Acre of pervious pavers. The combination of roof tops and pavers (12.65 Acres) were subtracted from the overall impervious area, leaving 9.73 Acres of roadway area that were still modeled into the SDHM program. The 1.0 paver area was modeled into the program as a separate element.

Basin 200
There are 38 homes in Basin 200, this translates to 1.57Ac of impervious areas such as roof tops and hardscaping. The project also proposes 1/2 Acre of pervious pavers. The combination of roof tops and pavers (2.07 Acres) were subtracted from the overall impervious area, leaving 1.28 Acres of roadway area that were still modeled into the SDHM program. The 1/2 paver area was modeled into the program as a separate element.

Basin 300
There are 32 homes in Basin 200, this translates to 1.32Ac of impervious areas such as roof tops and hardscaping. The project also proposes 1/4 Acre of pervious pavers. The combination of roof tops and pavers (1.57 Acres) were subtracted from the overall impervious area, leaving 0.77 Acres of roadway area that were still modeled into the SDHM program. The 1/4 paver area was modeled into the program as a separate element.

POST-DEVELOPMENT SCHEMATICS

BASINS 100



BASIN 100 RESULTS

SDHM2011
PROJECT REPORT

Project Name: 1037IMPTMPOC1a
Site Name: ILH Ranch
Site Address:
City :
Report Date: 5/20/2013
Gage : LAKE WOH
Data Start : 1959/10/01 00:00
Data End : 2004/09/30 00:00
Precip Scale: 1.00
Version : 2013/04/29

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1: 10 year

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	9.32
C,Grass,MOD(5-10%)	28.36
C,Grass,STEEP(10-20	153.02
Pervious Total	190.7

Impervious Land Use	Acres
IMPERVIOUS-FLAT	3.26
IMPERVIOUS-MOD	6.47
Impervious Total	9.73
Basin Total	200.43

Element Flows To:
Surface **Interflow** **Groundwater**

MITIGATED LAND USE

Name : Basin 1
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	19.84
C,Grass,MOD(5-10%)	15.14
C,Grass,STEEP(10-20	84.74
Pervious Total	119.72

Impervious Land Use	Acres
IMPERVIOUS-FLAT	3.26
IMPERVIOUS-MOD	6.47
Impervious Total	9.73
Basin Total	129.45

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Basin 2
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
B,Grass,FLAT(0-5%)	11.43
B,Grass,STEEP(10-20	8.65
C,Grass,FLAT(0-5%)	1.39
C,Grass,MOD(5-10%)	6.67
C,Grass,STEEP(10-20	9.34
Pervious Total	37.48

Impervious Land Use	Acres
IMPERVIOUS-FLAT	5.04
IMPERVIOUS-MOD	4.18
Impervious Total	9.22
Basin Total	46.7

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Porous Pavement 1
Pavement Length: 1320.00 ft.
Pavement Width: 33.00 ft.
Pavement slope 1: 0.01 To 1
Pavement thickness: 0.2
Pour Space of Pavement: 0.4
Material thickness of second layer: 0.3
Pour Space of material for second layer: 0.4
Material thickness of third layer: 2
Pour Space of material for third layer: 0.5

Element Flows To:
Outlet 1 **Outlet 2**

Porous Pavement Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	1.000	0.000	0.010	0.000
0.0278	1.000	0.013	0.010	0.000
0.0556	1.000	0.027	0.010	0.000
0.0833	1.000	0.041	0.010	0.000
0.1111	1.000	0.055	0.010	0.000
0.1389	1.000	0.069	0.010	0.000
0.1667	1.000	0.083	0.010	0.000
0.1944	1.000	0.097	0.010	0.000
0.2222	1.000	0.111	0.010	0.000
0.2500	1.000	0.125	0.010	0.000
0.2778	1.000	0.138	0.010	0.000
0.3056	1.000	0.152	0.011	0.000
0.3333	1.000	0.166	0.011	0.000
0.3611	1.000	0.180	0.011	0.000
0.3889	1.000	0.194	0.011	0.000
0.4167	1.000	0.208	0.011	0.000
0.4444	1.000	0.222	0.011	0.000
0.4722	1.000	0.236	0.011	0.000
0.5000	1.000	0.250	0.011	0.000
0.5278	1.000	0.263	0.011	0.000
0.5556	1.000	0.277	0.011	0.000
0.5833	1.000	0.291	0.011	0.000
0.6111	1.000	0.305	0.011	0.000
0.6389	1.000	0.319	0.011	0.000

0.6667	1.000	0.333	0.011	0.000
0.6944	1.000	0.347	0.011	0.000
0.7222	1.000	0.361	0.011	0.000
0.7500	1.000	0.375	0.011	0.000
0.7778	1.000	0.388	0.011	0.000
0.8056	1.000	0.402	0.011	0.000
0.8333	1.000	0.416	0.012	0.000
0.8611	1.000	0.430	0.012	0.000
0.8889	1.000	0.444	0.012	0.000
0.9167	1.000	0.458	0.012	0.000
0.9444	1.000	0.472	0.012	0.000
0.9722	1.000	0.486	0.012	0.000
1.0000	1.000	0.500	0.012	0.000
1.0278	1.000	0.513	0.012	0.000
1.0556	1.000	0.527	0.012	0.000
1.0833	1.000	0.541	0.012	0.000
1.1111	1.000	0.555	0.012	0.000
1.1389	1.000	0.569	0.012	0.000
1.1667	1.000	0.583	0.012	0.000
1.1944	1.000	0.597	0.012	0.000
1.2222	1.000	0.611	0.012	0.000
1.2500	1.000	0.625	0.012	0.000
1.2778	1.000	0.638	0.012	0.000
1.3056	1.000	0.652	0.012	0.000
1.3333	1.000	0.666	0.012	0.000
1.3611	1.000	0.680	0.012	0.000
1.3889	1.000	0.694	0.012	0.000
1.4167	1.000	0.708	0.013	0.000
1.4444	1.000	0.722	0.013	0.000
1.4722	1.000	0.736	0.013	0.000
1.5000	1.000	0.750	0.013	0.000
1.5278	1.000	0.763	0.013	0.000
1.5556	1.000	0.777	0.013	0.000
1.5833	1.000	0.791	0.013	0.000
1.6111	1.000	0.805	0.013	0.000
1.6389	1.000	0.819	0.013	0.000
1.6667	1.000	0.833	0.013	0.000
1.6944	1.000	0.847	0.013	0.000
1.7222	1.000	0.861	0.013	0.000
1.7500	1.000	0.875	0.013	0.000
1.7778	1.000	0.888	0.013	0.000
1.8056	1.000	0.902	0.013	0.000
1.8333	1.000	0.916	0.013	0.000
1.8611	1.000	0.930	0.013	0.000
1.8889	1.000	0.944	0.013	0.000
1.9167	1.000	0.958	0.013	0.000
1.9444	1.000	0.972	0.013	0.000
1.9722	1.000	0.986	0.013	0.000
2.0000	1.000	1.000	0.013	0.000
2.0278	1.000	1.011	0.014	0.000
2.0556	1.000	1.022	0.014	0.000
2.0833	1.000	1.033	0.014	0.000
2.1111	1.000	1.044	0.014	0.000
2.1389	1.000	1.055	0.014	0.000

2.1667	1.000	1.066	0.014	0.000
2.1944	1.000	1.077	0.014	0.000
2.2222	1.000	1.088	0.014	0.000
2.2500	1.000	1.100	0.014	0.000
2.2778	1.000	1.111	0.014	0.000
2.3056	1.000	1.122	0.014	0.000
2.3333	1.000	1.133	0.014	0.000
2.3611	1.000	1.144	0.014	0.000
2.3889	1.000	1.155	0.014	0.000
2.4167	1.000	1.166	0.014	0.000
2.4444	1.000	1.177	0.014	0.000
2.4722	1.000	1.188	0.014	0.000
2.5000	1.000	1.200	0.014	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area:190.7
Total Impervious Area:9.73

Mitigated Landuse Totals for POC #1
Total Pervious Area:157.2
Total Impervious Area:19.95

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	55.396999
5 year	85.086908
10 year	102.73363
25 year	117.033783

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	47.423302
5 year	73.61142
10 year	88.948635
25 year	102.097732

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs) Predev Mit Percentage Pass/Fail

5.5397	785	863	109	Pass
6.5215	676	722	106	Pass
7.5032	613	619	100	Pass
8.4850	567	556	98	Pass
9.4667	536	498	92	Pass
10.4485	506	467	92	Pass
11.4302	466	429	92	Pass
12.4120	437	399	91	Pass
13.3938	413	377	91	Pass
14.3755	397	358	90	Pass
15.3573	381	334	87	Pass
16.3390	366	314	85	Pass
17.3208	350	295	84	Pass
18.3025	325	279	85	Pass
19.2843	310	261	84	Pass
20.2661	295	245	83	Pass
21.2478	286	221	77	Pass
22.2296	274	202	73	Pass
23.2113	255	183	71	Pass
24.1931	241	174	72	Pass
25.1748	223	162	72	Pass
26.1566	208	154	74	Pass
27.1384	189	148	78	Pass
28.1201	176	142	80	Pass
29.1019	171	134	78	Pass
30.0836	157	129	82	Pass
31.0654	150	126	84	Pass
32.0471	146	120	82	Pass
33.0289	141	111	78	Pass
34.0106	134	103	76	Pass
34.9924	129	96	74	Pass
35.9742	124	88	70	Pass
36.9559	118	84	71	Pass
37.9377	111	79	71	Pass
38.9194	105	74	70	Pass
39.9012	102	70	68	Pass
40.8829	96	69	71	Pass
41.8647	89	64	71	Pass
42.8465	84	61	72	Pass
43.8282	80	60	75	Pass
44.8100	77	59	76	Pass
45.7917	75	59	78	Pass
46.7735	71	59	83	Pass
47.7552	69	55	79	Pass
48.7370	65	53	81	Pass
49.7188	63	52	82	Pass
50.7005	60	49	81	Pass
51.6823	59	48	81	Pass
52.6640	59	46	77	Pass
53.6458	59	42	71	Pass
54.6275	57	41	71	Pass
55.6093	54	39	72	Pass
56.5911	52	38	73	Pass
57.5728	51	36	70	Pass

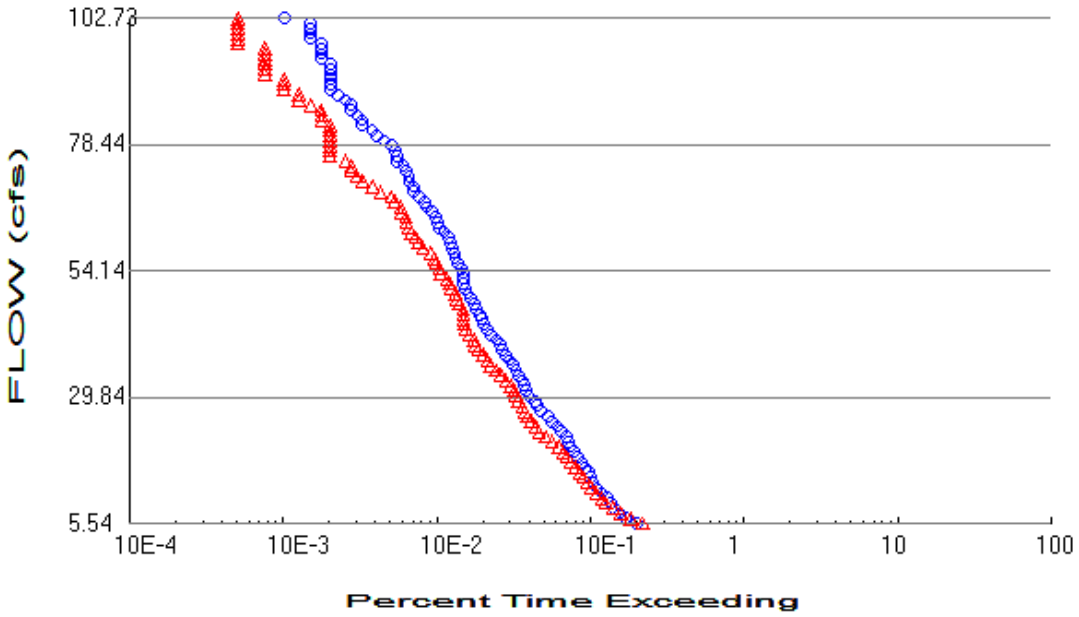
58.5546	50	32	64	Pass
59.5363	49	30	61	Pass
60.5181	47	29	61	Pass
61.4998	44	27	61	Pass
62.4816	41	26	63	Pass
63.4634	40	25	62	Pass
64.4451	39	25	64	Pass
65.4269	37	23	62	Pass
66.4086	34	23	67	Pass
67.3904	33	21	63	Pass
68.3721	30	20	66	Pass
69.3539	28	17	60	Pass
70.3357	28	15	53	Pass
71.3174	26	13	50	Pass
72.2992	26	12	46	Pass
73.2809	25	11	44	Pass
74.2627	24	11	45	Pass
75.2444	22	10	45	Pass
76.2262	22	8	36	Pass
77.2080	21	8	38	Pass
78.1897	20	8	40	Pass
79.1715	18	8	44	Pass
80.1532	16	8	50	Pass
81.1350	15	8	53	Pass
82.1167	13	8	61	Pass
83.0985	13	7	53	Pass
84.0802	12	7	58	Pass
85.0620	11	7	63	Pass
86.0438	11	6	54	Pass
87.0255	10	5	50	Pass
88.0073	9	5	55	Pass
88.9890	8	4	50	Pass
89.9708	8	4	50	Pass
90.9525	8	4	50	Pass
91.9343	8	3	37	Pass
92.9161	8	3	37	Pass
93.8978	8	3	37	Pass
94.8796	7	3	42	Pass
95.8613	7	3	42	Pass
96.8431	7	3	42	Pass
97.8248	7	2	28	Pass
98.8066	6	2	33	Pass
99.7884	6	2	33	Pass
100.7701	6	2	33	Pass
101.7519	6	2	33	Pass
102.7336	4	2	50	Pass

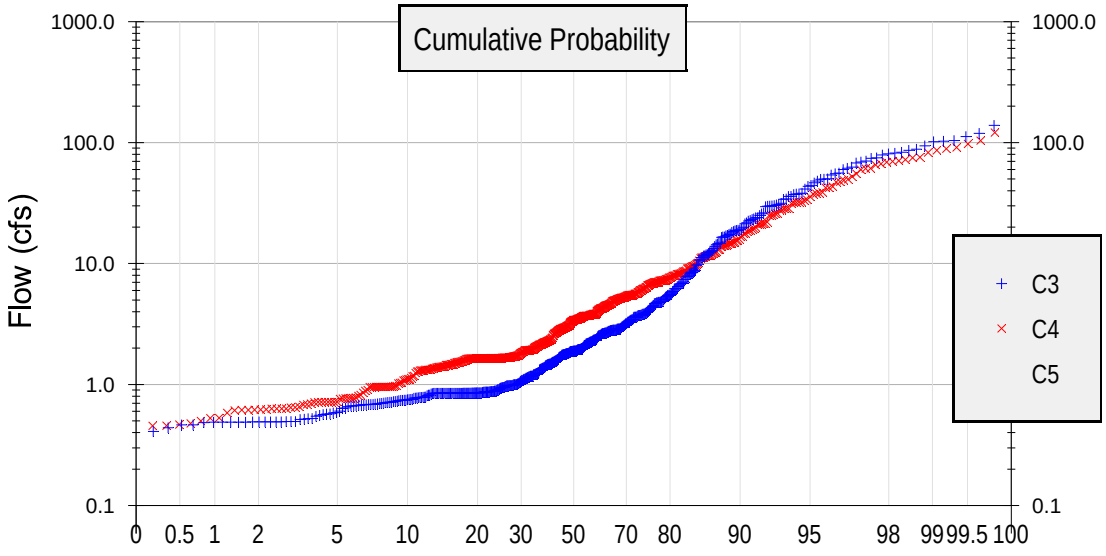
Drawdown Time Results

Perlnd and Implnd Changes

No changes have been made.

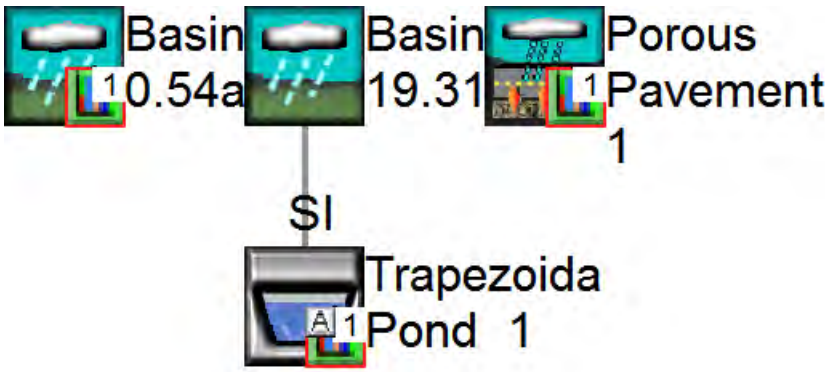
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POST-DEVELOPMENT SCHEMATICS

BASINS 200



BASIN 200 RESULTS

SDHM2011

PROJECT REPORT

Project Name: 1037IMPTMPOC2a
Site Name: LHR IMP TM
Site Address:
City :
Report Date: 5/20/2013
Gage : LAKE WOH
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2013/04/29

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1: 10 year

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	1.73
C,Grass,MOD(5-10%)	3.18
C,Grass,STEEP(10-20	10.15
Pervious Total	15.06

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.79
IMPERVIOUS-MOD	1.09
Impervious Total	1.88
Basin Total	16.94

Element Flows To:
Surface **Interflow** **Groundwater**

MITIGATED LAND USE

Name : Basin 1
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	.01
C,Grass,MOD(5-10%)	.16
C,Grass,STEEP(10-20	.37
Pervious Total	0.54

Impervious Land Use	Acres
Impervious Total	0
Basin Total	0.54

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Basin 2
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
B,Grass,FLAT(0-5%)	4.03
B,Grass,STEEP(10-20	4.2
C,Grass,FLAT(0-5%)	9.8
Pervious Total	18.03

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.35
IMPERVIOUS-MOD	0.93
Impervious Total	1.28
Basin Total	19.31

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Porous Pavement 1
Pavement Length: 660.00 ft.
Pavement Width: 33.00 ft.
Pavement slope 1: 0.01 To 1
Pavement thickness: 1.4
Pour Space of Pavement: 0.4
Material thickness of second layer: 0.1
Pour Space of material for second layer: 0.4
Material thickness of third layer: 0.25
Pour Space of material for third layer: 0.4

Element Flows To:
Outlet 1 **Outlet 2**

Porous Pavement Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.500	0.000	1.158	0.000
0.0178	0.500	0.003	1.164	0.000
0.0356	0.500	0.007	1.171	0.000
0.0533	0.500	0.010	1.178	0.000
0.0711	0.500	0.014	1.185	0.000
0.0889	0.500	0.017	1.191	0.000
0.1067	0.500	0.021	1.198	0.000
0.1244	0.500	0.024	1.205	0.000
0.1422	0.500	0.028	1.211	0.000
0.1600	0.500	0.032	1.218	0.000
0.1778	0.500	0.035	1.224	0.000
0.1956	0.500	0.039	1.231	0.000
0.2133	0.500	0.042	1.237	0.000
0.2311	0.500	0.046	1.244	0.000
0.2489	0.500	0.049	1.250	0.000
0.2667	0.500	0.053	1.256	0.000
0.2844	0.500	0.056	1.263	0.000
0.3022	0.500	0.060	1.269	0.000
0.3200	0.500	0.064	1.275	0.000
0.3378	0.500	0.067	1.281	0.000
0.3556	0.500	0.071	1.287	0.000
0.3733	0.500	0.074	1.294	0.000
0.3911	0.500	0.078	1.300	0.000
0.4089	0.500	0.081	1.306	0.000
0.4267	0.500	0.085	1.312	0.000
0.4444	0.500	0.088	1.318	0.000
0.4622	0.500	0.092	1.324	0.000
0.4800	0.500	0.096	1.330	0.000
0.4978	0.500	0.099	1.336	0.000
0.5156	0.500	0.103	1.342	0.000

0.5333	0.500	0.106	1.348	0.000
0.5511	0.500	0.110	1.354	0.000
0.5689	0.500	0.113	1.360	0.000
0.5867	0.500	0.117	1.365	0.000
0.6044	0.500	0.120	1.371	0.000
0.6222	0.500	0.124	1.377	0.000
0.6400	0.500	0.128	1.383	0.000
0.6578	0.500	0.131	1.388	0.000
0.6756	0.500	0.135	1.394	0.000
0.6933	0.500	0.138	1.400	0.000
0.7111	0.500	0.142	1.405	0.000
0.7289	0.500	0.145	1.411	0.000
0.7467	0.500	0.149	1.417	0.000
0.7644	0.500	0.152	1.422	0.000
0.7822	0.500	0.156	1.428	0.000
0.8000	0.500	0.160	1.433	0.000
0.8178	0.500	0.163	1.439	0.000
0.8356	0.500	0.167	1.445	0.000
0.8533	0.500	0.170	1.450	0.000
0.8711	0.500	0.174	1.455	0.000
0.8889	0.500	0.177	1.461	0.000
0.9067	0.500	0.181	1.466	0.000
0.9244	0.500	0.184	1.472	0.000
0.9422	0.500	0.188	1.477	0.000
0.9600	0.500	0.192	1.483	0.000
0.9778	0.500	0.195	1.488	0.000
0.9956	0.500	0.199	1.493	0.000
1.0133	0.500	0.202	1.498	0.000
1.0311	0.500	0.206	1.504	0.000
1.0489	0.500	0.209	1.509	0.000
1.0667	0.500	0.213	1.514	0.000
1.0844	0.500	0.216	1.520	0.000
1.1022	0.500	0.220	1.525	0.000
1.1200	0.500	0.224	1.530	0.000
1.1378	0.500	0.227	1.535	0.000
1.1556	0.500	0.231	1.540	0.000
1.1733	0.500	0.234	1.545	0.000
1.1911	0.500	0.238	1.551	0.000
1.2089	0.500	0.241	1.556	0.000
1.2267	0.500	0.245	1.561	0.000
1.2444	0.500	0.248	1.566	0.000
1.2622	0.500	0.252	1.571	0.000
1.2800	0.500	0.256	1.576	0.000
1.2978	0.500	0.259	1.581	0.000
1.3156	0.500	0.263	1.586	0.000
1.3333	0.500	0.266	1.591	0.000
1.3511	0.500	0.270	1.596	0.000
1.3689	0.500	0.273	1.601	0.000
1.3867	0.500	0.277	1.606	0.000
1.4044	0.500	0.280	1.611	0.000
1.4222	0.500	0.284	1.616	0.000
1.4400	0.500	0.288	1.621	0.000
1.4578	0.500	0.291	1.626	0.000
1.4756	0.500	0.295	1.631	0.000

1.4933	0.500	0.298	1.635	0.000
1.5111	0.500	0.302	1.640	0.000
1.5289	0.500	0.305	1.645	0.000
1.5467	0.500	0.309	1.650	0.000
1.5644	0.500	0.312	1.655	0.000
1.5822	0.500	0.316	1.659	0.000
1.6000	0.500	0.320	1.664	0.000

Name : Trapezoidal Pond 1
Bottom Length: 120.00 ft.
Bottom Width: 80.00 ft.
Depth: 5 ft.
Volume at riser head: 1.0530 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 4 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.500 ft.
Notch Height: 1.600 ft.
Orifice 1 Diameter: 3.448 in. **Elevation:** 0 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.220	0.000	0.000	0.000
0.0556	0.221	0.012	0.073	0.000
0.1111	0.222	0.024	0.104	0.000
0.1667	0.223	0.037	0.127	0.000
0.2222	0.224	0.049	0.147	0.000
0.2778	0.225	0.061	0.164	0.000
0.3333	0.226	0.074	0.180	0.000
0.3889	0.227	0.087	0.194	0.000
0.4444	0.228	0.099	0.208	0.000
0.5000	0.229	0.112	0.220	0.000
0.5556	0.230	0.125	0.232	0.000
0.6111	0.231	0.138	0.244	0.000
0.6667	0.232	0.151	0.254	0.000
0.7222	0.233	0.164	0.265	0.000
0.7778	0.234	0.177	0.275	0.000
0.8333	0.235	0.190	0.285	0.000
0.8889	0.237	0.203	0.294	0.000
0.9444	0.238	0.216	0.303	0.000
1.0000	0.239	0.229	0.312	0.000

1.0556	0.240	0.243	0.320	0.000
1.1111	0.241	0.256	0.329	0.000
1.1667	0.242	0.269	0.337	0.000
1.2222	0.243	0.283	0.345	0.000
1.2778	0.244	0.296	0.353	0.000
1.3333	0.245	0.310	0.360	0.000
1.3889	0.246	0.324	0.368	0.000
1.4444	0.247	0.337	0.375	0.000
1.5000	0.248	0.351	0.382	0.000
1.5556	0.249	0.365	0.389	0.000
1.6111	0.250	0.379	0.396	0.000
1.6667	0.252	0.393	0.403	0.000
1.7222	0.253	0.407	0.409	0.000
1.7778	0.254	0.421	0.416	0.000
1.8333	0.255	0.435	0.422	0.000
1.8889	0.256	0.449	0.429	0.000
1.9444	0.257	0.464	0.435	0.000
2.0000	0.258	0.478	0.441	0.000
2.0556	0.259	0.492	0.447	0.000
2.1111	0.260	0.507	0.453	0.000
2.1667	0.261	0.521	0.459	0.000
2.2222	0.263	0.536	0.465	0.000
2.2778	0.264	0.551	0.471	0.000
2.3333	0.265	0.565	0.477	0.000
2.3889	0.266	0.580	0.482	0.000
2.4444	0.267	0.595	0.503	0.000
2.5000	0.268	0.610	0.545	0.000
2.5556	0.269	0.625	0.598	0.000
2.6111	0.270	0.640	0.659	0.000
2.6667	0.272	0.655	0.726	0.000
2.7222	0.273	0.670	0.800	0.000
2.7778	0.274	0.685	0.877	0.000
2.8333	0.275	0.700	0.959	0.000
2.8889	0.276	0.716	1.044	0.000
2.9444	0.277	0.731	1.131	0.000
3.0000	0.278	0.747	1.221	0.000
3.0556	0.279	0.762	1.313	0.000
3.1111	0.281	0.778	1.407	0.000
3.1667	0.282	0.793	1.502	0.000
3.2222	0.283	0.809	1.597	0.000
3.2778	0.284	0.825	1.694	0.000
3.3333	0.285	0.841	1.791	0.000
3.3889	0.286	0.857	1.888	0.000
3.4444	0.288	0.873	2.001	0.000
3.5000	0.289	0.889	2.120	0.000
3.5556	0.290	0.905	2.243	0.000
3.6111	0.291	0.921	2.368	0.000
3.6667	0.292	0.937	2.496	0.000
3.7222	0.293	0.953	2.627	0.000
3.7778	0.295	0.970	2.761	0.000
3.8333	0.296	0.986	3.531	0.000
3.8889	0.297	1.003	3.707	0.000
3.9444	0.298	1.019	3.886	0.000
4.0000	0.299	1.036	4.068	0.000

4.0556	0.300	1.053	4.264	0.000
4.1111	0.302	1.069	4.618	0.000
4.1667	0.303	1.086	5.075	0.000
4.2222	0.304	1.103	5.616	0.000
4.2778	0.305	1.120	6.228	0.000
4.3333	0.306	1.137	6.905	0.000
4.3889	0.308	1.154	7.641	0.000
4.4444	0.309	1.171	8.431	0.000
4.5000	0.310	1.188	9.271	0.000
4.5556	0.311	1.206	10.16	0.000
4.6111	0.312	1.223	11.09	0.000
4.6667	0.314	1.240	12.07	0.000
4.7222	0.315	1.258	13.08	0.000
4.7778	0.316	1.275	14.14	0.000
4.8333	0.317	1.293	15.24	0.000
4.8889	0.319	1.311	16.37	0.000
4.9444	0.320	1.329	17.54	0.000
5.0000	0.321	1.346	18.75	0.000
5.0556	0.322	1.364	19.98	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area:15.06
Total Impervious Area:1.88

Mitigated Landuse Totals for POC #1
Total Pervious Area:18.57
Total Impervious Area:1.78

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	4.726828
5 year	7.238093
10 year	8.721725
25 year	9.947936

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.901838
5 year	4.353393
10 year	6.564302
25 year	8.106427

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4727	1033	825	79	Pass
0.5560	855	503	58	Pass
0.6393	735	413	56	Pass
0.7227	650	357	54	Pass
0.8060	587	311	52	Pass
0.8893	537	280	52	Pass
0.9726	492	257	52	Pass
1.0559	469	230	49	Pass
1.1393	439	210	47	Pass
1.2226	412	188	45	Pass
1.3059	391	167	42	Pass
1.3892	375	155	41	Pass
1.4726	359	147	40	Pass
1.5559	340	139	40	Pass
1.6392	321	124	38	Pass
1.7225	303	114	37	Pass
1.8059	290	102	35	Pass
1.8892	277	95	34	Pass
1.9725	257	88	34	Pass
2.0558	244	82	33	Pass
2.1392	227	76	33	Pass
2.2225	209	73	34	Pass
2.3058	191	65	34	Pass
2.3891	177	62	35	Pass
2.4725	170	59	34	Pass
2.5558	162	57	35	Pass
2.6391	153	54	35	Pass
2.7224	148	52	35	Pass
2.8057	146	51	34	Pass
2.8891	137	46	33	Pass
2.9724	132	46	34	Pass
3.0557	128	45	35	Pass
3.1390	123	45	36	Pass
3.2224	117	44	37	Pass
3.3057	110	42	38	Pass
3.3890	106	41	38	Pass
3.4723	97	40	41	Pass
3.5557	91	39	42	Pass
3.6390	86	39	45	Pass
3.7223	81	37	45	Pass
3.8056	77	35	45	Pass
3.8890	75	35	46	Pass
3.9723	71	34	47	Pass
4.0556	68	32	47	Pass
4.1389	64	30	46	Pass
4.2222	63	30	47	Pass
4.3056	61	29	47	Pass
4.3889	60	27	45	Pass

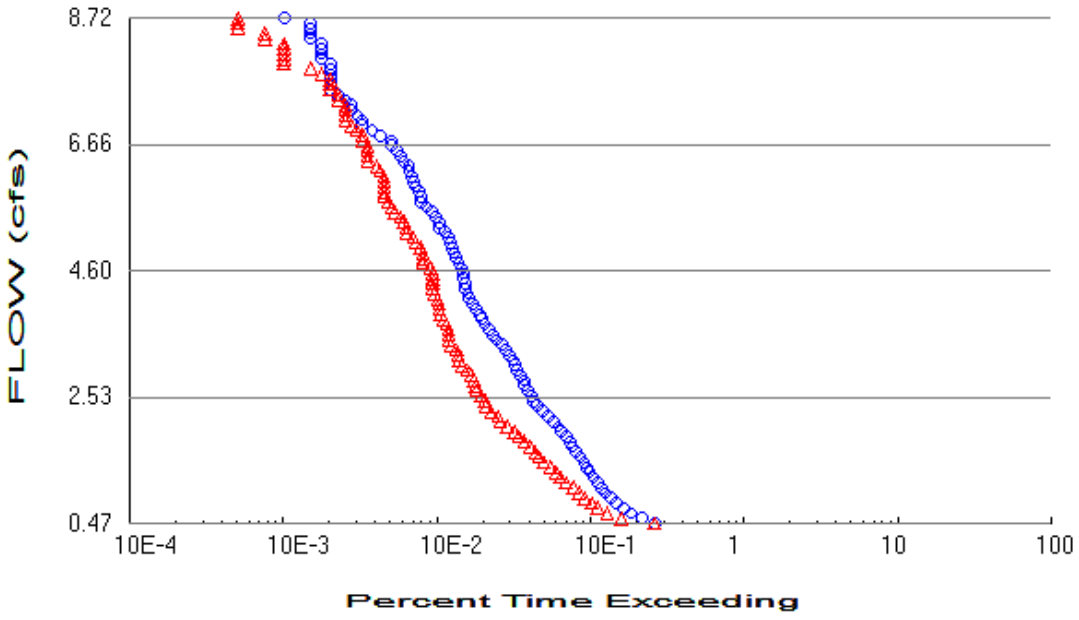
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4.8888	51	16	31	Pass
4.9722	50	16	32	Pass
5.0555	49	16	32	Pass
5.1388	47	16	34	Pass
5.2221	45	16	35	Pass
5.3055	41	16	39	Pass
5.3888	41	16	39	Pass
5.4721	39	15	38	Pass
5.5554	37	14	37	Pass
5.6387	34	14	41	Pass
5.7221	31	14	45	Pass
5.8054	31	13	41	Pass
5.8887	30	12	40	Pass
5.9720	29	12	41	Pass
6.0554	28	12	42	Pass
6.1387	27	11	40	Pass
6.2220	26	9	34	Pass
6.3053	26	9	34	Pass
6.3887	24	9	37	Pass
6.4720	23	8	34	Pass
6.5553	22	6	27	Pass
6.6386	20	6	30	Pass
6.7220	20	6	30	Pass
6.8053	17	5	29	Pass
6.8886	15	3	20	Pass
6.9719	13	3	23	Pass
7.0553	13	3	23	Pass
7.1386	12	3	25	Pass
7.2219	11	3	27	Pass
7.3052	11	3	27	Pass
7.3885	10	3	30	Pass
7.4719	9	2	22	Pass
7.5552	8	2	25	Pass
7.6385	8	2	25	Pass
7.7218	8	2	25	Pass
7.8052	8	2	25	Pass
7.8885	8	2	25	Pass
7.9718	8	2	25	Pass
8.0551	7	2	28	Pass
8.1385	7	2	28	Pass
8.2218	7	2	28	Pass
8.3051	7	2	28	Pass
8.3884	6	2	33	Pass
8.4718	6	2	33	Pass
8.5551	6	2	33	Pass
8.6384	6	2	33	Pass
8.7217	4	1	25	Pass

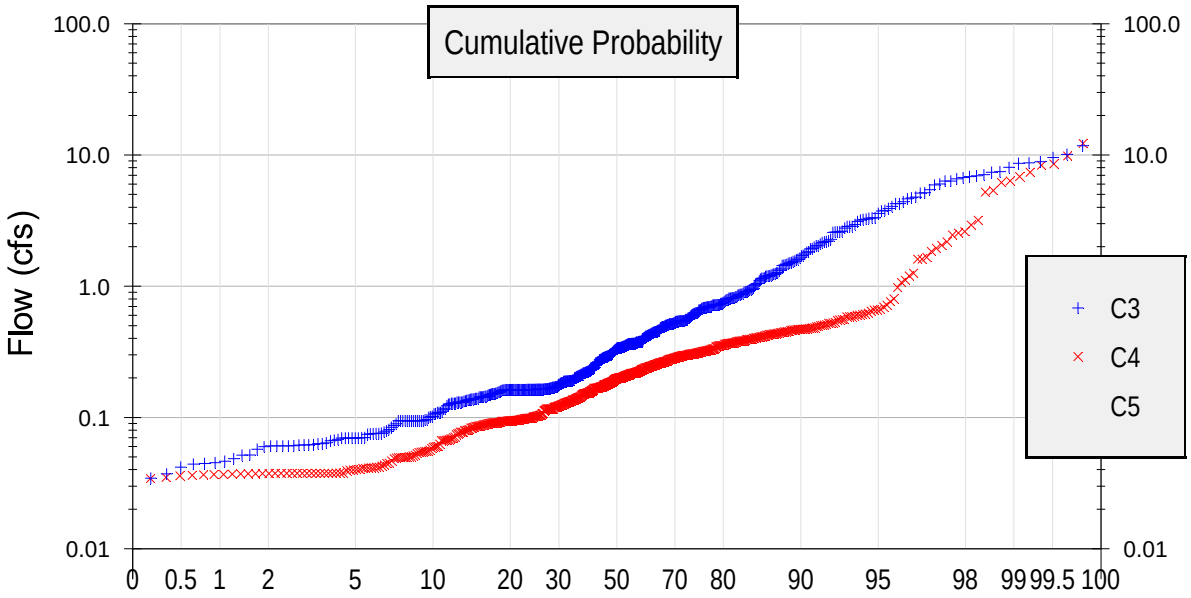
Drawdown Time Results

Perlnd and Implnd Changes

No changes have been made.

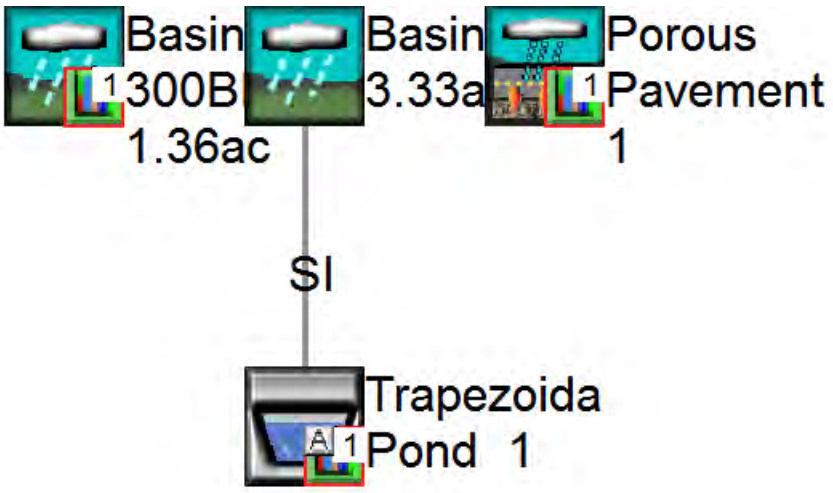
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Cumulative Probability
Flow (cfs)
100.0
10.0
1.0
0.1
0.01
0
0.5
1
2
5
10
20
30
50
70
80
90
95
98
99
99.5
100
C3
C4
C5

POST-DEVELOPMENT SCHEMATICS

BASINS 300



BASIN 300 RESULTS

SDHM2011

PROJECT REPORT

Project Name: 1037IMPTMPOC3a
Site Name: LHR POC 3
Site Address: W. LILAC RD.
City : VALLEY CENTER
Report Date: 5/20/2013
Gage : LAKE WOH
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version : 2013/04/29

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1: 10 year

PREDEVELOPED LAND USE

Name : Basin 300
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	.46
C,Grass,MOD(5-10%)	.72
C,Grass,STEEP(10-20	5.14
Pervious Total	6.32

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.05
IMPERVIOUS-MOD	0.38
Impervious Total	0.43
Basin Total	6.75

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : Basin 300BP
Bypass: Yes

GroundWater: No

Pervious Land Use	Acres
C,Grass,FLAT(0-5%)	.17
C,Grass,MOD(5-10%)	.09
C,Grass,STEEP(10-20	.92
Pervious Total	1.18

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.02
IMPERVIOUS-MOD	0.16
Impervious Total	0.18
Basin Total	1.36

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Basin 300
Bypass: No

GroundWater: No

Pervious Land Use	Acres
B,Grass,FLAT(0-5%)	.34
B,Grass,STEEP(10-20	.65
C,Grass,MOD(5-10%)	.08
C,Grass,FLAT(0-5%)	.09
C,Grass,STEEP(10-20	.34
Pervious Total	1.5

Impervious Land Use	Acres
IMPERVIOUS-FLAT	0.24
IMPERVIOUS-MOD	0.53
Impervious Total	0.77
Basin Total	2.27

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1	Trapezoidal Pond 1	

Name : Trapezoidal Pond 1
Bottom Length: 50.00 ft.
Bottom Width: 27.00 ft.
Depth: 5 ft.
Volume at riser head: 0.1920 acre-ft.
Side slope 1: 2 To 1
Side slope 2: 2 To 1
Side slope 3: 2 To 1
Side slope 4: 2 To 1
Discharge Structure
Riser Height: 4 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 1.369 ft.
Notch Height: 0.098 ft.
Orifice 1 Diameter: 1.03895 in. **Elevation:** 0 ft.

Element Flows To:

Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.031	0.000	0.000	0.000
0.0556	0.031	0.001	0.006	0.000
0.1111	0.031	0.003	0.009	0.000
0.1667	0.032	0.005	0.011	0.000
0.2222	0.032	0.007	0.013	0.000
0.2778	0.033	0.008	0.014	0.000
0.3333	0.033	0.010	0.016	0.000
0.3889	0.033	0.012	0.017	0.000
0.4444	0.034	0.014	0.018	0.000
0.5000	0.034	0.016	0.020	0.000
0.5556	0.035	0.018	0.021	0.000
0.6111	0.035	0.020	0.022	0.000
0.6667	0.035	0.022	0.023	0.000
0.7222	0.036	0.024	0.024	0.000
0.7778	0.036	0.026	0.025	0.000
0.8333	0.037	0.028	0.025	0.000
0.8889	0.037	0.030	0.026	0.000
0.9444	0.038	0.032	0.027	0.000
1.0000	0.038	0.034	0.028	0.000
1.0556	0.038	0.036	0.029	0.000

1.1111	0.039	0.039	0.029	0.000
1.1667	0.039	0.041	0.030	0.000
1.2222	0.040	0.043	0.031	0.000
1.2778	0.040	0.045	0.032	0.000
1.3333	0.041	0.047	0.032	0.000
1.3889	0.041	0.050	0.033	0.000
1.4444	0.042	0.052	0.034	0.000
1.5000	0.042	0.054	0.034	0.000
1.5556	0.042	0.057	0.035	0.000
1.6111	0.043	0.059	0.036	0.000
1.6667	0.043	0.062	0.036	0.000
1.7222	0.044	0.064	0.037	0.000
1.7778	0.044	0.067	0.037	0.000
1.8333	0.045	0.069	0.038	0.000
1.8889	0.045	0.072	0.039	0.000
1.9444	0.046	0.074	0.039	0.000
2.0000	0.046	0.077	0.040	0.000
2.0556	0.047	0.079	0.040	0.000
2.1111	0.047	0.082	0.041	0.000
2.1667	0.048	0.085	0.041	0.000
2.2222	0.048	0.087	0.042	0.000
2.2778	0.049	0.090	0.042	0.000
2.3333	0.049	0.093	0.043	0.000
2.3889	0.050	0.095	0.043	0.000
2.4444	0.050	0.098	0.044	0.000
2.5000	0.051	0.101	0.044	0.000
2.5556	0.051	0.104	0.045	0.000
2.6111	0.052	0.107	0.045	0.000
2.6667	0.052	0.110	0.046	0.000
2.7222	0.053	0.113	0.046	0.000
2.7778	0.053	0.116	0.047	0.000
2.8333	0.054	0.119	0.047	0.000
2.8889	0.054	0.122	0.048	0.000
2.9444	0.055	0.125	0.048	0.000
3.0000	0.055	0.128	0.049	0.000
3.0556	0.056	0.131	0.049	0.000
3.1111	0.056	0.134	0.050	0.000
3.1667	0.057	0.137	0.050	0.000
3.2222	0.057	0.140	0.050	0.000
3.2778	0.058	0.143	0.051	0.000
3.3333	0.058	0.147	0.051	0.000
3.3889	0.059	0.150	0.052	0.000
3.4444	0.059	0.153	0.052	0.000
3.5000	0.060	0.157	0.053	0.000
3.5556	0.060	0.160	0.053	0.000
3.6111	0.061	0.163	0.053	0.000
3.6667	0.061	0.167	0.054	0.000
3.7222	0.062	0.170	0.054	0.000
3.7778	0.062	0.174	0.055	0.000
3.8333	0.063	0.177	0.055	0.000
3.8889	0.064	0.181	0.055	0.000
3.9444	0.064	0.184	0.096	0.000
4.0000	0.065	0.188	0.196	0.000
4.0556	0.065	0.192	0.388	0.000

4.1111	0.066	0.195	0.738	0.000
4.1667	0.066	0.199	1.191	0.000
4.2222	0.067	0.203	1.728	0.000
4.2778	0.068	0.206	2.337	0.000
4.3333	0.068	0.210	3.010	0.000
4.3889	0.069	0.214	3.741	0.000
4.4444	0.069	0.218	4.528	0.000
4.5000	0.070	0.222	5.364	0.000
4.5556	0.070	0.226	6.249	0.000
4.6111	0.071	0.230	7.179	0.000
4.6667	0.072	0.234	8.152	0.000
4.7222	0.072	0.238	9.167	0.000
4.7778	0.073	0.242	10.22	0.000
4.8333	0.073	0.246	11.31	0.000
4.8889	0.074	0.250	12.44	0.000
4.9444	0.074	0.254	13.61	0.000
5.0000	0.075	0.258	14.81	0.000
5.0556	0.076	0.262	16.04	0.000

Name : Porous Pavement 1
Pavement Length: 330.00 ft.
Pavement Width: 33.00 ft.
Pavement slope 1: 0.02 To 1
Pavement thickness: 1.4
Pour Space of Pavement: 0.4
Material thickness of second layer: 0.1
Pour Space of material for second layer: 0.4
Material thickness of third layer: 0.25
Pour Space of material for third layer: 0.4

Element Flows To:
Outlet 1 **Outlet 2**

Porous Pavement Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.250	0.000	0.000	0.000
0.0178	0.250	0.001	0.126	0.000
0.0356	0.250	0.003	0.178	0.000
0.0533	0.250	0.005	0.218	0.000
0.0711	0.250	0.007	0.252	0.000
0.0889	0.250	0.008	0.281	0.000
0.1067	0.250	0.010	0.308	0.000
0.1244	0.250	0.012	0.333	0.000
0.1422	0.250	0.014	0.356	0.000
0.1600	0.250	0.016	0.378	0.000
0.1778	0.250	0.017	0.398	0.000
0.1956	0.250	0.019	0.418	0.000
0.2133	0.250	0.021	0.436	0.000
0.2311	0.250	0.023	0.454	0.000

0.2489	0.250	0.024	0.471	0.000
0.2667	0.250	0.026	0.488	0.000
0.2844	0.250	0.028	0.504	0.000
0.3022	0.250	0.030	0.519	0.000
0.3200	0.250	0.032	0.534	0.000
0.3378	0.250	0.033	0.549	0.000
0.3556	0.250	0.035	0.563	0.000
0.3733	0.250	0.037	0.577	0.000
0.3911	0.250	0.039	0.591	0.000
0.4089	0.250	0.040	0.604	0.000
0.4267	0.250	0.042	0.617	0.000
0.4444	0.250	0.044	0.630	0.000
0.4622	0.250	0.046	0.642	0.000
0.4800	0.250	0.048	0.655	0.000
0.4978	0.250	0.049	0.667	0.000
0.5156	0.250	0.051	0.678	0.000
0.5333	0.250	0.053	0.690	0.000
0.5511	0.250	0.055	0.701	0.000
0.5689	0.250	0.056	0.713	0.000
0.5867	0.250	0.058	0.724	0.000
0.6044	0.250	0.060	0.735	0.000
0.6222	0.250	0.062	0.745	0.000
0.6400	0.250	0.064	0.756	0.000
0.6578	0.250	0.065	0.766	0.000
0.6756	0.250	0.067	0.777	0.000
0.6933	0.250	0.069	0.787	0.000
0.7111	0.250	0.071	0.797	0.000
0.7289	0.250	0.072	0.807	0.000
0.7467	0.250	0.074	0.817	0.000
0.7644	0.250	0.076	0.826	0.000
0.7822	0.250	0.078	0.836	0.000
0.8000	0.250	0.080	0.845	0.000
0.8178	0.250	0.081	0.855	0.000
0.8356	0.250	0.083	0.864	0.000
0.8533	0.250	0.085	0.873	0.000
0.8711	0.250	0.087	0.882	0.000
0.8889	0.250	0.088	0.891	0.000
0.9067	0.250	0.090	0.900	0.000
0.9244	0.250	0.092	0.909	0.000
0.9422	0.250	0.094	0.917	0.000
0.9600	0.250	0.096	0.926	0.000
0.9778	0.250	0.097	0.934	0.000
0.9956	0.250	0.099	0.943	0.000
1.0133	0.250	0.101	0.951	0.000
1.0311	0.250	0.103	0.960	0.000
1.0489	0.250	0.104	0.968	0.000
1.0667	0.250	0.106	0.976	0.000
1.0844	0.250	0.108	0.984	0.000
1.1022	0.250	0.110	0.992	0.000
1.1200	0.250	0.112	1.000	0.000
1.1378	0.250	0.113	1.008	0.000
1.1556	0.250	0.115	1.016	0.000
1.1733	0.250	0.117	1.024	0.000
1.1911	0.250	0.119	1.031	0.000

1.2089	0.250	0.120	1.039	0.000
1.2267	0.250	0.122	1.047	0.000
1.2444	0.250	0.124	1.054	0.000
1.2622	0.250	0.126	1.062	0.000
1.2800	0.250	0.128	1.069	0.000
1.2978	0.250	0.129	1.077	0.000
1.3156	0.250	0.131	1.084	0.000
1.3333	0.250	0.133	1.091	0.000
1.3511	0.250	0.135	1.099	0.000
1.3689	0.250	0.136	1.106	0.000
1.3867	0.250	0.138	1.113	0.000
1.4044	0.250	0.140	1.120	0.000
1.4222	0.250	0.142	1.127	0.000
1.4400	0.250	0.144	1.134	0.000
1.4578	0.250	0.145	1.141	0.000
1.4756	0.250	0.147	1.148	0.000
1.4933	0.250	0.149	1.155	0.000
1.5111	0.250	0.151	1.162	0.000
1.5289	0.250	0.152	1.169	0.000
1.5467	0.250	0.154	1.175	0.000
1.5644	0.250	0.156	1.182	0.000
1.5822	0.250	0.158	1.189	0.000
1.6000	0.250	0.160	1.196	0.000

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area:6.32
Total Impervious Area:0.43

Mitigated Landuse Totals for POC #1
Total Pervious Area:2.68
Total Impervious Area:1.2

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	1.915375
5 year	2.931998
10 year	3.544594
25 year	4.024805

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.603194
5 year	1.265934
10 year	1.555072
25 year	2.317114

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1915	834	522	62	Pass
0.2254	717	411	57	Pass
0.2593	627	331	52	Pass
0.2931	589	280	47	Pass
0.3270	545	242	44	Pass
0.3609	514	217	42	Pass
0.3948	477	192	40	Pass
0.4286	445	171	38	Pass
0.4625	423	152	35	Pass
0.4964	402	139	34	Pass
0.5302	385	124	32	Pass
0.5641	369	111	30	Pass
0.5980	356	98	27	Pass
0.6318	335	86	25	Pass
0.6657	314	81	25	Pass
0.6996	296	75	25	Pass
0.7334	286	70	24	Pass
0.7673	273	64	23	Pass
0.8012	254	60	23	Pass
0.8351	240	53	22	Pass
0.8689	226	51	22	Pass
0.9028	208	43	20	Pass
0.9367	191	42	21	Pass
0.9705	176	40	22	Pass
1.0044	170	39	22	Pass
1.0383	160	35	21	Pass
1.0721	151	33	21	Pass
1.1060	145	30	20	Pass
1.1399	143	28	19	Pass
1.1737	135	25	18	Pass
1.2076	131	24	18	Pass
1.2415	125	23	18	Pass
1.2754	118	21	17	Pass
1.3092	113	20	17	Pass
1.3431	106	19	17	Pass
1.3770	102	18	17	Pass
1.4108	97	17	17	Pass
1.4447	89	16	17	Pass
1.4786	84	14	16	Pass
1.5124	80	10	12	Pass
1.5463	77	9	11	Pass
1.5802	75	8	10	Pass
1.6140	71	7	9	Pass
1.6479	69	6	8	Pass

1.6818	65	5	7	Pass
1.7157	63	5	7	Pass
1.7495	61	5	8	Pass
1.7834	59	5	8	Pass
1.8173	59	5	8	Pass
1.8511	59	5	8	Pass
1.8850	57	5	8	Pass
1.9189	54	3	5	Pass
1.9527	52	3	5	Pass
1.9866	51	3	5	Pass
2.0205	50	3	6	Pass
2.0543	49	3	6	Pass
2.0882	47	2	4	Pass
2.1221	45	2	4	Pass
2.1560	41	2	4	Pass
2.1898	40	2	5	Pass
2.2237	39	2	5	Pass
2.2576	37	2	5	Pass
2.2914	34	2	5	Pass
2.3253	32	2	6	Pass
2.3592	31	2	6	Pass
2.3930	29	2	6	Pass
2.4269	28	1	3	Pass
2.4608	26	0	0	Pass
2.4946	26	0	0	Pass
2.5285	25	0	0	Pass
2.5624	24	0	0	Pass
2.5963	23	0	0	Pass
2.6301	22	0	0	Pass
2.6640	21	0	0	Pass
2.6979	20	0	0	Pass
2.7317	18	0	0	Pass
2.7656	16	0	0	Pass
2.7995	15	0	0	Pass
2.8333	13	0	0	Pass
2.8672	13	0	0	Pass
2.9011	12	0	0	Pass
2.9349	11	0	0	Pass
2.9688	11	0	0	Pass
3.0027	10	0	0	Pass
3.0366	8	0	0	Pass
3.0704	8	0	0	Pass
3.1043	8	0	0	Pass
3.1382	8	0	0	Pass
3.1720	8	0	0	Pass
3.2059	8	0	0	Pass
3.2398	8	0	0	Pass
3.2736	7	0	0	Pass
3.3075	7	0	0	Pass
3.3414	7	0	0	Pass
3.3752	6	0	0	Pass
3.4091	6	0	0	Pass
3.4430	6	0	0	Pass
3.4769	6	0	0	Pass

3.5107	5	0	0	Pass
3.5446	4	0	0	Pass

Drawdown Time Results
Pond: Trapezoidal Pond 1

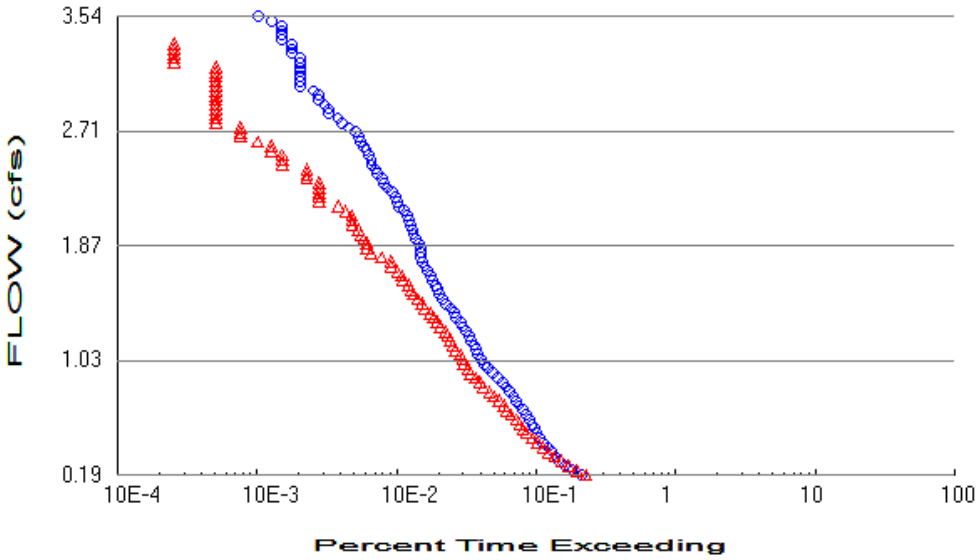
Days	Stage(feet)	Percent of Total Run Time
1	0.997	2.7560
2	2.291	0.8869
3	3.702	0.1531
4	5.000	0.0000
5	5.000	0.0000

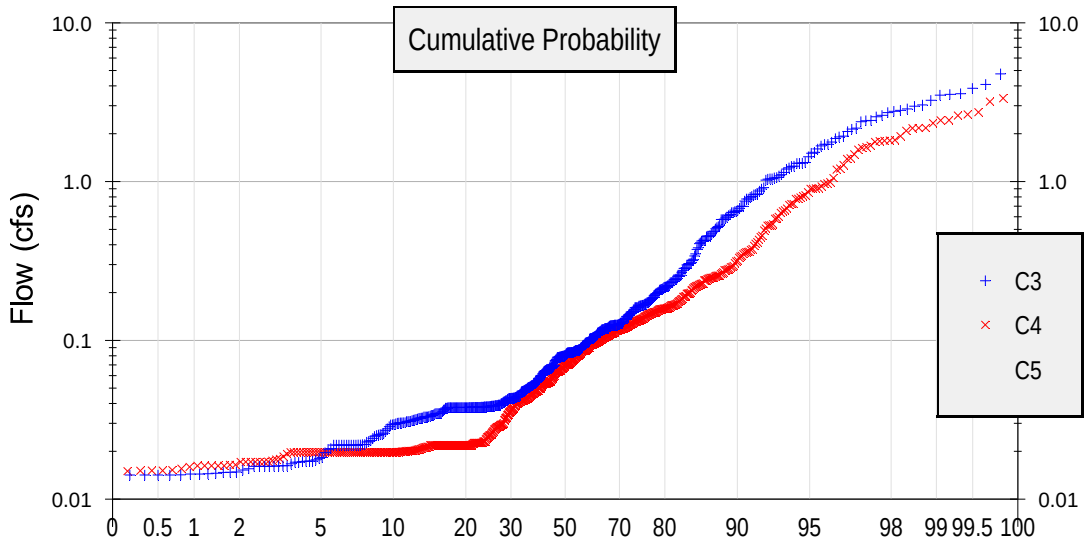
Maximum Stage: 4.109
Drawdown Time: 02 23:55:50

Perlnd and Implnd Changes

No changes have been made.

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Cumulative Probability
Flow (cfs)
10.0
1.0
0.1
0.01
0
0.5
1
2
5
10
20
30
50
70
80
90
95
98
99
99.5
100
C3
C4
C5

SUMMARY

PEAK FLOW

BASIN 100

	10% Q2	Q2	Q5	Q10
	(CFS)	(CFS)	(CFS)	(CFS)
PRE-DEV	5.5	55.4	85.1	102.7
POST-DEV	4.7	47.4	73.6	88.9

BASIN 200

	10% Q2	Q2	Q5	Q10
	(CFS)	(CFS)	(CFS)	(CFS)
PRE-DEV	0.5	4.7	7.2	8.7
POST-DEV	0.1	0.9	4.3	6.6

BASIN 300

	10% Q2	Q2	Q5	Q10
	(CFS)	(CFS)	(CFS)	(CFS)
PRE-DEV	0.2	1.9	2.9	3.5
POST-DEV	0.1	0.6	1.3	1.5

MITIGATION DEVICE	PROPOSED SIZE	DETAIL DESCRIPTION
PERMEABLE PAVERS	1Acre of pavers	1 acres of permeable pavers to be places at lot points of streets just upstream of the final discharging point. Permeable pavers consist of unit pavers over 30" of base material with a minimum of 0.4 porosity. **Drawdown time <72 hours, no vector control required**
PERMEABLE PAVERS & DETENTION BASIN 200	½ Acre of pavers with 1.0 Ac-Ft. detention basin	1/2 acres of permeable pavers to be places at lot points of streets just upstream of the final discharging point. Permeable pavers consist of unit pavers over 30" of base material with a minimum of 0.4 porosity. 1.0 Ac-Ft trapezoidal pond at 5' deep with a 1' freeboard. 18" diameter riser at 4' high with 17.9" wide notch at 0.13' high and 3" diameter orifice at bottom of pond. **Drawdown time <72 hours, no vector control**

		required.
PERMEABLE PAVERS & DETENTION BASIN 300	¼ Acre of pavers with 0.2 Ac-Ft. detention basin	0.2 Ac-Ft trapezoidal pond at 5' deep with a 1' freeboard. 18" diameter riser at 4' high with 16.4" wide notch at 0.098' high and 1.04" diameter orifice at bottom of pond. **Drawdown time <72 hours, no vector control**

As presented in this report, the post-development discharge durations will not deviate above the pre-development durations from 0.1Q2 to Q10. The flow rates from 0.1Q2 to Q10, under the post-development conditions, will not deviate above those under the pre-development conditions. The proposed detention basin is sized for 100-year storm mitigation and is verified to be more than adequate to mitigate the anticipated hydromodification peak flow and duration as a result of the proposed development's increased impervious areas. The proposed development will not adversely affect downstream drainage facilities.

MAINTENANACE

Immediately after construction, the proposed HMP facilities will be maintained by the developer until a Home Owner's Association is established. The maintenance responsibility will then be transferred to the HOA. The HOA will maintain these HMP facilities into perpetuity.