Appendix J:

The Project Stormwater Control Plan by Lea & Braze Engineering, Inc.

STORMWATER CONTROL PLAN

23 LOT SUBDIVISION
ON PROCTOR ROAD

CASTRO VALLEY, CALIFORNIA

Owner/Developer:
Hue Tran
4584 Ewing Road
Castro Valley, CA 94546

Prepared By:
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(510) 887-4086

October 29, 2010
Rev. July 6, 2012

Job #: 2080293

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Tables

Attachments

I. Project Setting

A. Project Location and Description

The proposed 23 lot subdivision is located in northern Castro Valley, off of Proctor Road near Anthony Chabot Regional Park. The site is approximately 5.9 acres and development will include a private roadway, pedestrian sidewalk, off-street parking, and 23 single family residential homes.

B. Existing Site Features and Conditions

The site has moderate to steep terrain, and drains to the south. The runoff is captured at the low end of the site by the treatment pond and then the flow metered into a small existing wetland.

C. Opportunities and Constraints for Stormwater Control

Due to the steepness of the terrain, there are few opportunities for storm water control for the site. The proposed lots are going to be minimally graded for the development by using split level home construction. The majority of the site grading will be to construct a roadway satisfying the Alameda County Fire Department standards.

Since the site has steep terrain, and a natural low spot at the southern end, a retention pond is the logical choice for stormwater control and treatment. The entire site, both developed lots and roadway improvements will drain to the proposed pond.

II. Measures to Limit Imperviousness

To reduce imperviousness, we propose providing sidewalk on one side of the road only, and minimizing hardscape around the homes. The use of pervious pavements will be explored as the design of the subdivision moves forward. Any site retaining walls will have subdrainage which will be directed to the storm water control features. All impervious areas within the right-of-way will be directed to storm water control features to provide maximum infiltration and treatment.

III. Selection and Preliminary Design of Stormwater Treatment BMPs

A. General Pond Characteristics

Using the Bay Area Hydrology Model (BAHM) software, a 40’ x 160’ pond is sufficient to retain and treat runoff from the site. The pond will include a flat basin to maximize the retention time and volume.

The pond will be made up of 6 inches of permeable planting soil over 18 inches of sandy loam. This loam should have an infiltration rate between 5-10 inches per hour. This loam is placed over ¾ inch clean, crushed drain rock. The filtered water will then be picked up by perforated PVC pipes and conveyed out to the existing storm drainage system.

B. Specific Characteristics of Impervious Areas and Retention Pond

The runoff from the entire site will be treated by the proposed pond. The impervious area from the roadway improvements (41,773 square feet) and approximately 50% of the lot areas (107,884 square feet), a total impervious area of 149,657 square feet, will be treated by the pond. Including the pervious areas, the entire shed area is 254,927 square feet.

The pond has an area of 6,024 square feet of proposed treatment area, which is 4.03% of the total impervious area. The minimum required area is 4% of the total impervious area, which equals 5,986 square feet. The pond is designed to be a maximum of five feet deep, with an emergency overflow grate above the five foot level. Underneath the pond, a network of 4" perforated PVC pipes will collect the filtered runoff and transmit it to the existing storm drainage system.

IV. Source Control Measures

The potential sources of stormwater pollutants may include:

- automotive oil from vehicles traveling on the road
- dumping of wash-water or other liquids into storm drain inlets.
- Future pest control
- Fertilizers and pesticides used in pond maintenance

Table 1. Sources and Source Control BMPs

Potential Source	Permanent Controls (BMPs)	Operational Controls (BMPs)
Off-site drain inlets	All accessible on-site inlets will be marked with the words "No Dumping! Flows to Bay!"	Markings will be inspected annually and repainted or replaced as needed.
Street use and parking		All shall be swept regularly to prevent accumulation of litter and debris.
Landscape/outdoor pesticide use	Final landscape plans will be designed to minimize irrigation and runoff and to minimize use of fertilizers and pesticides that can contribute to stormwater	Landscape will be maintained using minimum or no pesticides.

	pollution. Any native trees, shrubs, and ground cover on the site will be preserved to the maximum extent possible	
Vehicle and equipment cleaning	All paved areas drain to the pond.	

V. Summary of Permitting and Code Compliance Issues

There are no known conflicts between the proposed storm water control plan and the County of Alameda ordinances or policies. Any conflicts that are found will be resolved through the design review process or during subsequent permitting.

VI. BMP Operation and Maintenance

A. Means to Finance and Implement BMP Maintenance

All stormwater treatment facilities (pond) in this plan, within the proposed storm drain areas, will be owned and maintained by the subdivision homeowners association.

B. Summary of Maintenance Requirements

Pond Maintenance

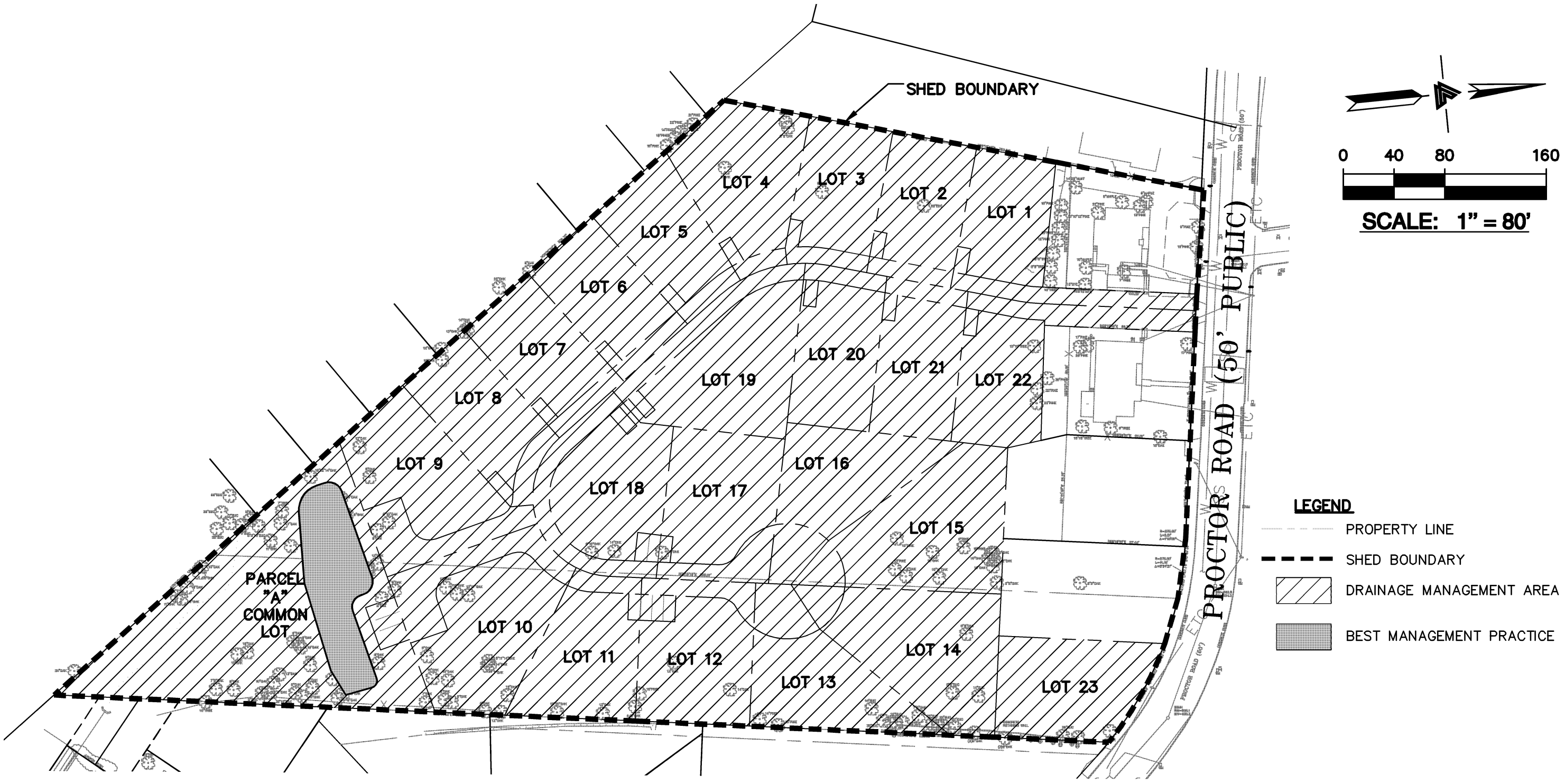
- Mow during dry weather to the extent necessary to keep vegetation down.
- Remove obstructions and trash from pond.
- The use of pesticides and quick-release synthetic fertilizers shall be minimized, and the principles of integrated pest management (IPM) followed. Check with the local jurisdiction for any local policies regarding the use of pesticides and fertilizers.
- Pond shall be inspected and maintained monthly to review:
    - Obstructions and trash.
    - Ponded flow is drained within five days after a rainfall event.
    - Condition of grasses.
    - Undesirable tree and shrub growth within the pond.
    - Condition of inlet and emergency outfall.
    - Moderate of severe low or high spots in the pond bottom. They should be graded flat.
    - Sediment accumulation.

VII. Construction Plan C.3 Checklist

Stormwater Control Plan Reference	BMP Description	Plan Sheet Number
Exhibit, and Section III.B	BMP treatments are sized as specified and designed to capture and route drainage from the areas delineated on the Exhibit 1.	
Table 1	On-site drain inlets (if any) to be marked with “No Dumping! Flows to Bay!” message.	
Table 1	Plant selection to minimize irrigation; minimize use of fertilizers and pesticides, and for pest resistance.	

VIII. Certification

The Selection, size, and preliminary design of treatment BMPs and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2003-0022.



Date 7-6-12
Scale 1" = 80'
Design By PT
Drawn By TB
Job No. 2080293

STORMWATER CONTROL PLAN

EXHIBIT 1

23 LOT SUBDIVISION – PROCTOR ROAD

CASTRO VALLEY, CA

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Bay Area Hydrology Model
PROJECT REPORT

Project Name: Proctor
Site Address: 4651 Proctor
City : Castro Valley
Report Date : 6/15/2012
Gage : NRWARK
Data Start : 1959/10/01
Data End : 2003/09/30
Precip Scale: 1.62
BAHM Version:

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C D,Grass,Flat(0-5%)	.27
C D,Grass,Mod(5-10%)	.72
C D,Grass,Ste(10-20)	2.39
C D,Grass,Very(>20%)	3.36

Impervious Land Use	Acres
Roof Area	0.08
,Flat(0-5%)	0.03

Element Flows To:

Surface	Interflow	Groundwater

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C D,Grass,Flat(0-5%)	.25
C D,Grass,Mod(5-10%)	.42
C D,Grass,Ste(10-20)	1.46
C D,Grass,Very(>20%)	2.04

Impervious Land Use	Acres						
Roads,Flat(0-5%)	0.05	,Mod(5-10%)	0.02	,Steep(10-20%)	0.64	Area	
1.33	,Flat(0-5%)	0.01	,Mod(5-10%)	0.5	,St(10-20%)	0.13	

Element Flows To:

Surface	Interflow	Groundwater
Trapezoidal Pond 1,	Trapezoidal Pond 1,	

Name : Trapezoidal Pond 1
Bottom Length: 96.4187487781752ft.
Bottom Width: 48.209374389088ft.
Depth : 4ft.
Volume at riser head : 0.3865ft.
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: 3 ft.
Riser Diameter: 18 in.
NotchType : Rectangular
Notch Width : 1.477 ft.
Notch Height: 0.072 ft.
Orifice 1 Diameter: 3.21381633184661 in. **Elevation:** 0 ft.

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

Pond Hydraulic Table

Stage(ft)	Area(acr)	Volume(acr-ft)	Dschrg(cfs)	Infilt(cfs)
0.000	0.107	0.000	0.000	0.000
0.044	0.107	0.005	0.057	0.000
0.089	0.108	0.010	0.081	0.000
0.133	0.108	0.014	0.099	0.000
0.178	0.109	0.019	0.114	0.000
0.222	0.110	0.024	0.128	0.000
0.267	0.110	0.029	0.140	0.000
0.311	0.111	0.034	0.151	0.000
0.356	0.111	0.039	0.162	0.000
0.400	0.112	0.044	0.172	0.000
0.444	0.113	0.049	0.181	0.000
0.489	0.113	0.054	0.190	0.000
0.533	0.114	0.059	0.198	0.000
0.578	0.115	0.064	0.206	0.000
0.622	0.115	0.069	0.214	0.000
0.667	0.116	0.074	0.221	0.000
0.711	0.116	0.079	0.229	0.000
0.756	0.117	0.084	0.236	0.000
0.800	0.118	0.090	0.243	0.000
0.844	0.118	0.095	0.249	0.000
0.889	0.119	0.100	0.256	0.000
0.933	0.119	0.105	0.262	0.000
0.978	0.120	0.111	0.268	0.000
1.022	0.121	0.116	0.274	0.000
1.067	0.121	0.122	0.280	0.000
1.111	0.122	0.127	0.286	0.000
1.156	0.123	0.132	0.292	0.000
1.200	0.123	0.138	0.297	0.000
1.244	0.124	0.143	0.303	0.000
1.289	0.124	0.149	0.308	0.000
1.333	0.125	0.154	0.313	0.000
1.378	0.126	0.160	0.318	0.000
1.422	0.126	0.166	0.324	0.000
1.467	0.127	0.171	0.329	0.000
1.511	0.128	0.177	0.333	0.000
1.556	0.128	0.183	0.338	0.000
1.600	0.129	0.188	0.343	0.000
1.644	0.130	0.194	0.348	0.000
1.689	0.130	0.200	0.353	0.000
1.733	0.131	0.206	0.357	0.000
1.778	0.131	0.211	0.362	0.000
1.822	0.132	0.217	0.366	0.000
1.867	0.133	0.223	0.371	0.000
1.911	0.133	0.229	0.375	0.000
1.956	0.134	0.235	0.379	0.000
2.000	0.135	0.241	0.384	0.000
2.044	0.135	0.247	0.388	0.000
2.089	0.136	0.253	0.392	0.000
2.133	0.137	0.259	0.396	0.000
2.178	0.137	0.265	0.400	0.000
2.222	0.138	0.271	0.404	0.000
2.267	0.139	0.277	0.408	0.000
2.311	0.139	0.284	0.412	0.000

2.356	0.140	0.290	0.416	0.000
2.400	0.141	0.296	0.420	0.000
2.444	0.141	0.302	0.424	0.000
2.489	0.142	0.309	0.428	0.000
2.533	0.143	0.315	0.432	0.000
2.578	0.143	0.321	0.436	0.000
2.622	0.144	0.328	0.439	0.000
2.667	0.145	0.334	0.443	0.000
2.711	0.145	0.341	0.447	0.000
2.756	0.146	0.347	0.450	0.000
2.800	0.147	0.354	0.454	0.000
2.844	0.147	0.360	0.458	0.000
2.889	0.148	0.367	0.461	0.000
2.933	0.149	0.373	0.466	0.000
2.978	0.150	0.380	0.523	0.000
3.022	0.150	0.387	0.615	0.000
3.067	0.151	0.393	0.821	0.000
3.111	0.152	0.400	1.114	0.000
3.156	0.152	0.407	1.473	0.000
3.200	0.153	0.413	1.887	0.000
3.244	0.154	0.420	2.349	0.000
3.289	0.154	0.427	2.855	0.000
3.333	0.155	0.434	3.402	0.000
3.378	0.156	0.441	3.986	0.000
3.422	0.156	0.448	4.605	0.000
3.467	0.157	0.455	5.257	0.000
3.511	0.158	0.462	5.941	0.000
3.556	0.159	0.469	6.656	0.000
3.600	0.159	0.476	7.399	0.000
3.644	0.160	0.483	8.170	0.000
3.689	0.161	0.490	8.969	0.000
3.733	0.161	0.497	9.793	0.000
3.778	0.162	0.504	10.64	0.000
3.822	0.163	0.512	11.52	0.000
3.867	0.164	0.519	12.41	0.000
3.911	0.164	0.526	13.34	0.000
3.956	0.165	0.534	14.28	0.000
4.000	0.166	0.541	15.25	0.000
4.044	0.166	0.548	16.23	0.000

MITIGATED LAND USE

ANALYSIS RESULTS

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	3.537626
5 year	5.32785
10 year	6.947631
25 year	11.379589

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0
5 year	0
10 year	0
25 year	0

Yearly Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1961	4.578	0.000
1962	4.672	0.000
1963	6.560	0.000
1964	9.594	0.000
1965	5.211	0.000
1966	2.219	0.000
1967	4.187	0.000
1968	11.267	0.000

1969	3.499	0.000
1970	5.839	0.000
1971	2.455	0.000
1972	4.250	0.000
1973	1.149	0.000
1974	6.953	0.000
1975	3.578	0.000
1976	6.008	0.000
1977	0.355	0.000
1978	0.843	0.000
1979	4.324	0.000
1980	4.556	0.000
1981	3.402	0.000
1982	1.767	0.000
1983	6.943	0.000
1984	3.779	0.000
1985	4.206	0.000
1986	2.355	0.000
1987	2.630	0.000
1988	2.078	0.000
1989	2.686	0.000
1990	1.877	0.000
1991	1.890	0.000
1992	2.481	0.000
1993	5.328	0.000
1994	3.614	0.000
1995	1.632	0.000
1996	12.280	0.000
1997	2.650	0.000
1998	3.586	0.000
1999	4.148	0.000
2000	2.143	0.000
2001	2.392	0.000
2002	1.933	0.000
2003	1.845	0.000
2004	4.008	0.000

Ranked Yearly Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	12.2795	0.0000
2	11.2671	0.0000
3	9.5938	0.0000
4	6.9532	0.0000
5	6.9432	0.0000
6	6.5602	0.0000
7	6.0075	0.0000
8	5.8385	0.0000
9	5.3279	0.0000
10	5.2111	0.0000
11	4.6724	0.0000
12	4.5775	0.0000
13	4.5558	0.0000
14	4.3242	0.0000
15	4.2496	0.0000
16	4.2065	0.0000
17	4.1867	0.0000
18	4.1483	0.0000
19	4.0078	0.0000
20	3.7788	0.0000
21	3.6142	0.0000
22	3.5864	0.0000
23	3.5778	0.0000
24	3.4992	0.0000
25	3.4017	0.0000
26	2.6856	0.0000
27	2.6501	0.0000
28	2.6295	0.0000
29	2.4814	0.0000
30	2.4549	0.0000
31	2.3918	0.0000
32	2.3554	0.0000
33	2.2190	0.0000

34	2.1425	0.0000
35	2.0783	0.0000
36	1.9326	0.0000
37	1.8899	0.0000
38	1.8765	0.0000
39	1.8448	0.0000
40	1.7671	0.0000
41	1.6322	0.0000
42	1.1492	0.0000
43	0.8428	0.0000
44	0.3549	0.0000

POC #1
The Facility PASSED

The Facility PASSED.

Flow(CFS)	Predev	Dev	Percentage	Pass/Fail
0.3538	2248	0	0	Pass
0.4204	1974	0	0	Pass
0.4870	1760	0	0	Pass
0.5536	1547	0	0	Pass
0.6202	1374	0	0	Pass
0.6868	1235	0	0	Pass
0.7534	1101	0	0	Pass
0.8200	989	0	0	Pass
0.8866	881	0	0	Pass
0.9532	796	0	0	Pass
1.0198	704	0	0	Pass
1.0864	631	0	0	Pass
1.1530	574	0	0	Pass
1.2196	529	0	0	Pass
1.2862	493	0	0	Pass
1.3528	456	0	0	Pass
1.4194	426	0	0	Pass
1.4860	386	0	0	Pass
1.5526	349	0	0	Pass
1.6193	312	0	0	Pass
1.6859	285	0	0	Pass
1.7525	251	0	0	Pass
1.8191	235	0	0	Pass
1.8857	218	0	0	Pass
1.9523	207	0	0	Pass
2.0189	189	0	0	Pass
2.0855	180	0	0	Pass
2.1521	160	0	0	Pass
2.2187	150	0	0	Pass
2.2853	145	0	0	Pass
2.3519	136	0	0	Pass
2.4185	124	0	0	Pass
2.4851	111	0	0	Pass
2.5517	103	0	0	Pass
2.6183	95	0	0	Pass
2.6849	89	0	0	Pass
2.7515	85	0	0	Pass
2.8181	81	0	0	Pass
2.8847	81	0	0	Pass
2.9513	75	0	0	Pass
3.0180	70	0	0	Pass
3.0846	68	0	0	Pass
3.1512	66	0	0	Pass
3.2178	62	0	0	Pass
3.2844	58	0	0	Pass
3.3510	55	0	0	Pass
3.4176	53	0	0	Pass
3.4842	51	0	0	Pass
3.5508	47	0	0	Pass
3.6174	42	0	0	Pass
3.6840	40	0	0	Pass
3.7506	40	0	0	Pass
3.8172	38	0	0	Pass
3.8838	37	0	0	Pass

3.9504	34	0	0	Pass
4.0170	33	0	0	Pass
4.0836	32	0	0	Pass
4.1502	30	0	0	Pass
4.2168	27	0	0	Pass
4.2834	25	0	0	Pass
4.3500	24	0	0	Pass
4.4167	24	0	0	Pass
4.4833	23	0	0	Pass
4.5499	23	0	0	Pass
4.6165	21	0	0	Pass
4.6831	19	0	0	Pass
4.7497	18	0	0	Pass
4.8163	18	0	0	Pass
4.8829	17	0	0	Pass
4.9495	16	0	0	Pass
5.0161	16	0	0	Pass
5.0827	16	0	0	Pass
5.1493	16	0	0	Pass
5.2159	14	0	0	Pass
5.2825	14	0	0	Pass
5.3491	12	0	0	Pass
5.4157	11	0	0	Pass
5.4823	11	0	0	Pass
5.5489	11	0	0	Pass
5.6155	10	0	0	Pass
5.6821	10	0	0	Pass
5.7487	9	0	0	Pass
5.8154	9	0	0	Pass
5.8820	8	0	0	Pass
5.9486	8	0	0	Pass
6.0152	7	0	0	Pass
6.0818	7	0	0	Pass
6.1484	7	0	0	Pass
6.2150	7	0	0	Pass
6.2816	7	0	0	Pass
6.3482	7	0	0	Pass
6.4148	7	0	0	Pass
6.4814	7	0	0	Pass
6.5480	7	0	0	Pass
6.6146	6	0	0	Pass
6.6812	6	0	0	Pass
6.7478	6	0	0	Pass
6.8144	6	0	0	Pass
6.8810	6	0	0	Pass
6.9476	5	0	0	Pass

Perlnd and Implnd Changes

No changes have been made.
