

# John Henry Mine Technical Information Report

March 15, 2018

Prepared for  
Pacific Coast Coal Company  
PO Box 10  
Black Diamond, WA 98010  
(360) 886 - 1060



Submitted by

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Section Tab #1

## **1. Project Overview**

The John Henry Mine property is composed of multiple parcels located for the most part in unincorporated King County, Washington (399.30 acres) with the southwest portion of the property located in the City of Black Diamond (91.34 acres), for a total property area of 490.64 acres. The property is owned by multiple entities associated with Palmer Coking Coal (PCC) and the permit mine (480 acres) is leased and permitted by Pacific Coast Coal Company (PCCC). An approximately 10 acre portion of the outlying parcels are not part of the permit boundary.

As reviewed from multiple sources listed in Section 6 of this report, the John Henry Mine is an existing open pit coal mine that started in 1986. Coal mining operations were active through 1999. Since 1999, PCCC has been conducting mine maintenance, minor reclamation activities, and water quality monitoring on the property.

A mining and reclamation plan was submitted in 2013 that proposes to resume surface coal mining operations for approximately 6 years, then complete 1 year of reclamation activity. The permit renewal and revision application to the federal permit #WA-0007D is currently being processed by the Department of Interior's Office of Surface Mining, Reclamation and Enforcement (OSMRE) to confirm that it is in compliance with National Environmental Policy Act requirements. The project also has a National Pollutant Discharge and Elimination System (NPDES) permit #WA0030830 which is currently in the process of being renewed.

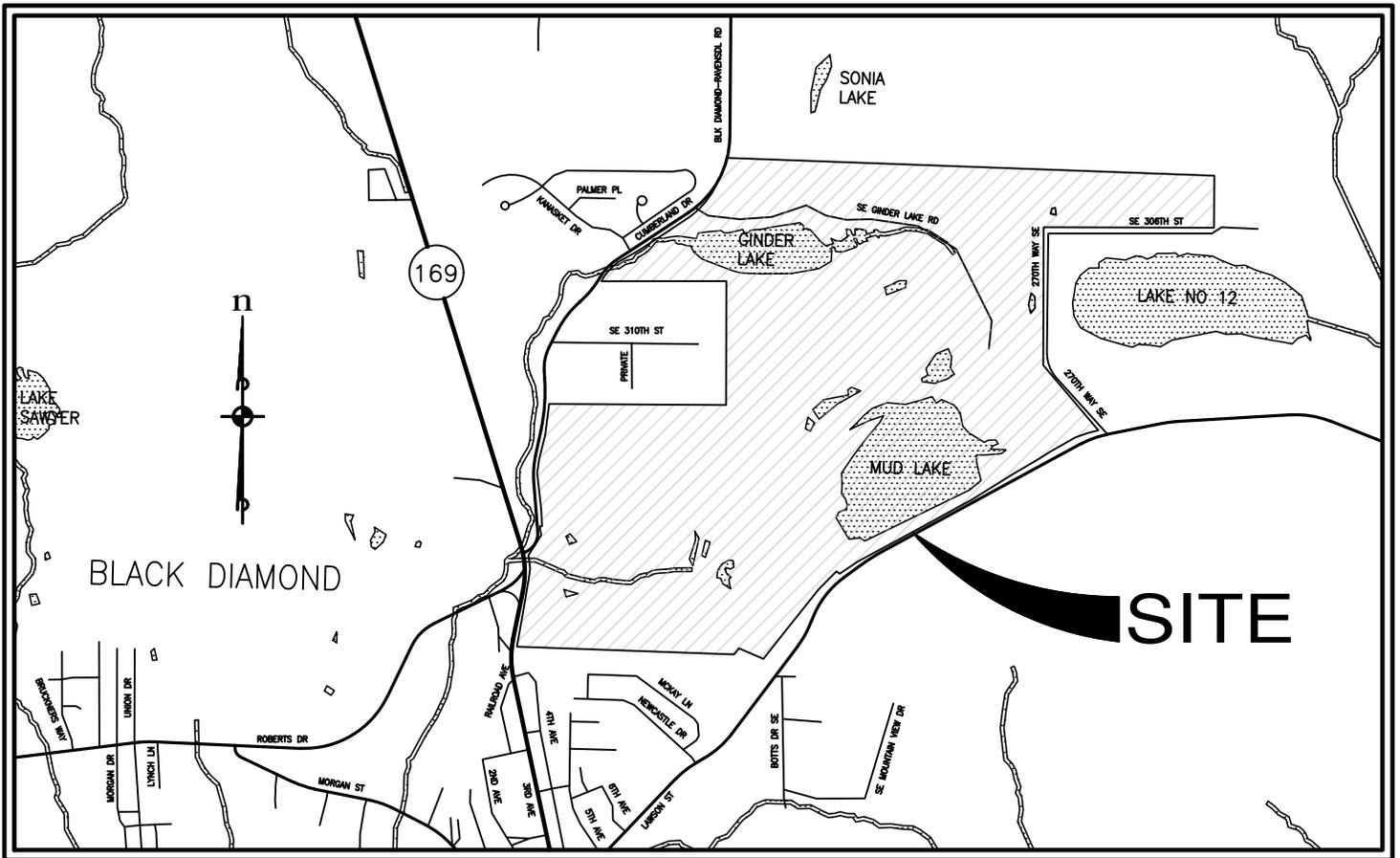
The project site also has a King County permit (GRDE15-0112), which has been extended to December 31, 2018. The permit requires a Technical Information Report (TIR) to determine if the site's current facilities meet the requirements set forth for full drainage review in the current 2016 King County Surface Water Design Manual (SWDM). The TIR also requires a mining plan that includes current facilities, shows proposed changes to those facilities and addresses the revisions of the proposed mining program.

The purpose of this TIR is to evaluate the John Henry Mine property as to how it complies with the SWDM, by reviewing pre-developed historic conditions (prior to the mine construction), future post mine (reclamation) construction conditions, as well as the existing and proposed mining activities conditions.

This TIR addresses the property elements that are in compliance, functionally equivalent, or require mitigation to comply with the requirements of the SWDM. It should be noted that this TIR does not describe in detail the intricacies of federal, state, or local permits review, approval, and extension processes as they relate to past and proposed coal mining operations. Section 6 of this report contains references to the available documentation reviewed in this TIR that can be provided to King County DPER upon request.

A Site Plan map is provided following this section showing the current facilities and the proposed mining areas (Figure 1.3). The basins for pre-developed, future, and existing/mining conditions are described in detail in Section 4 and the associated basin maps are included in Appendix A of this report.

# FIGURE 1.1 - VICINITY MAP



NOT TO SCALE



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Civil Engineering  
Public Works

Land Surveying  
Project Management

Land Planning  
Landscape Architecture

JOB NO. : 1988-001-017  
DRAWING NAME : EN-01  
DATE : 03-19-2018  
DRAWN : TMA  
SHEET 1 OF 1

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

**Part 1 PROJECT OWNER AND PROJECT ENGINEER**

Project Owner \_\_\_\_\_  
 Phone \_\_\_\_\_  
 Address \_\_\_\_\_  
 \_\_\_\_\_  
 Project Engineer \_\_\_\_\_  
 Company \_\_\_\_\_  
 Phone \_\_\_\_\_

**Part 2 PROJECT LOCATION AND DESCRIPTION**

Project Name \_\_\_\_\_  
 DPER Permit # \_\_\_\_\_  
 Location Township \_\_\_\_\_  
 Range \_\_\_\_\_  
 Section \_\_\_\_\_  
 Site Address \_\_\_\_\_  
 \_\_\_\_\_

**Part 3 TYPE OF PERMIT APPLICATION**

Landuse (e.g., Subdivision / Short Subd. / UPD)  
 Building (e.g., M/F / Commercial / SFR)  
 Clearing and Grading  
 Right-of-Way Use  
 Other \_\_\_\_\_

**Part 4 OTHER REVIEWS AND PERMITS**

DFW HPA  
 COE 404  
 DOE Dam Safety  
 FEMA Floodplain  
 COE Wetlands  
 Other \_\_\_\_\_

Shoreline Management  
 Structural Rockery/Vault/\_\_\_\_\_  
 ESA Section 7

**Part 5 PLAN AND REPORT INFORMATION**

Technical Information Report	Site Improvement Plan (Engr. Plans)
Type of Drainage Review (check one): <input type="checkbox"/> Full <input type="checkbox"/> Targeted <input type="checkbox"/> Simplified <input type="checkbox"/> Large Project <input type="checkbox"/> Directed	Plan Type (check one): <input type="checkbox"/> Full <input type="checkbox"/> Modified <input type="checkbox"/> Simplified
Date (include revision dates): _____ Date of Final: _____	Date (include revision dates): _____ Date of Final: _____

**Part 6 SWDM ADJUSTMENT APPROVALS**

Type (circle one):    Standard / Experimental / Blanket  
 Description: (include conditions in TIR Section 2)  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Approved Adjustment No. \_\_\_\_\_    Date of Approval: \_\_\_\_\_

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 7 MONITORING REQUIREMENTS

Monitoring Required: Yes / <input checked="" type="radio"/> No	Describe: _____
Start Date: _____	_____
Completion Date: _____	Re: KCSWDM Adjustment No. _____

Part 8 SITE COMMUNITY AND DRAINAGE BASIN

Community Plan : \_\_\_\_\_

Special District Overlays: \_\_\_\_\_

Drainage Basin: \_\_\_\_\_

Stormwater Requirements: \_\_\_\_\_

Part 9 ONSITE AND ADJACENT SENSITIVE AREAS

<input type="checkbox"/> River/Stream _____	<input type="checkbox"/> Steep Slope _____
<input type="checkbox"/> Lake _____	<input type="checkbox"/> Erosion Hazard _____
<input type="checkbox"/> Wetlands _____	<input type="checkbox"/> Landslide Hazard _____
<input type="checkbox"/> Closed Depression _____	<input type="checkbox"/> Coal Mine Hazard _____
<input type="checkbox"/> Floodplain _____	<input type="checkbox"/> Seismic Hazard _____
<input type="checkbox"/> Other _____	<input type="checkbox"/> Habitat Protection _____
	<input type="checkbox"/> _____

Part 10 SOILS

Soil Type	Slopes	Erosion Potential
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

High Groundwater Table (within 5 feet)       Sole Source Aquifer

Other \_\_\_\_\_       Seeps/Springs

Additional Sheets Attached

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 11 DRAINAGE DESIGN LIMITATIONS	
REFERENCE	LIMITATION / SITE CONSTRAINT
<input type="checkbox"/> Core 2 – Offsite Analysis _____	_____
<input type="checkbox"/> Sensitive/Critical Areas _____	_____
<input type="checkbox"/> SEPA _____	_____
<input type="checkbox"/> LID Infeasibility _____	_____
<input type="checkbox"/> Other _____	_____
<input type="checkbox"/> _____	_____
<input type="checkbox"/> Additional Sheets Attached	

Part 12 TIR SUMMARY SHEET (provide one TIR Summary Sheet per Threshold Discharge Area)

<b>Threshold Discharge Area:</b> (name or description)	
<b>Core Requirements (all 8 apply):</b>	
Discharge at Natural Location	Number of Natural Discharge Locations: _____
Offsite Analysis	Level: <u>1</u> 2 / 3      dated: _____
Flow Control (include facility summary sheet)	Level: 1 <u>2</u> 3    or    Exemption Number _____ Flow Control BMPs _____
Conveyance System	Spill containment located at: _____
Erosion and Sediment Control / Construction Stormwater Pollution Prevention	CSWPP/CESCL/ESC Site Supervisor: _____ Contact Phone: _____ After Hours Phone: _____
Maintenance and Operation	Responsibility (circle one): <u>Private</u> / Public If Private, Maintenance Log Required: Yes / No
Financial Guarantees and Liability	Provided:      Yes / No
Water Quality (include facility summary sheet)	Type (circle one) <u>Basic / Sens. Lake</u> / Enhanced Basic / <u>Bog</u> or      Exemption No. _____ Landscape Management Plan: Yes / No
<b>Special Requirements (as applicable):</b>	
Area Specific Drainage Requirements	Type: CDA / SDO / MDP / BP / LMP / Shared Fac. / <u>None</u> Name: _____
Floodplain/Floodway Delineation	Type (circle one): Major / Minor / Exemption / <u>None</u> 100-year Base Flood Elevation (or range): _____ Datum: _____
Flood Protection Facilities	Describe: _____

## TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Part 12 TIR SUMMARY SHEET <span style="float: right; font-weight: normal;">(provide one TIR Summary Sheet per Threshold Discharge Area)</span>	
Source Control (commercial / industrial land use)	Describe land use: Describe any structural controls:
Oil Control	High-use Site: Yes / No Treatment BMP: _____ Maintenance Agreement: Yes / No with whom? _____
<b>Other Drainage Structures</b>	
Describe:	

Part 13 EROSION AND SEDIMENT CONTROL REQUIREMENTS	
<p style="text-align: center;"><b>MINIMUM ESC REQUIREMENTS DURING CONSTRUCTION</b></p> <input type="checkbox"/> Clearing Limits <input type="checkbox"/> Cover Measures <input type="checkbox"/> Perimeter Protection <input type="checkbox"/> Traffic Area Stabilization <input type="checkbox"/> Sediment Retention <input type="checkbox"/> Surface Water Collection <input type="checkbox"/> Dewatering Control <input type="checkbox"/> Dust Control <input type="checkbox"/> Flow Control <input type="checkbox"/> Protection of Flow Control BMP Facilities (existing and proposed) <input type="checkbox"/> Maintain BMPs / Manage Project	<p style="text-align: center;"><b>MINIMUM ESC REQUIREMENTS AFTER CONSTRUCTION</b></p> <input type="checkbox"/> Stabilize exposed surfaces <input type="checkbox"/> Remove and restore Temporary ESC Facilities <input type="checkbox"/> Clean and remove all silt and debris, ensure operation of Permanent Facilities, restore operation of Flow Control BMP Facilities as necessary <input type="checkbox"/> Flag limits of SAO and open space preservation areas <input type="checkbox"/> Other _____

Part 14 STORMWATER FACILITY DESCRIPTIONS (Note: Include Facility Summary and Sketch)			
Flow Control	Type/Description	Water Quality	Type/Description
<input type="checkbox"/> Detention <input type="checkbox"/> Infiltration <input type="checkbox"/> Regional Facility <input type="checkbox"/> Shared Facility <input type="checkbox"/> Flow Control BMPs <input type="checkbox"/> Other	_____ _____ _____ _____ _____	<input type="checkbox"/> Vegetated Flowpath <input type="checkbox"/> Wetpool <input type="checkbox"/> Filtration <input type="checkbox"/> Oil Control <input type="checkbox"/> Spill Control <input type="checkbox"/> Flow Control BMPs <input type="checkbox"/> Other	_____ _____ _____ _____ _____ _____

TECHNICAL INFORMATION REPORT (TIR) WORKSHEET

Temporary

Part 15 EASEMENTS/TRACTS	Part 16 STRUCTURAL ANALYSIS
<input type="checkbox"/> Drainage Easement <input type="checkbox"/> Covenant <input checked="" type="checkbox"/> Native Growth Protection Covenant <input type="checkbox"/> Tract <input type="checkbox"/> Other _____	<input type="checkbox"/> Cast in Place Vault <input type="checkbox"/> Retaining Wall <input type="checkbox"/> Rockery > 4' High <input type="checkbox"/> Structural on Steep Slope <input type="checkbox"/> Other _____

Part 17 SIGNATURE OF PROFESSIONAL ENGINEER

I, or a civil engineer under my supervision, have visited the site. Actual site conditions as observed were incorporated into this worksheet and the attached Technical Information Report. To the best of my knowledge the information provided here is accurate.

*David W. Jones*      3/16/18

Signed/Date



Figure 1.4

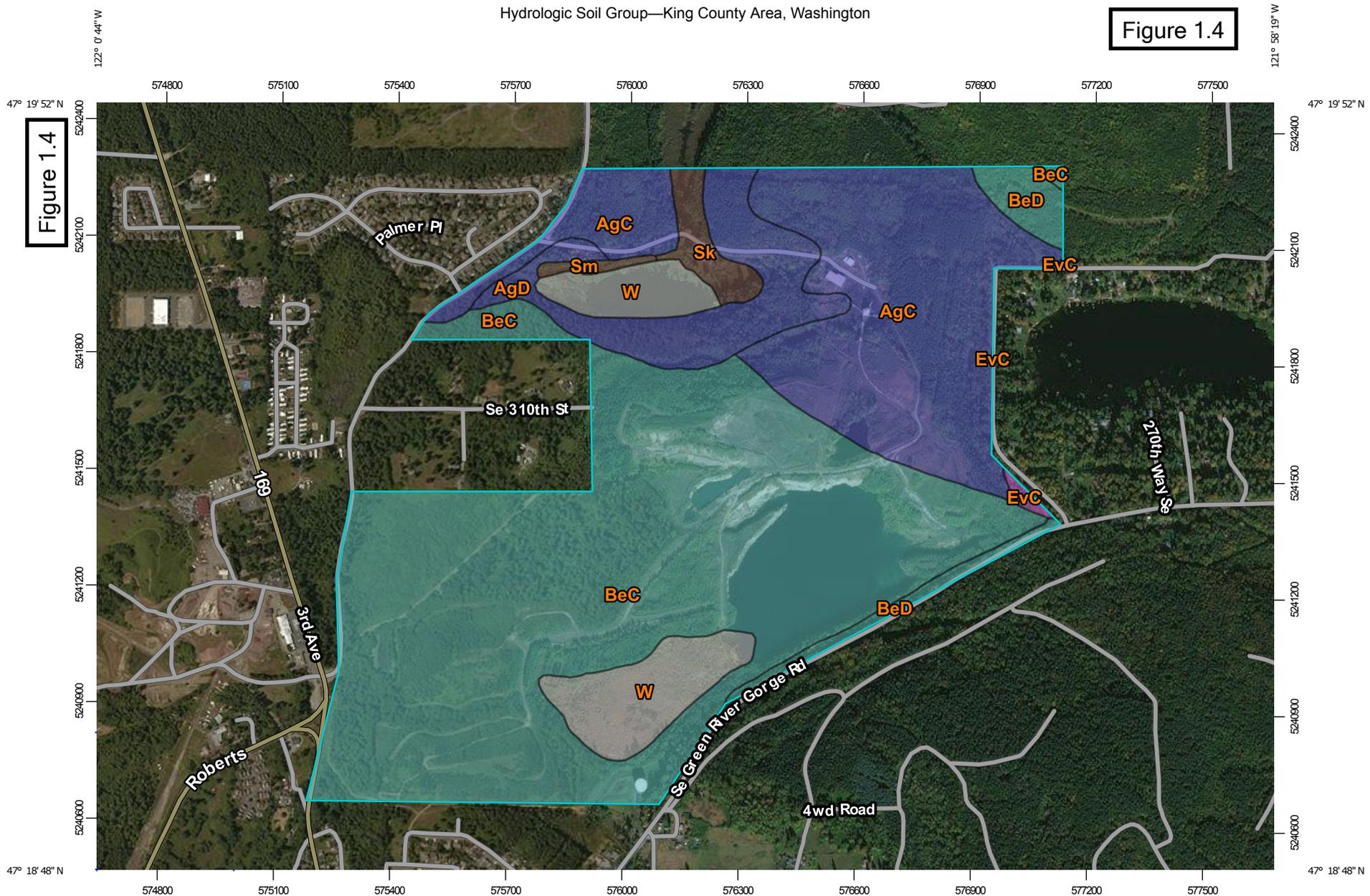


Figure 1.4

Map Scale: 1:13,900 if printed on A landscape (11" x 8.5") sheet.



**Figure 1.4**

**Figure 1.4**

**MAP LEGEND**

**Area of Interest (AOI)**

 Area of Interest (AOI)

**Soils**

**Soil Rating Polygons**

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

**Soil Rating Lines**

-  A
-  A/D
-  B
-  B/D
-  C
-  C/D
-  D
-  Not rated or not available

**Soil Rating Points**

-  A
-  A/D
-  B
-  B/D

-  C
-  C/D
-  D
-  Not rated or not available

**Water Features**

 Streams and Canals

**Transportation**

-  Rails
-  Interstate Highways
-  US Routes
-  Major Roads
-  Local Roads

**Background**

 Aerial Photography

**MAP INFORMATION**

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL:  
 Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: King County Area, Washington  
 Survey Area Data: Version 13, Sep 7, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 25, 2010—Oct 10, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AgC	Alderwood gravelly sandy loam, 8 to 15 percent slopes	B	121.5	23.7%
AgD	Alderwood gravelly sandy loam, 15 to 30 percent slopes	B	37.3	7.3%
BeC	Beausite gravelly sandy loam, 6 to 15 percent slopes	C	293.2	57.1%
BeD	Beausite gravelly sandy loam, 15 to 30 percent slopes	C	13.5	2.6%
EvC	Everett very gravelly sandy loam, 8 to 15 percent slopes	A	1.3	0.3%
Sk	Seattle muck	B/D	8.9	1.7%
Sm	Shalcar muck	B/D	2.0	0.4%
W	Water		35.7	7.0%
<b>Totals for Area of Interest</b>			<b>513.6</b>	<b>100.0%</b>

## Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

Section Tab #2

## **2. Conditions and Requirements Summary**

### **Review of the 9 Core Requirements and 5 Special Requirements**

This section describes how the property meets the SWDM Core and Special Requirements.

#### **Core Requirement No. 1 Discharge at the Natural Location**

As shown on the pre-developed historic and post mine conditions basin plan exhibits in Appendix A, the property flows to three natural locations - Mud Lake outlet channel, Ginder Lake, and Lake 12. For more information, see Section 4.

#### **Core Requirement No. 2 Off-site Analysis**

The off-site analysis has been documented in Section 3.

#### **Core Requirement No. 3 Flow Control**

The property is required to provide flow control and to release stormwater at the rate that complies with the Level 2 flow control standards, as determined by an approved hydrology model per the SWDM. The Level 2 Flow control requirement will be addressed using detention ponds. For more information, see Section 4 of this report.

#### **Core Requirement No. 4 Conveyance System**

The conveyance system is described in Section 5.

#### **Core Requirement No. 5 Erosion and Sediment Control**

Erosion and sediment controls to prevent the transport of sediment from the project site to downstream drainage facilities, water resources, and adjacent properties are described in Section 8.

#### **Core Requirement No. 6 Maintenance and Operations**

Maintenance and Operations are described in Section 10.

#### **Core Requirement No. 7 Financial Guarantees and Liability**

The financial guarantee requirements as provided in the King County Bond Quantities Worksheet are included in Section 9.

#### **Core Requirement No. 8 Water Quality**

Basic Water Quality, Sensitive Lake Protection, and Sphagnum Bog Protection Menus are required for different portions of the property. Water quality treatment is described in Section 4.

#### **Core Requirement No. 9 Flow Control BMP's**

Applicable Flow Control Best Management Practices (BMPs) are listed and discussed in Section 4.

**Special Requirement No. 1                      Other Adopted Area-Specific Requirements**

There are no known master drainage plans, basin plans, salmon conservation plans, stormwater compliance plans, flood hazard reduction plan updates, or shared facility drainage plans for this project. Special Requirement No. 1 does not apply.

**Special Requirement No. 2                      Flood Hazard Area Delineation**

The existing property and proposed mining activities are not located in a 100-year floodplain. Special Requirement No. 2 does not apply.

**Special Requirement No. 3                      Flood Protection Facilities**

The existing property and proposed mining activities are not protected by an existing flood protection facility. The proposed site improvements do not include the modification of an existing flood protection facility. Special Requirement No. 3 does not apply.

**Special Requirement No. 4                      Source Control**

The project will follow the King County Stormwater Pollution Prevention Manual and King County Code 9.12 to identify and implement source controls as needed. Source control will be implemented per Chapter III of the Federal Permit - Operation and Reclamation Plan dated May 3, 2013, provided by PCCC and referenced in Section 6 of this report.

**Special Requirement No. 5                      Oil Control**

Oil control will be implemented per Chapter III of the Federal Permit - Operation and Reclamation Plan dated May 3, 2013, provided by PCCC and referenced in Section 6 of this report.

Section Tab #3

### **3. Off-Site Analysis**

A Level 1 downstream analysis has been performed for the site.

#### **Task 1: Study Area Definition and Maps**

The study area consists of the project site and downstream flow path for runoff released from the property. Figure 1.3 shows the site plan and Figure 3.5 shows the extent of offsite analysis and the downstream flow path from the project site.

#### **Task 2: Resource Review**

##### Flow Control Map

According to the SWDM, the property is required to meet Level 2, Conservation Flow Control standards (Figure 3.3).

##### Water Quality Map

According to the SWDM, the property is required to meet Basic Water Quality, Sensitive Lake Protection, as well as Sphagnum Bog Protection Menus, depending on location. See Figure 3.4 for more information.

##### Soil Survey Map

Figure 1.4 shows the known soils on the property.

##### King County iMap

According to iMap, the project site is NOT mapped in any of the following areas:

- 100 Year Floodplains
- Seismic Hazard Areas
- Landslide Hazard Areas
- Critical Aquifer Recharge Area

##### King County iMap and the Pre-Application Conference Notes

The project site has the following areas mapped onsite and nearby:

- Coal Mine Hazard Areas
- Streams & Wetlands
- Erosion Hazard Areas
- Steep Slope Hazard Areas

See Figures 3.1 and 3.2 for more information regarding the environmental hazards near the project site.

##### Road Drainage Problems

None noted

##### Wetlands Inventory

According to iMap, the Critical Areas Review, and the 1990 King County Wetlands Inventory Notebooks, Mud Lake and Ginder Lake are considered wetlands on the property. Additional wetlands were mapped on the property by Group Four, Inc. as part of the revised Wetland Study, dated November 8, 2011, by Gresham Environmental Services.

##### Migrating River Study

None noted

### Downstream Drainage Complaints

According to iMap, there are no relevant downstream drainage complaints near the property. The onsite drainage complaints on Figure 3.1 are related to stormwater fee investigations and thus not relevant. The downstream drainage complaints on Figure 3.1 are from 1974 and 1983, so older than 10 years, and thus not relevant.

### **Task 3: Field Inspection (Level 1 Inspection)**

Two property site visits were completed by ESM Consulting Engineers, LLC in the morning of December 21, 2017 and the morning of January 16, 2018. The weather on December 21, 2017 was partly cloudy with a temperature of approximately 35°. The weather on January 16, 2018 was partly cloudy with a temperature of approximately 45°.

Onsite stormwater runoff flows were verified in the field to match existing conditions as shown on the Basin Plan Exhibit for Existing / Mining Conditions in this section.

Stormwater runoff from the property appears to flow offsite in three different natural locations: Mud Lake outlet channel, Ginder Lake, and Lake 12. Stormwater runoff from Mud Lake and Ginder Lake combine downstream (to the south), into an unnamed stream, tributary to Rock Creek (westbound) that flows to Lake Sawyer and is ultimately tributary to Covington Creek. Stormwater runoff from Lake 12 flows east to Rock Creek (eastbound) and is tributary to Cedar River. For more information, see Figure 3.5 - Downstream Analysis Flow Path in Appendix A.

A key map and photos with descriptions of key onsite features are included following this section of the report.

There did not appear to be any flooding issues over any of the roads adjacent to the property site.

### **Task 4: Drainage Description and Problem Descriptions**

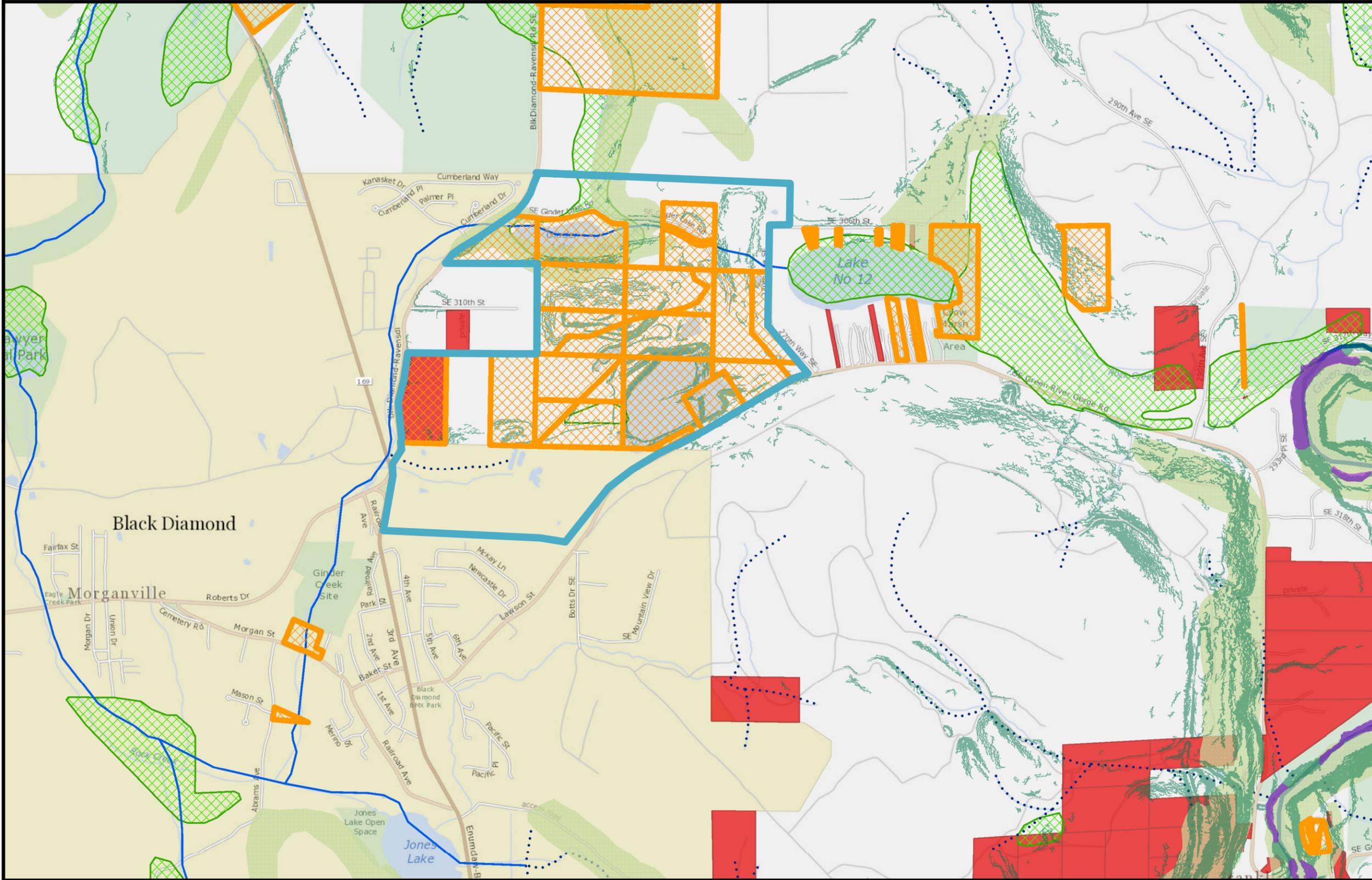
According to iMap, the portion of the property that flows to Mud Lake and Ginder Lake is in the Covington Creek (King County WRIA number: 9) drainage basin. The portion that flows to Lake 12 is in the Lower Cedar River (King County WRIA number 8) drainage basin.

No drainage problems were observed on or adjacent to the property for existing conditions.

### **Task 5: Mitigation of Existing or Potential Problems**

No existing or potential problems were observed with the existing drainage system within the scope of the downstream analysis; therefore, no further mitigation is proposed.

Figure 3.1 - Environmental Hazards & Drainage Complaints



- Legend**
- Bonded
  - Commercial-MF
  - Commercial-SF
  - Construction
  - DOT
  - FMD
  - Regional
  - Residential
  - Drainage complaints
  - Potential landslide hazard areas (2016, see explanation-->)
  - Potential steep slope hazard areas (2016, see explanation-->)
  - Erosion hazard (1990 SAO)
  - Seismic hazard (1990 SAO)
  - class 1
  - class 2 perennial
  - class 2 salmonid
  - class 3
  - unclassified
  - Wetland (1990 SAO)
  - Sensitive area notice on title

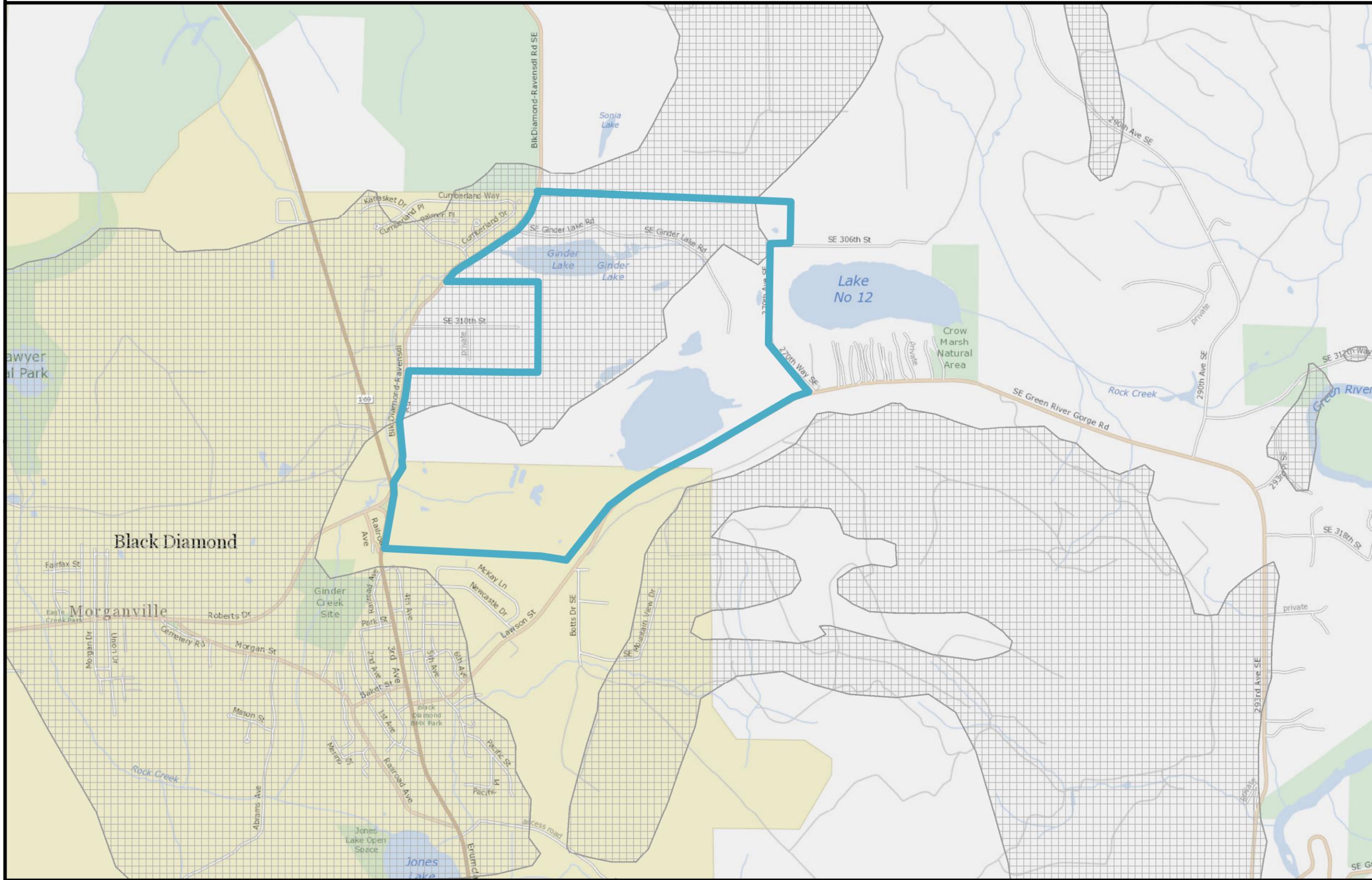
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Date: 2/1/2018

Notes:



### Figure 3.2 - Coal Hazard Area



#### Legend

Coal mine hazard (1990 SAO)

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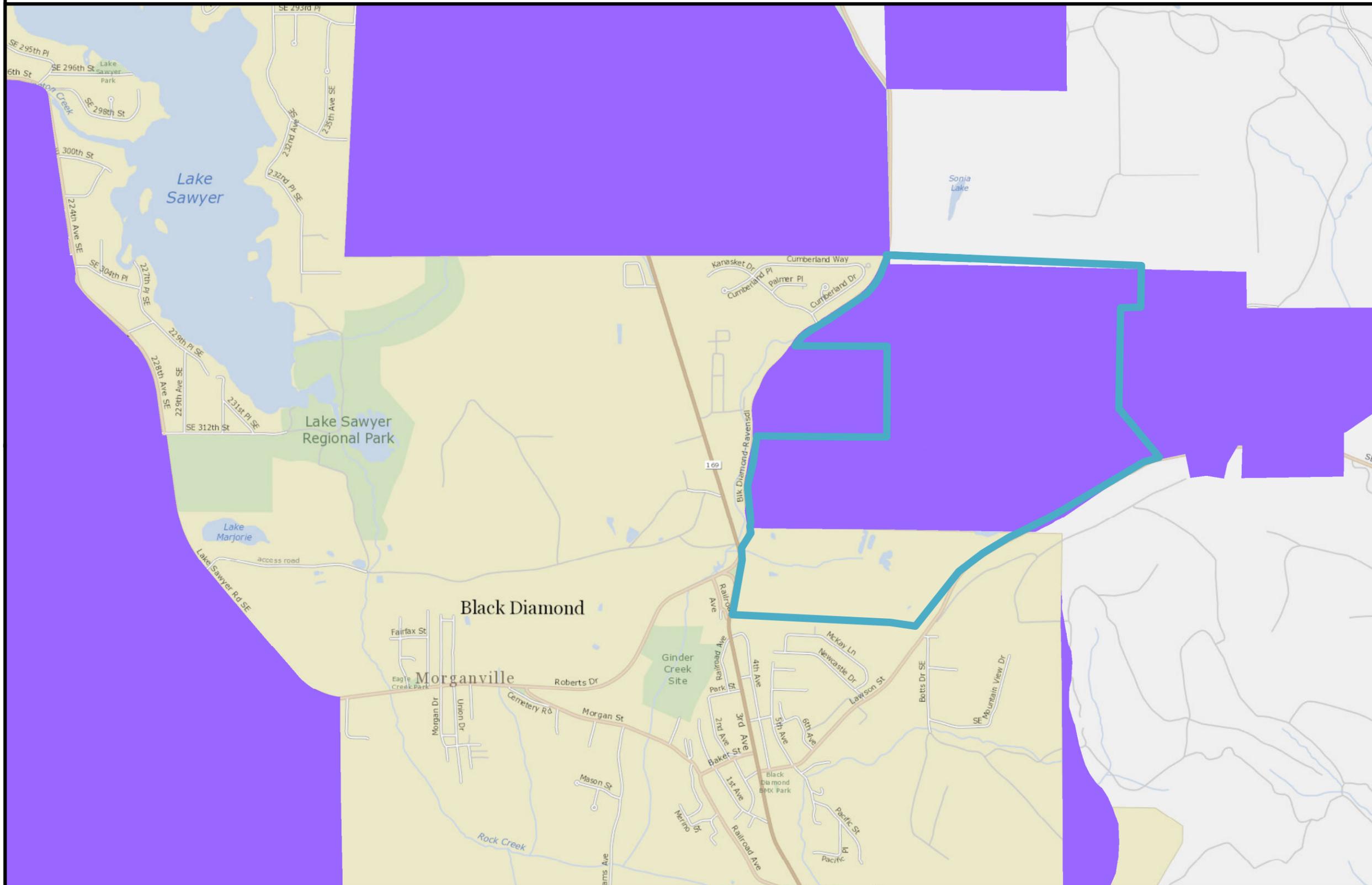
Date: 2/1/2018

Notes:



**King County**  
**GIS CENTER**

### Figure 3.3 - Detention Requirements



#### Legend

- Conservation Flow Control Standard Area

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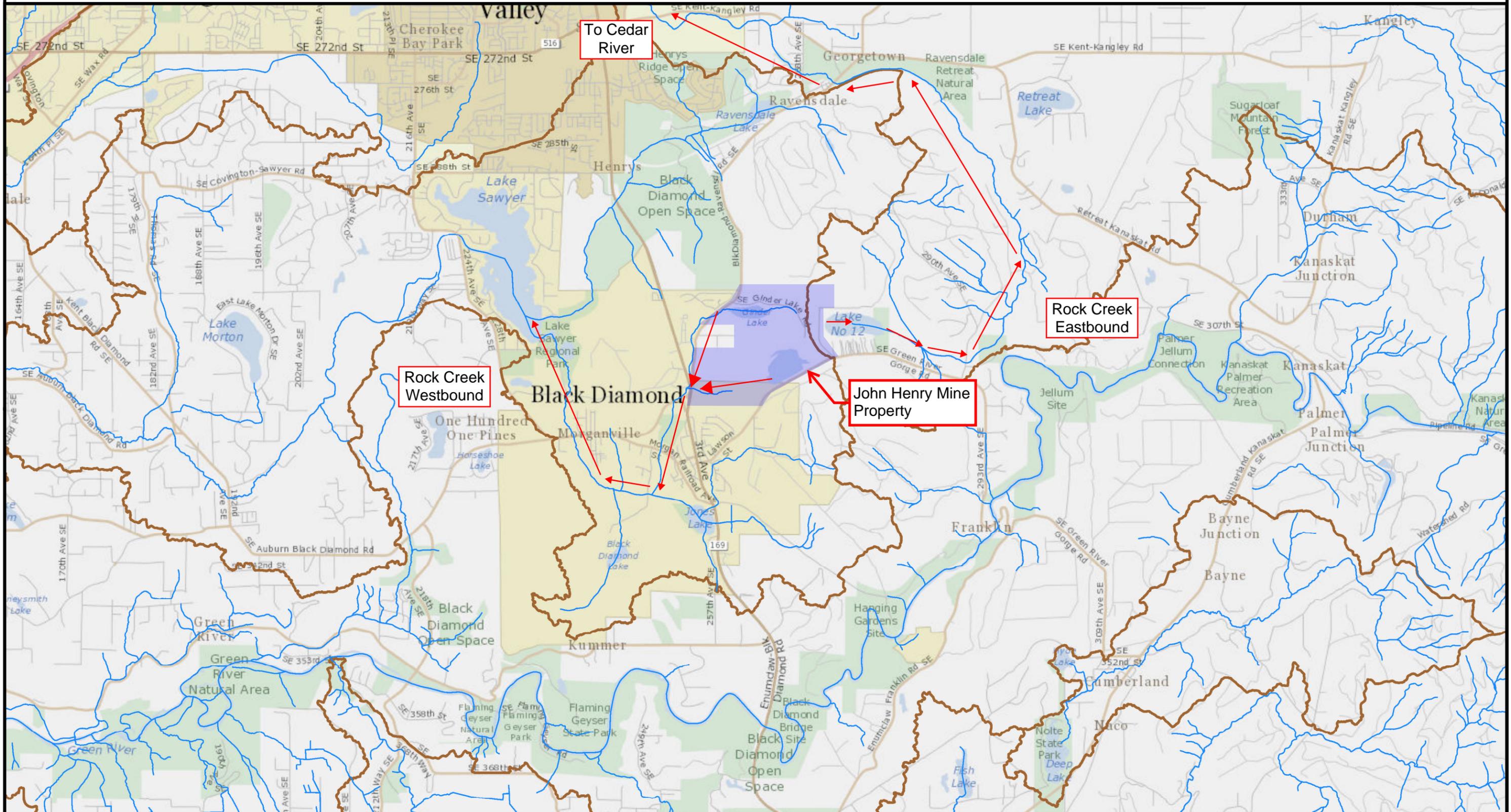
Date: 2/5/2018

Notes:





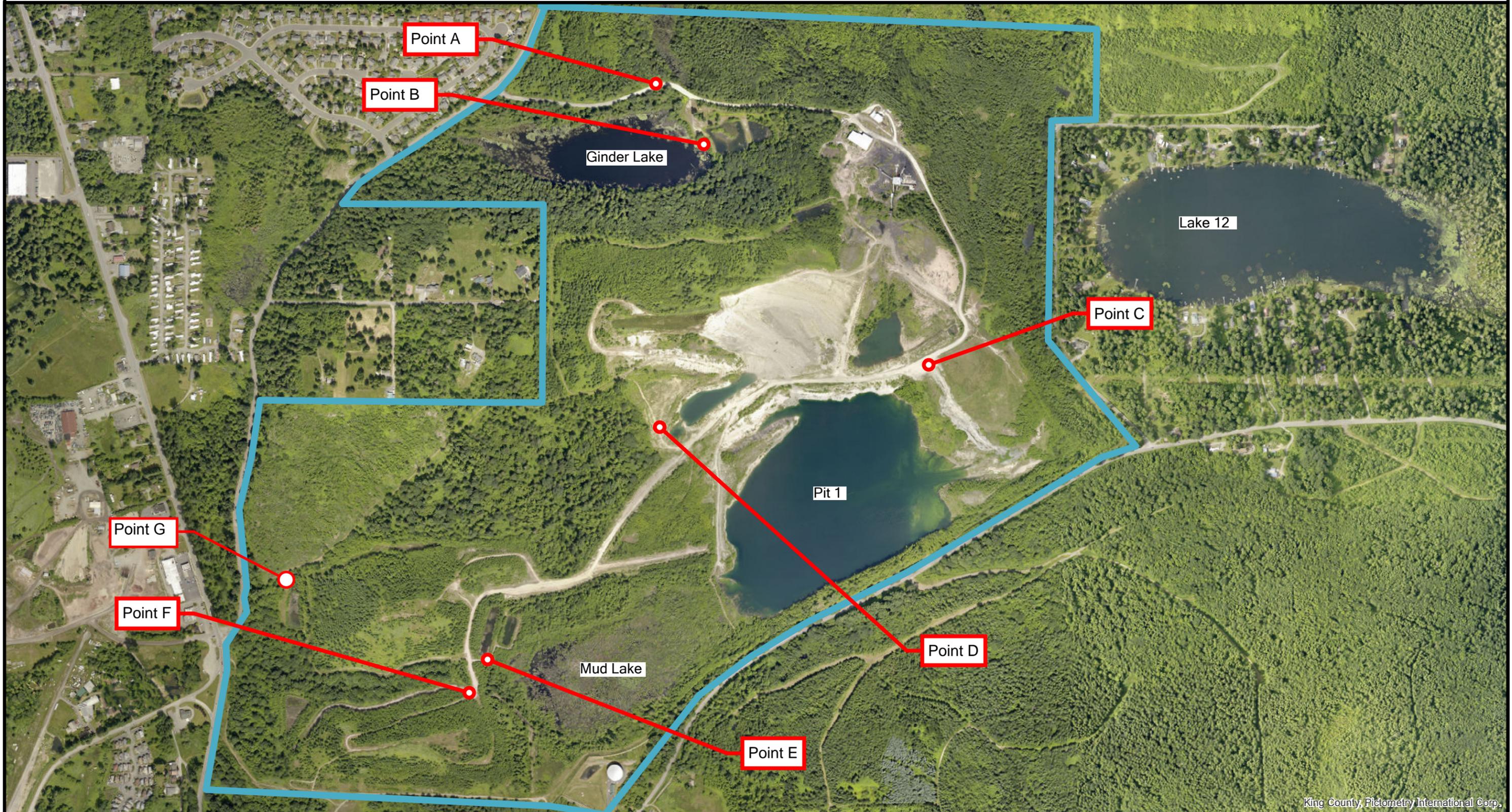
# Figure 3.5 - Downstream Analysis Flowpath



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Figure 3.6 - Photo Key Map



King County, Pictometry International Corp.

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Date: 2/7/2018

Notes:

## Spoil Pile Cover and Pit 1 Lake



**At Point A looking S at the north side of Spoil Pile 2 across Ginder Lake (not shown)**

The Spoil Pile was vegetated with fir trees as shown between the skyline and the meadow land cover across the middle of this photo. This forested cover type and density was typical of all spoil piles on the property.



**At Point C looking NW at Spoil Pile 2's SW face**

This face of Spoil Pile 2 has been partially reclaimed and runoff now flows from the top of the cleared area into Pit 2 and Pit 1. This was the only portion of any spoil pile on the property with a ground cover type other than forest.



**At Point C looking SW at the Mud Lake Dike across Pit 1**

The water in the pit lake was very clear and still.

## Pond H2, B, & I



**At Point G looking S at Pond H2 and its access road**

The vegetation of Spoil Pile 3N can be seen in the top-left of the photo. The access road and pond are heavily vegetated.



**At Point B looking E across Pond B (Cell 2) toward Spoil Pile 1**

The pond's outlet structure (Hickenbottom type) can be seen in orange near the middle of the photo. The pond itself had vegetation throughout as shown in the photo.



**At Point E looking NW across Pond I (Cell 2)**

Heavy vegetation surrounds Pond I and requires annual clearing to maintain access to the control structure.

## Typical Pond Outlet Control



At Point E looking NW at the outlet control structure for Pond I

The control structure shown is typical for all ponds other than Pond B (orange, Hickenbottom type, see Point B photo). It consists of a vertical 6" nominal schedule 40 PVC pipe with  $\frac{3}{4}$ " to 1" holes cross drilled around the perimeter every 6" along the length of the pipe.

## Typical Road Condition



### **At Point F looking NW at the Mud Lake Outlet Channel along the north side of Spoil Pile 3S**

The Spoil Pile was vegetated with fir trees and the outlet channel was covered with deciduous trees. Runoff from the spoil pile is collected at its base and directed toward Pond H1.



### **At Point D looking N toward Spoil Pile 2**

The condition of the road at this location is typical of access roads throughout the property. Ruts for the wheel tracks were separated by vegetated land cover with dense vegetation on both sides of the road.

Section Tab #4

## **4. Flow Control & Water Quality Facility Analysis and Design**

### **Stormwater Overview**

The 480 acre permit area has a unique and complex history of coal mining operations with associated documentation for permits. The available documentation listed in Section 6 was reviewed as it relates to stormwater, to provide a starting point for this Flow Control & Water Quality Facility Analysis and Design.

Stormwater runoff on the property was originally evaluated for the coal mining operations starting in 1984, including pre-developed conditions, offsite basins, coal mining operations and associated stormwater infrastructure. To mitigate for stormwater flow control and treatment and as part of the permitted coal mining operations, Pit 1, Pit 2, and eight settling ponds were constructed.

Stormwater runoff elements were then outlined in the project Operations and Reclamation Plan and the Drainage Control and Monitoring Plan from 2000 to 2013 to address permit extensions and associated federal, state, and county requirements.

The property stormwater analysis is divided into the following categories and each were reviewed in this section to verify compliance to the SWDM:

- Pre-Developed Historic Site Hydrology
- Post Mine Site Hydrology
- Existing Site Hydrology
- Proposed Mining Activities Hydrology
- Performance Standards for Existing and Mining Conditions
- Flow Control for Existing / Mining Conditions
- Water Quality for Existing / Mining Conditions
- Flow Control BMPs for Existing / Mining Conditions
- Mitigation Summary

### **Pre-Developed Historic Site Hydrology**

The 480 acre permit area was originally generally forested, and then logged for underground mine timbers. Coal mining operations started in 1986, and the topography and basin areas provided by PCCC and verified by ESM is shown on the Basin Plan Exhibit for Pre Mine Conditions in Appendix A.

Soils on the permit area are shown in Figure 1.4 - Soils Map. Topography on the property sloped naturally from the middle of the site at various slopes, ranging from 1% to 100% from approximate elevation 850 in three different natural discharge directions - Mud Lake and its associated outlet channel (elevation 650), Ginder Lake (elevation 675), and Lake 12 (elevation 725). The undisturbed basin areas are forested and have historically remained forested and undisturbed during the past coal mine operations. Mud Lake and Ginder Lake have been identified as historic waterbodies on the site. The pre-developed historic basin areas are shown in Table 4.1.

**Table 4.1 - Pre-Developed  
Historic Conditions**

<b>Basin</b>	<b>Waterbody Area (acres)</b>	<b>Forested Area (acres)</b>
Mud Lake	20	153
Mud Lake Outlet Channel	-	54
Ginder Lake	15	131
Lake 12	-	51
Undisturbed Basin Areas	-	56
<b>Total Pre-Developed Historic Basin</b>	<b>35</b>	<b>445</b>

Offsite upstream stormwater runoff also historically flows through the property to these three locations. The offsite drainage basins were provided by PCCC and verified by ESM. There are three downstream basins that total to 366 acres that have uncertainty regarding the specific flow direction. Since these areas are downstream of the property, the specific downstream offsite flow direction is not relevant to the stormwater analysis. For more information, see Table 4.2 below and the Offsite Basins Exhibit in Appendix A.

**Table 4.2 - Offsite Basins**

<b>Basin</b>	<b>Forested Area (acres)</b>
Mud Lake	61
Pit 1 / Pit 2	97
Ginder Lake	418
Lake 12	295
Downstream Basins	366
<b>Total Offsite Basin</b>	<b>1,237</b>

The total pre-developed historic basin as provided by PCCC in the Chapter III of the Federal Permit - Operation and Reclamation Plan, dated May 3, 2013, including offsite areas, is 1,706 acres and as verified by ESM is 1,717 acres (480 + 1,237 acres), which is within 1% difference.

In summary, the pre-developed historic site hydrology conditions have been reviewed and verified by ESM to comply with the analysis typically done for the SWDM.

**Post Mine Site Hydrology**

As required by the federal permit, the John Henry Mine will be reclaimed and restored to pre-developed forested conditions, following specific criteria outlined in the currently approved reclamation plan that is part of the permit documentation. The intent of the reclamation plan is to generally restore the property to historic conditions as it relates to vegetation and topography. Following are the general reclamation and restoration elements proposed as part of the permit documents:

1. The reclamation period is estimated to take 1 to 2 years.
2. Approximately 21 acres along the southwest edge of Spoil Pile 1 have been fully reclaimed.

3. A portion of the temporary Spoil Piles 1, 2, 3N, and 3S will be removed and used for backfill.
4. A portion of Pit 1 will be backfilled and reclaimed into a post-mine lake.
5. Pit 2 and the existing ponds will be backfilled in their entirety.
6. Elevation would increase from 5 to 20 feet compared to pre-developed conditions in selected areas across the mine site.
7. All disturbed land will be covered with topsoil and re-vegetated.

Soils on the permit area are estimated to be generally the same for post mine site conditions, since no soils will be hauled offsite. Topography on the permit area will vary in areas from pre-developed conditions, however, the overall vegetated site slopes ranging from 1% to 100% will continue to direct stormwater runoff to the natural discharge directions.

A portion of the existing impervious gravel and dirt roads on the property will remain and continue to be maintained to provide access and security for the property. The gravel and dirt roads will be infrequently used and will not trigger water quality requirements and will use the Full Dispersion flow control BMP into the adjacent native vegetation.

The reclamation and restoration elements have flexibility to be revised in the future, in coordination with OSMRE. The reclamation period may take 1 to 2 years, as coordinated with OSMRE. Spoil Pile 1 and portions of the other spoil piles, as well as the existing ponds may be allowed to remain, to minimize overall disturbance to the property and maintain the native vegetation that has been planted and allowed to grow since 1999. Upon completed reclamation, OSMRE will provide a final bond release.

The Basin Plan Exhibit for Post Mine Conditions is attached in Appendix A, showing basin outlines and topography as provided by PCCC with the areas summarized in Table 4.3 below.

**Table 4.3 - Post Mine Conditions**

<b>Basin</b>	<b>Forested Area (acres)</b>	<b>Access Road Area (acres)</b>	<b>Water Area (acres)</b>	<b>Total Area (acres)</b>
Pit 1 w/ Overflow to Mud Lake	66	4	36	106
Mud Lake	62	2	23	87
Mud Lake Outlet Channel	59	2	-	61
Ginder Lake	141	4	15	160
Lake 12	32	-	-	32
Undisturbed Basin Areas	34	-	-	34
<b>Total Post Mine Basin</b>	<b>393</b>	<b>12</b>	<b>74</b>	<b>480</b>

The post mine basins have been reviewed by ESM to generally match pre-developed historic conditions, sending stormwater runoff overland in the same three natural discharge directions - Mud Lake and its associated outlet channel, Ginder Lake, and Lake 12 (elevation 725).

The three differences between pre-developed historic conditions and post mine conditions consist of: 1) limited revisions to topography, 2) gravel and dirt access roads, and 3) a portion of the stormwater runoff that will collect into Pit 1 and overflow to Mud Lake. Furthermore, depending on possible future revisions to the reclamation plan, the existing ponds may remain in place, which would attenuate the peak flows leaving the site. While these are modifications from the pre-developed historic conditions, they would not result in

stormwater runoff increasing in rate or volume, and would maintain the same general drainage basin and natural discharge location. Therefore, we believe this is an acceptable option for the post mine conditions and functionally equivalent to the pre-developed historic conditions.

### Existing Site Hydrology

The existing site represents an inactive mine condition since 1999. As observed on the two site visits completed on the property, the existing site is mostly forested with some meadow areas as well as gravel and dirt access roads in various conditions.

Site topography was revised during mining to include mining facilities, gravel and dirt access roads, four spoil piles - 1, 2, 3N, and 3S, eight settling ponds - A, A', B, F, G, I, H1, H2, as well as drainage ditches and culverts that convey stormwater. The ponds were originally designed as sediment control facilities for the 10 year 24 hour SCS Type 1A storm event for the disturbed mining areas. A portion of the drainage ditches and culverts were designed to convey the peak flow from the 25 year 24 hour SCS Type 1A storm event for the disturbed mining areas. The remaining drainage ditches and culverts were constructed to direct forested undisturbed on and offsite flows around the disturbed mining areas.

Portions of the site have been replanted with trees, such as Spoil Piles 1, portion of 2, 3N and 3S, and other areas of the site, including ponds and drainage ditches, have overgrown naturally over time with native vegetation such as trees, bushes, and meadow grasses. The majority of the infrequently used gravel and dirt roads are also vegetated. For more information see Section 3 and the Basin Plan Exhibit for Existing / Mining Conditions in Appendix A. This exhibit has been combined with Mining Conditions, since existing conditions for the 480 acre permit area will remain on the site during proposed mining in the areas identified in red (total disturbed area of 27.9 acres).

The Basin Plan Exhibit for Existing / Mining Conditions shows basin outlines and topography as provided by PCCC per requirements of the federal permit. The offsite basin areas were required to be directed away from the coal mining operations, using drainage swales and culverts.

The 480 acre permit area is described in detail as part of each basin and associated sub-basins, and the areas listed in Tables 4.4 - 4.6 below.

**Table 4.4 - Existing Mud Lake Drainage Basin**

Sub-Basins	Forested Area (acres)	Meadow Area (acres)	Impervious Area* (acres)	Full Dispersion** (acres)	Water Area (acres)	Total Area (acres)
Pit 1 / Pit 2	37.3	23.6	-	4.4	40.6	105.9
Mud Lake	14.6	-	-	-	23.0	37.6
Pond I	14.7	10.3	4.1	-	0.8	29.9
Pond I (2)	1.8	-	-	0.4	-	2.2
Pond H1	21.4	-	-	2.2	0.4	24.0
Pond H2	55.2	-	-	1.0	0.4	56.6
Mud Lake Outlet Channel	17.4	-	-	0.4	-	17.8
<b>Total Existing Mud Lake Drainage Basin</b>	<b>162.4</b>	<b>33.9</b>	<b>4.1</b>	<b>8.4</b>	<b>65.2</b>	<b>274.0</b>

\*Impervious Areas include gravel and dirt roads as well as gravel areas.

\*\*Full Dispersion Areas includes gravel roads that fully disperse in native vegetation.

**Table 4.5 - Existing Ginder Lake Basin**

Sub-Basins	Forested Area (acres)	Meadow Area (acres)	Impervious Area* (acres)	Full Dispersion** (acres)	Water Area (acres)	Total Area (acres)
Pond F	27	5.4	-	-	0.4	32.8
Pond G	1.1	3.7	1.8	-	0.1	6.7
Pond B	33.4	1.7	5.0	2.0	1.5	43.6
Ginder Lake	49.4	-	-	1.0	16.5	66.9
Undisturbed Areas	24.2	-	-	-	-	24.2
<b>Total Existing Ginder Lake Drainage Basin</b>	<b>135.1</b>	<b>10.8</b>	<b>6.8</b>	<b>3.0</b>	<b>18.5</b>	<b>174.2</b>

\*Impervious Areas include gravel and dirt roads, gravel areas, and roofs.

\*\*Full Dispersion Areas includes gravel roads that fully disperse in native vegetation.

**Table 4.6 - Existing Basin**

Sub-Basins	Forested Area (acres)	Meadow Area (acres)	Impervious Area* (acres)	Full Dispersion** (acres)	Water Area (acres)	Total Area (acres)
Mud Lake	162.4	33.9	4.1	8.4	65.2	274.0
Ginder Lake	135.1	10.8	6.8	3.0	18.5	174.2
Lake 12	32.2	-	-	-	-	32.2
<b>Total Existing Basin</b>	<b>329.7</b>	<b>44.7</b>	<b>10.9</b>	<b>11.4</b>	<b>83.7</b>	<b>480.4</b>

\*Impervious Areas include gravel and dirt roads, gravel areas, and roofs.

\*\*Full Dispersion Areas includes gravel roads that fully disperse in native vegetation.

**Mud Lake Drainage Basin**

1. Pit 1 / Pit 2 - 105.9 acres

This drainage sub-basin consists of the two pits dug up during past coal mining operations that generated the four spoil piles present on the permit area. Pit 1 is a large waterbody and Pit 2 is a meadow area with some standing water that drains to Pit 1. There is an offsite upstream drainage basin to the south (Pit 1 offsite drainage basin) that is conveyed to Mud Lake in an existing drainage ditch located on the south side of Pit 1 and on the north side of SE Green River Gorge Road. Pit 1 / Pit 2 is currently pumped into Pond I approximately 8 months out of the year at a rate of 500 gallons per minute (gpm) or 1.11 cubic feet per second (cfs).

Stormwater runoff for the infrequently used roads in this sub-basin (4.4 acres) disperses fully into the adjacent native vegetation. Stormwater runoff for this drainage sub-basin has been evaluated for compliance to the SWDM for flow control, water quality, and flow control BMPs in the respective portions of this section.

This drainage sub-basin will be disturbed as part of the proposed mining activities, as described in the respective portion of this section. Furthermore, this drainage sub-basin will require reclamation and restoration elements per OSMRE, as described in the Post Mine Site Hydrology portion of this section.

2. Mud Lake - 37.6 acres

This drainage sub-basin consists mostly of undisturbed forested areas and the Mud Lake waterbody and wetland, which is surrounded by forest and heavy vegetation. There are two offsite upstream forested drainage basins flowing to Mud Lake. The Mud Lake

offsite upstream drainage basin located to the south flows directly into Mud Lake, and the Pit 1 offsite drainage basin is conveyed to Mud Lake in an existing drainage ditch located on the south side of Pit 1 and on the north side of SE Green River Gorge Road.

This drainage sub-basin and associated offsite drainage basins have not been disturbed since the property was originally logged and then forested. Stormwater runoff from the overall sub-basin will continue to flow at the same rate and volume of pre-developed historic conditions. Furthermore, this sub-basin will not be disturbed as part of proposed mining activities and is not anticipated to require reclamation.

3. Pond I - 29.9 acres and Pond I (2) - 2.2 acres

This drainage sub-basin consists of areas disturbed as part of past coal mining operations, providing the connection between Pit 1 / Pit 2 and Spoil Piles 3N and 3S. Pond I represents the majority of the drainage sub-basin located to the east and Pond I (2) represents a small forested portion of Spoil Pile 3S. Portions of this drainage sub-basin are vegetated with forest, meadow grasses, and bushes, with some dirt roads that provide access between Pit 1, Pit 2, and Pond I. Pond I overflows to the top of the Mud Lake Outlet Channel on the south side of Spoil Pile 3N.

This drainage sub-basin has Pit 1 / Pit 2 as an upstream drainage basin that is pumped into Pond I approximately 8 months out of the year at a rate of 500 gpm (1.11 cfs), and stormwater runoff for it has been evaluated for compliance to the SWDM for flow control, water quality, and flow control BMPs in the respective portions of this section.

This drainage sub-basin will be disturbed as part of proposed mining activities, as described in the respective portion of this section. Furthermore, this drainage sub-basin will require reclamation and restoration elements per OSMRE, as described in the Post Mine Site Hydrology portion of this section.

4. Pond H1 - 24 acres

This drainage sub-basin was created with the placement of Spoil Pile 3S and the associated settling Pond H1 that collects water from the majority of Spoil Pile 3S using existing drainage ditches and overflows draining to an existing drainage ditch in the Mud Lake Outlet Channel that continues under SR 169. A 2.2 acre portion of Spoil Pile 3S flows to Pond I. Spoil Pile 3S has been replanted with forest with approximately 2.2 acres of dirt roads that provide access to Pond H1.

Stormwater runoff for the infrequently used road disperses fully into the adjacent native vegetation and since most of the sub-basin is forested, and Pond H1 provides additional storage, stormwater runoff from the overall sub-basin will continue to flow at the same rate and volume of pre-developed historic conditions.

This sub-basin will not be disturbed as part of proposed mining activities, and will require reclamation and restoration elements per OSMRE, as described in the Post Mine Site Hydrology portion of this section.

5. Pond H2 - 56.6 acres

This drainage sub-basin was created with the placement of Spoil Pile 3N and the associated settling Pond H2 that collects water from Spoil Pile 3N using existing drainage ditches and overflows draining to an existing drainage ditch in the Mud Lake Outlet Channel that continues under SR 169. Spoil Pile 3N has been replanted with forest with approximately 1 acre of dirt road that provides access to Pond H2.

Stormwater runoff for the infrequently used road disperses fully into the adjacent native vegetation and since most of the sub-basin is forested, and Pond H2 provides additional storage, stormwater runoff from the overall sub-basin will continue to flow at the same rate and volume of pre-developed historic conditions.

The northern portion of this sub-basin, located in unincorporated King County will be disturbed as part of proposed mining activities, as described in the respective portion of this section. Furthermore, this drainage sub-basin will require reclamation and restoration elements per OSMRE, as described in the Post Mine Site Hydrology portion of this section.

6. Mud Lake Outlet Channel - 17.8 acres

This drainage sub-basin is mostly forested; with 0.4 acres of existing dirt road that is partially vegetated and used to provide access and security on the property. Mud Lake is located to the east and represents the upstream basin of the Mud Lake Outlet Channel, which discharges into this sub-basin using a culvert under an existing dike.

Other than the maintenance road, this drainage sub-basin has not been disturbed since the property was originally logged and then forested. Stormwater runoff for the infrequently used road disperses fully into the adjacent native vegetation and since most of the sub-basin is forested, stormwater runoff from the overall sub-basin will continue to flow at the same rate and volume of pre-developed historic conditions. Furthermore, this sub-basin will not be disturbed as part of proposed mining activities and is not anticipated to require reclamation.

Ginder Lake Drainage Basin

1. Pond F - 32.8 acres

This drainage sub-basin was created with the placement of Spoil Pile 2 and the associated settling Pond F that collects water from Spoil Pile 2 using existing drainage ditches and overflows to the existing drainage ditch between Pond G and Ginder Lake, on the south side of Pond B. Spoil Pile 2 has been mostly replanted with forest with approximately 5.4 acres of meadow grasses and bushes across the top of the pile.

This existing drainage sub-basin has no upstream drainage basins, and stormwater runoff for it has been evaluated for compliance to the SWDM for flow control, water quality, and flow control BMPs in the respective portions of this section.

This sub-basin will not be disturbed as part of proposed mining activities, and will require reclamation and restoration elements per OSMRE, as described in the Post Mine Site Hydrology portion of this section.

2. Pond G - 6.7 acres

This drainage sub-basin has been mostly disturbed as part of the past coal mining operations, including an open covered storage facility (pole barn), gravel and dirt areas adjacent to the coal processing plant, and meadow grasses. Pond G is a small one cell pond that was originally constructed as a settling pond for these disturbed / developed areas and discharges to Ginder Lake on the south side of Pond B.

This existing drainage sub-basin has no upstream drainage basins, and stormwater runoff for it has been evaluated for compliance to the SWDM for flow control, water quality, and flow control BMPs in the respective portions of this section.

While the mining facilities in this sub-basin will be used as part of proposed mining activities, no additional disturbed or developed areas are proposed, so for this drainage

sub-basin, the existing conditions will remain the same as for the proposed mining conditions. This drainage sub-basin will require reclamation and restoration elements per OSMRE, as described in the Post Mine Site Hydrology portion of this section.

3. Pond B - 43.6 acres

This drainage sub-basin is mostly forested, with a 10.2 acre portion of the sub-basin developed as part of the past coal mining operations, including SE Ginder Lake Road, the office, shop, storage, washdown station, and scale on the north side, and the coal processing plant on the south side. A 1.7 acre portion of the area disturbed in the past has been vegetated with meadow grasses. Pond B was originally constructed as a settling pond for the disturbed / developed areas and has two cells.

The northern undisturbed forested portion of the sub-basin as well as the upstream offsite drainage basin were directed using a drainage ditch around the developed portion of the site to an approximately 36 inch diameter culvert that crosses SE Ginder Lake Road and flows in to Ginder Lake.

Stormwater runoff for the infrequently used roads in this sub-basin (extension of SE Ginder Lake Road, 2 acres) disperses fully into the adjacent native vegetation. Stormwater runoff for this existing drainage sub-basin has been evaluated for compliance to the SWDM for flow control, water quality, and flow control BMPs in the respective portions of this section.

While the mining facilities in this sub-basin will be used as part of proposed mining activities, no additional disturbed or developed areas are proposed, so for this drainage sub-basin, the existing conditions will remain the same as for the proposed mining conditions. This drainage sub-basin will require reclamation and restoration elements per OSMRE, as described in the Post Mine Site Hydrology portion of this section.

4. Ginder Lake - 66.9 acres

This drainage sub-basin consists mostly of undisturbed forested areas, the Ginder Lake waterbody, which is surrounded by forest and heavy vegetation, and SE Ginder Lake Road (gravel road, with wheel wash on the north side, approximately 350 feet into the permit area). An existing drain field has been mapped approximately 650 feet into the permit area and 250 feet north/upstream of SE Ginder Lake Road. Since this area is forested, there is no visible evidence of the drain field.

There is an offsite upstream drainage basin to the north of Ginder Lake drainage basin, which includes Sonia Lake. This upstream drainage basin flows in an existing approximately 36 inch diameter culvert under SE Ginder Lake Road to Ginder Lake.

Other than the addition of SE Ginder Lake Road, these areas have not been disturbed since the property was originally logged and are forested. Stormwater runoff for the road disperses fully into the adjacent native vegetation and since most of the sub-basin is forested and contains a pre-developed historic water body, stormwater runoff from the overall sub-basin will continue to flow at the same rate and volume of pre-developed historic conditions. Furthermore, this sub-basin will not be disturbed as part of proposed mining activities and is not anticipated to require reclamation.

5. Undisturbed Areas - 24.2 acres

This sub-basin consists of undisturbed forested areas in the overall Ginder Lake drainage basin. These areas have not been disturbed since the property was originally logged and are forested. Stormwater runoff will continue to flow at the same rate and

volume of pre-developed historic conditions. This sub-basin will not be disturbed as part of proposed mining activities and is not anticipated to require reclamation.

Lake 12 Drainage Basin - Ponds A / A' - 32.2 acres

This existing forested basin is located on the east side of the permit area and consists of Spoil Pile 1 and two associated settling ponds A and A'. Spoil Pile 1 flows to Ponds A and A' via existing drainage ditches. Pond A overflows to Lake 12. The northeast corner of this drainage basin as well as a portion of the offsite basin flow to an existing drainage ditch that picks up the overflow from Pond A' and drains into Lake 12. Ponds A and A' are heavily vegetated, have been considered inactive under the project NPDES permit and require no water quality monitoring.

This basin will not be disturbed as part of proposed mining activities and is not anticipated to require any additional reclamation. As discussed in the Post Mine Site Hydrology section, Spoil Pile 1 and associated Ponds A and A' are likely to be allowed to remain, to minimize overall disturbance to the property and maintain the native vegetation that has been planted and allowed to grow since 1999.

While this basin does have modifications from the pre-developed historic conditions (revisions to topography, Ponds A / A', and drainage ditches), these elements would not result in stormwater runoff increasing in rate or volume, since the entire basin is forested, and would maintain the same general drainage basin and natural discharge location. Therefore, we believe this is an acceptable option for this basin and functionally equivalent to the pre-developed historic conditions.

**Proposed Mining Activities Hydrology**

The proposed mining activities are described in detail in Chapter III of the Federal Permit - Operation and Reclamation Plan, dated May 3, 2013, by the Pacific Coast Coal Company.

For the purposes of mitigating stormwater runoff, the proposed mining activity areas are listed in Table 4.7 below.

**Table 4.7 - Proposed Mining Activities Areas**

<b>Year (Impacted Drainage Basin)</b>	<b>Disturbed Mining Area (acres)</b>
2018 (Pond I and Pond H2)	3.5
2019 (Pit 1/ Pit 2, Pond I and Pond H2)	2.9
2020 (Pit 1/Pit 2, Pond I and Pond H2)	5.9
2021 (Pond I and Pond H2)	5.6
2022 (Pond H2)	5.2
2023 (Pond H2)	4.8
<b>Total Proposed Mining Activities Basin</b>	<b>27.9</b>

The proposed mining activity areas have also been shown Basin Plan Exhibit for Existing / Mining Conditions in Appendix A and include an additional already disturbed 7.2 acres of area for 2018 - 2020.

Following are the general parameters to be used for the proposed mining activities:

1. The proposed mining activities would progress from east to west, first mining the areas on the north end of the Pond I drainage sub-basin and using the material to backfill the western edges of Pit 1.

2. The mining areas would take the shape of pits that would also act as settling ponds that would then be pumped into Pit 1 for water quality and detention storage.
3. Pit 1 will be partially pumped down to prevent discharge into Mud Lake while placing and compacting fill around the western perimeter.
4. As mining activities continue over the years to the west, once the portion of Pit 1 is backfilled the previous year pits would be also backfilled and vegetated.
5. No mining activities are proposed for the parcels located in Black Diamond, only reclamation.
6. No additional mining facilities are proposed. The coal mined from the pits will be processed at the existing coal plant, and the excess soil material placed on the western edges of Pit 1. The existing coal processing plant is a closed circuit plant with no discharge to stormwater.

**Mud Lake Drainage Basin**

1. Pit 1 / Pit 2 - 133.2 acres

The proposed mining activities will disturb 27.9 acres of vegetated area and access roads across the Pit 1 / Pit 2, Pond I, and Pond H2 sub-basins. To minimize impact to Ponds I and H2, the stormwater runoff from this disturbed area will be collected in Pit 2 during mining activities and will be pumped to Pit 1 for water quality treatment and detention. Pit 1 will continue to discharge to Mud Lake using one to two pumps for a maximum total pumping rate of 1,000 gpm (2.22 cfs), which is less than 50% of the 2-year pre-developed peak flow rate of 5.31 cfs.

Stormwater runoff for the infrequently used roads in this sub-basin (4.4 acres) will continue to disperse fully into the adjacent native vegetation during the proposed mining activities.

2. Pond I - 15.5 acres and Pond I (2) - 2.2 acres

This drainage sub-basin is reduced in size for the proposed mining activities (from 29.9 to 15.5 acres), since a portion of the stormwater runoff from this basin will be pumped to Pit 1, however the overall natural discharge location remains Mud Lake.

3. Pond H2 - 43.7 acres

This drainage sub-basin is reduced in size for the proposed mining activities (from 56.6 to 43.7 acres), since a portion of the stormwater runoff from this basin will be pumped to Pit 1, however the overall natural discharge location remains Mud Lake.

Table 4.8 shows the drainage sub-basins that will be impacted by the proposed mining activities.

**Table 4.8 - Proposed Mining Activities Drainage Basin**

Sub-Basins	Forested Area (acres)	Meadow Area (acres)	Impervious Area* (acres)	Full Dispersion** (acres)	Water Area (acres)	Total Area (acres)
Pit 1 / Pit 2	37.3	23.0	27.9	4.4	40.6	133.2
Pond I	4.7	7.9	2.1	-	0.8	15.5
Pond I (2)	1.8	-	-	0.4	-	2.2
Pond H2	42.3	-	-	1.0	0.4	43.7
<b>Total Proposed Mining Activities Drainage Basin</b>	<b>86.1</b>	<b>30.9</b>	<b>30.0</b>	<b>5.8</b>	<b>41.8</b>	<b>194.6</b>

\*Impervious Areas include gravel and dirt roads as well as gravel areas.

\*\*Full Dispersion Areas includes gravel roads that fully disperse in native vegetation.

The remaining drainage sub-basins in the Mud Lake Drainage basin will not be disturbed as part of the proposed mining activities.

#### Ginder Lake Drainage Basin

As described in the Existing Site Conditions portion of this section, while the mining facilities in this basin will be used as part of proposed mining activities, no additional disturbed or developed areas are proposed, so for this drainage basin, the existing conditions will remain the same as for the proposed mining conditions.

#### Lake 12 Drainage Basin - Ponds A / A' - 32.2 acres

As described in the Existing Site Conditions portion of this section, this basin will not be disturbed as part of proposed mining activities.

#### **Performance Standards for Existing and Mining Conditions**

Stormwater systems onsite are to be designed to mitigate runoff generated from the project per the requirements of the SWDM. The facility sizes are required to be determined by an approved hydrology model per the SWDM. The approved hydrology model used to size the stormwater detention and water quality facilities was the 2012 Western Washington Hydrology Model (WWHM).

Conservation flow control requirements will be met by using the existing available live storage in the settling ponds for both existing conditions and proposed mining activities. The settling ponds will no longer be used for sediment control, because the limited disturbed area for the proposed mining activities will use the pits for sediment settling. Clean runoff will then be pumped from the pits to the original respective settling ponds. For more information, see each relevant sub-basin in this section under Flow Control System.

Based on the location of the permit area, the project is required to comply with conservation flow control standards as well as Basic Water Quality, Sphagnum Bog Protection, and Sensitive Lake Protection Menus. Since the permit area is currently inactive, and no pollution generating activities are taking place, other than infrequent use of roads for maintenance, water quality requirements apply only to the proposed mining activities.

The Basic Water Quality Menu is required for the portion of the permit area in the Lake 12 Drainage Basin. Since this basin will not be disturbed and remain forested, water quality treatment is not required; therefore the basic water quality portion of the permit area is not applicable.

The Sphagnum Bog Protection Menu is required for the portion of the permit area in the Ginder Lake Drainage Basin that appears to be associated with Sonia Lake. Since this basin will not be disturbed and remain forested, water quality treatment is not required; therefore the bog water quality portion of the permit area is not applicable.

The Sensitive Lake Protection Menu is required for the remainder (majority) of the permit area. Per Section 6.1.3 of the SWDM, 4 options are available for Sensitive Lake water quality treatment. Lake Protection Option 4 allows earning credits for integrating land use and site design measures to prevent or reduce the levels of phosphorus leaving the site. The applicable credits to the permit area consists of leaving at least 65% of the site undisturbed, including undevelopable land, as well as directing road runoff to pervious non-pollution-generating vegetated areas.

The permit area will remain at approximately 90% undisturbed as evaluated for the proposed mining conditions (27.9 acres additional disturbed area + 10.9 acres existing impervious

area + 11.4 acres fully dispersed existing impervious area = 50.2 / 480.4 = 10% total disturbed area). Several of the existing infrequently used roads will be dispersed fully into adjacent native vegetation, so additional credit could be available, if needed. The 10 points of credit attained excuse the permit area from the requirement to provide a second water quality facility in a two facility treatment train. As required, a temporary covenant will be provided to protect the vegetated tracts from disturbance during the proposed mining activities. The covenant would then be re-evaluated as part of the future reclamation activities.

Furthermore, per Section 1.2.8.1 of the SWDM, if 50% or more of the runoff that drains to any proposed water quality facility is from an industrial land use, the Enhanced Basic Water Quality Menu has to be applied. Due to the size of each sub-basin, and the limited area to be disturbed during the proposed mining activities, this requirement is not anticipated to be applicable and is further verified in this section under Water Quality System.

In summary, water quality treatment will be provided using basic wetponds for the applicable sub-basins. These wetponds will use the dead storage available in the original settling ponds. The settling ponds will no longer be used for sediment control, because the limited disturbed area for the proposed mining activities will use the pits for sediment settling. For more information, see each relevant sub-basin in this section under Water Quality System.

**Flow Control System**

Conservation flow control has been evaluated using WWHM for the following sub-basins during existing conditions and for the proposed mining activities.

Mud Lake Drainage Basin - Existing Conditions

4. Pit 1 / Pit 2 - 105.9 acres  
As described in this section under Existing Site Hydrology, this drainage basin is currently pumped at a rate of 1.11 cfs, which is less than 50% of the 2-year pre-developed forested condition flow rate of 4.18 cfs for this basin.
5. Pond I - 29.9 acres and Pond I (2) - 2.2 acres

Ginder Lake Drainage Basin - Existing Conditions

1. Pond F - 32.8 acres
2. Pond G - 6.7 acres
3. Pond B - 43.6 acres

Table 4.9 below provides the available volumes for existing conditions that adequately meet the conservation flow control requirement.

**Table 4.9 - Existing Conditions Detention Volume**

Conservation Flow Control	Pit 1 / Pit 2 ( cu ft )	Pond I ( cu ft )	Pond F ( cu ft )	Pond G ( cu ft )	Pond B ( cu ft )
Available	1,768,536*	258,707	173,954	64,693	271,011

\*Estimated conservatively at 1 foot depth at the general existing water level (40.6 acres).

Mud Lake Drainage Basin - Proposed Mining Activities

1. Pit 1 / Pit 2 - 133.2 acres  
Stormwater will be pumped into Pit 1 and then discharged to Mud Lake using one to two pumps for a maximum total pumping rate of 2.22 cfs, which remains less than 50% of the 2-year pre-developed peak flow rate of 5.31 cfs.
2. Pond I - 15.5 acres and Pond I (2) - 2.2 acres
3. Pond H2 - 43.7 acres

Table 4.10 below provides the available volumes for proposed mining activities that adequately meet the conservation flow control requirement.

**Table 4.10 - Proposed Mining Activities Detention Volume**

Conservation Flow Control	Pit 1 / Pit 2 ( cu ft )	Pond I ( cu ft )	Pond H2 ( cu ft )
Available	1,568,160*	258,707	229,206

\*Estimated conservatively at 1 foot depth at the general post mining conditions water level (36 acres).

The WWHM input was calculated based on existing and proposed mining activities sub-basin areas, respectively. The available volume was calculated based on the live storage of the pond as-built information provided in Appendix B (minimum water level / maximum sediment storage up to maximum water level).

The WWHM output for each sub-basin is provided in Appendix C and shows that each facility passes the conservation flow control standard. Since WWHM does not provide an option for a Hickenbottom type control structure, a standard orifice structure was used for each pond. A comparison chart was provided for each pond in Appendix B, to ensure that the Hickenbottom type control structure is functionally equivalent to a standard control structure. Pond G is estimated to be over-drained by the existing control structure, so providing a new control structure or pumping to Pond F for additional live storage of 173,954 cubic feet is recommended in this section under Mitigation Summary.

As described in this section under Existing Site Hydrology, the remaining basins and associated sub-basins are forested and functionally equivalent to pre-developed historic conditions.

**Water Quality System**

Water quality has been evaluated using WWHM for the following sub-basins for the proposed mining activities.

Mud Lake Drainage Basin

1. Pit 1 / Pit 2 - 133.2 acres
2. Pond I - 15.5 acres and Pond I (2) - 2.2 acres

Ginder Lake Drainage Basin - Existing Conditions

2. Pond G - 6.7 acres

This drainage sub-basin will not have additional disturbed or developed areas as part of the proposed mining activities but it will be used for coal processing and thus trigger water quality requirements. At most, 27% of the sub-basin (calculated using the impervious area divided by the total sub-basin area) and associated stormwater runoff will come from the industrial use, and since this is below the 50% threshold, this sub-basin does not require the use of the Enhanced Basic Water Quality Menu.

3. Pond B - 43.6 acres

This drainage sub-basin will not have additional disturbed or developed areas as part of the proposed mining activities but it will be used for coal processing and thus trigger water quality requirements. At most, 16% of the sub-basin (calculated using the impervious area divided by the total sub-basin area) and associated stormwater runoff will come from the industrial use, and since this is below the 50% threshold, this sub-basin does not require the use of the Enhanced Basic Water Quality Menu.

Table 4.11 provides the available volumes for proposed mining activities that adequately meet the basic water quality treatment requirement.

**Table 4.11 - Proposed Mining Activities Water Quality Volume**

<b>Basic Water Quality</b>	<b>Pit 1 / Pit 2 ( cu ft )</b>	<b>Pond I ( cu ft )</b>	<b>Pond G ( cu ft )</b>	<b>Pond B ( cfs )</b>
Required	499,546	43,190	20,904*	100,658
Available	Unlimited	72,634	17,403	109,396

\*Pond G will be over-excavated to provide additional water quality storage or will be pumped to Pond F, which has 72,150 cubic feet of water quality storage available is recommended in this section under Mitigation Summary.

As described in this section under Existing Site Hydrology, the remaining basins will not be used or disturbed as part of the proposed mining activities, and do not trigger water quality requirements.

### **Flow Control BMPs**

Flow control BMPs were evaluated for the property and the proposed mining activities as outlined in the SWDM under Section 1.2.9.2.2 - Large Lot BMP Requirements. These BMP's are described in order of precedence below with feasibility determined and the portion of applicable area credited as mitigated should be no less than 20% of the target impervious area. The total target impervious area for existing conditions is 22.3 acres and the total target impervious area for proposed mining activities is 50.2 acres. Therefore, the minimum requirement for applicable area credited as mitigated is 10 acres (50.2 acres x 20%).

### Full Dispersion

As described above in this section, under Existing Site Hydrology, the majority of the infrequently used roads that provide access and security on the property disperse fully into the adjacent native vegetation, with a flow path of at least 100 feet. The estimated calculated total acreage for these roads is 5 acres as present in the sub-basins for Mud Lake, Pond I(2), Pond H1, H2, and Ginder Lake and portions of the sub-basins for Pit 1 / Pit 2 and Pond B (6.4 acres), for a total of 11.4 acres, which exceeds the minimum requirement for applicable area credited as mitigated.

### Full Infiltration

Based on coordination with PCCC and Figure 1.4 - Soils Map, the property does not infiltrate stormwater, and this BMP is not feasible.

### Limited Infiltration

As described above, in the Full Infiltration BMP, infiltration is not feasible for the property.

### Bioretention

Bioretention could be feasible on the project site, however, this flow control BMP would be removed as part of the future reclamation plan on the property and not necessary since the project site meets the Full Dispersion BMP requirements as applicable for the entire site.

### Permeable Pavement

The proposed mining activities do not require pavement, therefore, this BMP is not applicable.

### Basic Dispersion

As discussed above, the project site meets the BMP requirements through full dispersion.

If the impervious area credited as mitigated is less than the threshold specified in Flow Control BMPs above, then (according to Section 1.2.9.2.2.5 of the SWDM) a fee in lieu must be paid OR one or more the following BMPs must be implemented to achieve compliance:

### Reduced Impervious Surface Credit

The proposed mining activities do not require new impervious surfaces; therefore, this BMP is not applicable.

### Native Growth Retention Credit

This BMP could be feasible on the project site, considering the large amount of existing and remaining undisturbed forested area, as well as the future reclamation plan that restores the entire permit area to forest. Furthermore, as described above, this BMP is not necessary since the project site meets the Full Dispersion BMP requirements as applicable for the entire site.

### Soil Amendment Minimum Requirement #6

Soils on the project site will be amended as part of the future reclamation plan as described in Chapter III of the Federal Permit - Operation and Reclamation Plan dated May 3, 2013, provided by PCCC and referenced in Section 6 of this report.

### Roof Downspout Minimum Requirement #7

The proposed mining activities do not require new roof surfaces; therefore, this BMP is not applicable.

In summary, the project site will implement the Full Dispersion Flow Control BMP. If the impervious area credited as mitigated is revised during the proposed mining activities and determined not sufficient, a fee in lieu will be paid, or the Native Growth Retention Credit will be implemented. The project will also amend soils as part of the future reclamation plan.

## **Mitigation Summary**

Overall, the site meets the SWDM stormwater requirements with three mitigation elements proposed for flow control and water quality:

1. Pond G mitigation for flow control and water quality can be completed using one of two options: 1) Pond G will be over-excavated to provide additional water quality storage and a new riser structure will be provided to limit outlet flows, or 2) Pump G will be pumped to Pond F for both water quality and detention storage available.
2. For the proposed mining activities, flow control and water quality mitigation consists of pumping stormwater from the disturbed mining areas to Pit 1 which is sufficiently sized to accommodate both detention and water quality requirements.
3. The Sensitive Lake Protection Menu will be reduced to the Basic Water Quality Menu by leaving approximately 90% undisturbed area. As required, a temporary covenant will be provided to protect the vegetated tracts from disturbance during the proposed mining activities. The covenant would then be re-evaluated as part of the future reclamation activities.

Section Tab #5

## **5. Conveyance System Analysis and Design**

Runoff from the various sub-basins will continue to flow using existing drainage ditches and culverts, which have been designed to convey the peak flow from the 25 year 24 hour SCS Type 1A storm event for the disturbed mining areas.

The existing drainage ditches and culverts are estimated to have adequate capacity to continue to convey stormwater runoff based on the following parameters:

1. Most of the original disturbed areas have been re-vegetated and forested,
2. No flooding has been observed on or offsite during existing conditions, and
3. The proposed mining activities only disturb a limited portion of the permit area.

Section Tab #6

## **6. Special Reports and Studies**

Following is a list of relevant documents reviewed and referenced in this report that can be provided to King County DPER upon request.

1. Permit Revision Package Volume IV of V, Chapters VI (Hydrology) and VII (Soil Resources) dated September 2000, by the Pacific Coast Coal Company.
2. Appendix VI-9 - Drainage and Sedimentation Control Plan, dated July 30, 2010, by the Pacific Coast Coal Company.
3. Revised Wetland Study, dated November 8, 2011, by Gresham Environmental Services.
4. Chapter III of the Federal Permit - Operation and Reclamation Plan, dated May 3, 2013, by the Pacific Coast Coal Company.
5. Periodic Review Report and Decision, dated December 24, 2014, by King County DPER.
6. Drainage Control and Monitoring Plan, dated November 5, 2015, by the Pacific Coast Coal Company.
7. Revision Application and Renewal of Permit WA-0007D Finding of No Significant Impact, dated September 2017, by the United States Department of the Interior Office of Surface Mining Reclamation and Enforcement.
8. Environmental Assessment and Appendices Proposed Revision and Renewal of Permit WA-0007D, dated September 2017, by the Office of Surface Mining Reclamation and Enforcement Western Region.
9. Permit Requirements Letter, dated October 26, 2017, by King County DPER.

Section Tab #7

## **7. Other Permits**

The property has a mining permit renewal and revision application through OSMRE in process.

The property also has a King County Grading Permit (GRDE15-0112) that has been extended to December 31, 2018 and an NPDES permit in the process of being renewed.

Section Tab #8

## **8. ESC Analysis and Design**

PCCC maintains a Stormwater Pollution Prevention Plan (SWPPP) associated with the existing NPDES permit that is currently in the process of being renewed. Conditions of the permit specify erosion control measures that will be used during mining activities, as approved through the mining renewal revision application by OSMRE.

Section Tab #9

## **9. Bond Quantities, Facility Summaries, and Declaration of Covenant**

Bond Quantities, Facility Summaries, and Declaration of Covenant will be coordinated with King County DPER as applicable to the property.

Section Tab #10

## **10. Operations and Maintenance**

Operations and maintenance for the property will continue to be completed by PCCC as required by the permit documents reviewed and approved by OSMRE. The overall operations and maintenance manual for the property is Appendix VI-9, "Drainage and Sedimentation Control Plan", which contains pond as-builts and the original flow/sizing calculations. More specifically, Section 3.0 contains the Operations Plan.

Operations and Maintenance excerpts from the SWDM that apply to the existing combined detention and water quality ponds, conveyance pipes and ditches, and access roads are attached following this section.

<b>NO. 1 – DETENTION PONDS</b>			
<b>Maintenance Component</b>	<b>Defect or Problem</b>	<b>Conditions When Maintenance Is Needed</b>	<b>Results Expected When Maintenance Is Performed</b>
Site	Trash and debris	Any trash and debris which exceed 1 cubic foot per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size office garbage can). In general, there should be no visual evidence of dumping.	Trash and debris cleared from site.
	Noxious weeds	Any noxious or nuisance vegetation which may constitute a hazard to County personnel or the public.	Noxious and nuisance vegetation removed according to applicable regulations. No danger of noxious vegetation where County personnel or the public might normally be.
	Contaminants and pollution	Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint.	Materials removed and disposed of according to applicable regulations. Source control BMPs implemented if appropriate. No contaminants present other than a surface oil film.
	Grass/groundcover	Grass or groundcover exceeds 18 inches in height.	Grass or groundcover mowed to a height no greater than 6 inches.
Top or Side Slopes of Dam, Berm or Embankment	Rodent holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents removed or destroyed and dam or berm repaired.
	Tree growth	Tree growth threatens integrity of slopes, does not allow maintenance access, or interferes with maintenance activity. If trees are not a threat or not interfering with access or maintenance, they do not need to be removed.	Trees do not hinder facility performance or maintenance activities.
	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted slope.	Slopes stabilized using appropriate erosion control measures. If erosion is occurring on compacted slope, a licensed civil engineer should be consulted to resolve source of erosion.
	Settlement	Any part of a dam, berm or embankment that has settled 4 inches lower than the design elevation.	Top or side slope restored to design dimensions. If settlement is significant, a licensed civil engineer should be consulted to determine the cause of the settlement.
Storage Area	Sediment accumulation	Accumulated sediment that exceeds 10% of the designed pond depth.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
	Liner damaged (If Applicable)	Liner is visible or pond does not hold water as designed.	Liner repaired or replaced.
Inlet/Outlet Pipe.	Sediment accumulation	Sediment filling 20% or more of the pipe.	Inlet/outlet pipes clear of sediment.
	Trash and debris	Trash and debris accumulated in inlet/outlet pipes (includes floatables and non-floatables).	No trash or debris in pipes.
	Damaged	Cracks wider than ½-inch at the joint of the inlet/outlet pipes or any evidence of soil entering at the joints of the inlet/outlet pipes.	No cracks more than ¼-inch wide at the joint of the inlet/outlet pipe.
Emergency Overflow/Spillway	Tree growth	Tree growth impedes flow or threatens stability of spillway.	Trees removed.
	Rock missing	Only one layer of rock exists above native soil in area five square feet or larger or any exposure of native soil on the spillway.	Spillway restored to design standards.

<b>NO. 6 – CONVEYANCE PIPES AND DITCHES</b>			
<b>Maintenance Component</b>	<b>Defect or Problem</b>	<b>Conditions When Maintenance is Needed</b>	<b>Results Expected When Maintenance is Performed</b>
Pipes	Sediment & debris accumulation	Accumulated sediment or debris that exceeds 20% of the diameter of the pipe.	Water flows freely through pipes.
	Vegetation/roots	Vegetation/roots that reduce free movement of water through pipes.	Water flows freely through pipes.
	Contaminants and pollution	Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint.	Materials removed and disposed of according to applicable regulations. Source control BMPs implemented if appropriate. No contaminants present other than a surface oil film.
	Damage to protective coating or corrosion	Protective coating is damaged; rust or corrosion is weakening the structural integrity of any part of pipe.	Pipe repaired or replaced.
	Damaged	Any dent that decreases the cross section area of pipe by more than 20% or is determined to have weakened structural integrity of the pipe.	Pipe repaired or replaced.
Ditches	Trash and debris	Trash and debris exceeds 1 cubic foot per 1,000 square feet of ditch and slopes.	Trash and debris cleared from ditches.
	Sediment accumulation	Accumulated sediment that exceeds 20% of the design depth.	Ditch cleaned/flushed of all sediment and debris so that it matches design.
	Noxious weeds	Any noxious or nuisance vegetation which may constitute a hazard to County personnel or the public.	Noxious and nuisance vegetation removed according to applicable regulations. No danger of noxious vegetation where County personnel or the public might normally be.
	Contaminants and pollution	Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint.	Materials removed and disposed of according to applicable regulations. Source control BMPs implemented if appropriate. No contaminants present other than a surface oil film.
	Vegetation	Vegetation that reduces free movement of water through ditches.	Water flows freely through ditches.
	Erosion damage to slopes	Any erosion observed on a ditch slope.	Slopes are not eroding.
	Rock lining out of place or missing (If Applicable)	One layer or less of rock exists above native soil area 5 square feet or more, any exposed native soil.	Replace rocks to design standards.

<b>NO. 12 – ACCESS ROADS</b>			
<b>Maintenance Component</b>	<b>Defect or Problem</b>	<b>Condition When Maintenance is Needed</b>	<b>Results Expected When Maintenance is Performed</b>
Site	Trash and debris	Trash and debris exceeds 1 cubic foot per 1,000 square feet (i.e., trash and debris would fill up one standards size garbage can).	Roadway drivable by maintenance vehicles.
		Debris which could damage vehicle tires or prohibit use of road.	Roadway drivable by maintenance vehicles.
	Contaminants and pollution	Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint.	Materials removed and disposed of according to applicable regulations. Source control BMPs implemented if appropriate. No contaminants present other than a surface oil film.
	Blocked roadway	Any obstruction which reduces clearance above road surface to less than 14 feet.	Roadway overhead clear to 14 feet high.
Any obstruction restricting the access to a 10- to 12 foot width for a distance of more than 12 feet or any point restricting access to less than a 10 foot width.		At least 12-foot of width on access road.	
Road Surface	Erosion, settlement, potholes, soft spots, ruts	Any surface defect which hinders or prevents maintenance access.	Road drivable by maintenance vehicles.
	Vegetation on road surface	Trees or other vegetation prevent access to facility by maintenance vehicles.	Maintenance vehicles can access facility.
Shoulders and Ditches	Erosion	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep.	Shoulder free of erosion and matching the surrounding road.
	Weeds and brush	Weeds and brush exceed 18 inches in height or hinder maintenance access.	Weeds and brush cut to 2 inches in height or cleared in such a way as to allow maintenance access.
Modular Grid Pavement	Contaminants and pollution	Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint.	Materials removed and disposed of according to applicable regulations. Source control BMPs implemented if appropriate. No contaminants present other than a surface oil film.
	Damaged or missing	Access surface compacted because of broken or missing modular block.	Access road surface restored so road infiltrates.

<b>NO. 16 – WETPOND</b>			
<b>Maintenance Component</b>	<b>Defect or Problem</b>	<b>Condition When Maintenance is Needed</b>	<b>Results Expected When Maintenance Is Performed</b>
Site	Trash and debris	Any trash and debris accumulated on the wetpond site.	Wetpond site free of any trash or debris.
	Noxious weeds	Any noxious or nuisance vegetation which may constitute a hazard to County personnel or the public.	Noxious and nuisance vegetation removed according to applicable regulations. No danger of noxious vegetation where County personnel or the public might normally be.
	Contaminants and pollution	Any evidence of contaminants or pollution such as oil, gasoline, concrete slurries or paint.	Materials removed and disposed of according to applicable regulations. Source control BMPs implemented if appropriate. No contaminants present other than a surface oil film.
	Grass/groundcover	Grass or groundcover exceeds 18 inches in height.	Grass or groundcover mowed to a height no greater than 6 inches.
Side Slopes of Dam, Berm, internal berm or Embankment	Rodent holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents removed or destroyed and dam or berm repaired.
	Tree growth	Tree growth threatens integrity of dams, berms or slopes, does not allow maintenance access, or interferes with maintenance activity. If trees are not a threat to dam, berm or embankment integrity, are not interfering with access or maintenance or leaves do not cause a plugging problem they do not need to be removed.	Trees do not hinder facility performance or maintenance activities.
	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted slope.	Slopes stabilized using appropriate erosion control measures. If erosion is occurring on compacted slope, a licensed civil engineer should be consulted to resolve source of erosion.
Top or Side Slopes of Dam, Berm, internal berm or Embankment	Settlement	Any part of a dam, berm or embankment that has settled 4 inches lower than the design elevation.	Top or side slope restored to design dimensions. If settlement is significant, a licensed civil engineer should be consulted to determine the cause of the settlement.
	Irregular surface on internal berm	Top of berm not uniform and level.	Top of berm graded to design elevation.
Pond Areas	Sediment accumulation (except first wetpool cell)	Accumulated sediment that exceeds 10% of the designed pond depth.	Sediment cleaned out to designed pond shape and depth.
	Sediment accumulation (first wetpool cell)	Sediment accumulations in pond bottom that exceeds the depth of sediment storage (1 foot) plus 6 inches.	Sediment storage contains no sediment.
	Liner damaged (If Applicable)	Liner is visible or pond does not hold water as designed.	Liner repaired or replaced.
	Water level (all wetpool cells)	Cell level(s) drops more than 12 inches in any 7-day period.	Cell level(s) drops less than 12 inches in any 7-day period.
	Algae mats (first wetpool cell)	Algae mats develop over more than 10% of the water surface should be removed.	Algae mats removed (usually in the late summer before Fall rains, especially in Sensitive Lake Protection Areas.)

<b>NO. 16 – WETPOND</b>			
<b>Maintenance Component</b>	<b>Defect or Problem</b>	<b>Condition When Maintenance is Needed</b>	<b>Results Expected When Maintenance Is Performed</b>
	Design planting and vegetation survival and maintenance	Sparse or dying design planting, or when design plantings are not thriving across 80% or more of the design vegetated areas within the pond; invasive vegetation e.g., cattails	Design plantings and vegetation are thriving and appropriately spaced across 80% or more of the design vegetated areas within the pond; invasives removed including root clumps
Gravity Drain	Inoperable valve	Valve will not open and close.	Valve opens and closes normally.
	Valve won't seal	Valve does not seal completely.	Valve completely seals closed.
Emergency Overflow Spillway	Tree growth	Tree growth impedes flow or threatens stability of spillway.	Trees removed.
	Rock missing	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway. Rip-rap on inside slopes need not be replaced.	Spillway restored to design standards.
Inlet/Outlet Pipe	Sediment accumulation	Sediment filling 20% or more of the pipe.	Inlet/outlet pipes clear of sediment.
	Trash and debris	Trash and debris accumulated in inlet/outlet pipes (includes floatables and non-floatables).	No trash or debris in pipes.
	Damaged	Cracks wider than ½-inch at the joint of the inlet/outlet pipes or any evidence of soil entering at the joints of the inlet/outlet pipes.	No cracks more than ¼-inch wide at the joint of the inlet/outlet pipe.

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## Appendix A







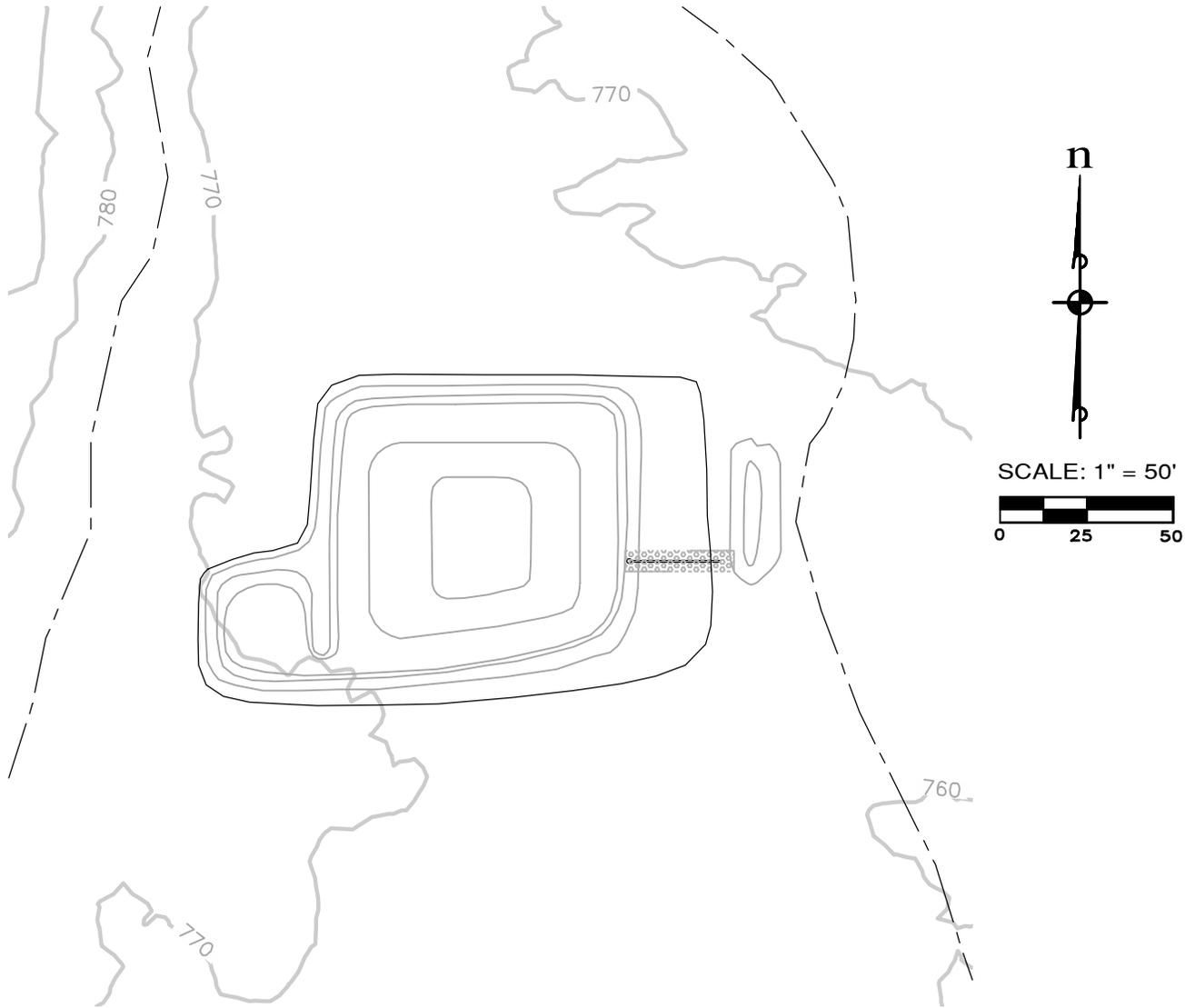


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## Appendix B

# POND A' VOLUME VERIFICATION



## POND VOLUME

Pond A'	CF	Ac-Ft
Live Storage Volume	23,023	0.53
Dead Storage Volume	6,234	0.14

### NOTE:

VOLUME CALCULATIONS WERE COMPLETED USING A SURFACE CREATED BASED ON THE CONTOURS PROVIDED BY PCCC. ESM ASSUMES NO LIABILITY OVER THE ACCURACY OF THIS INFORMATION

JOB NO. 1988-001-017  
 DRAWING NAME : EN-07  
 DATE : 02/06/2018  
 DRAWN : JJH  
 SHEET 1 OF 8



CONSULTING ENGINEERS LLC

33400 8th Ave S, Suite 205  
 Federal Way, WA 98003



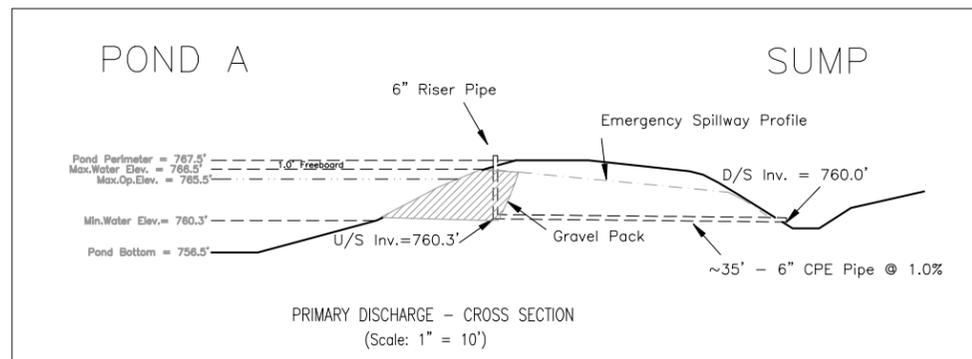
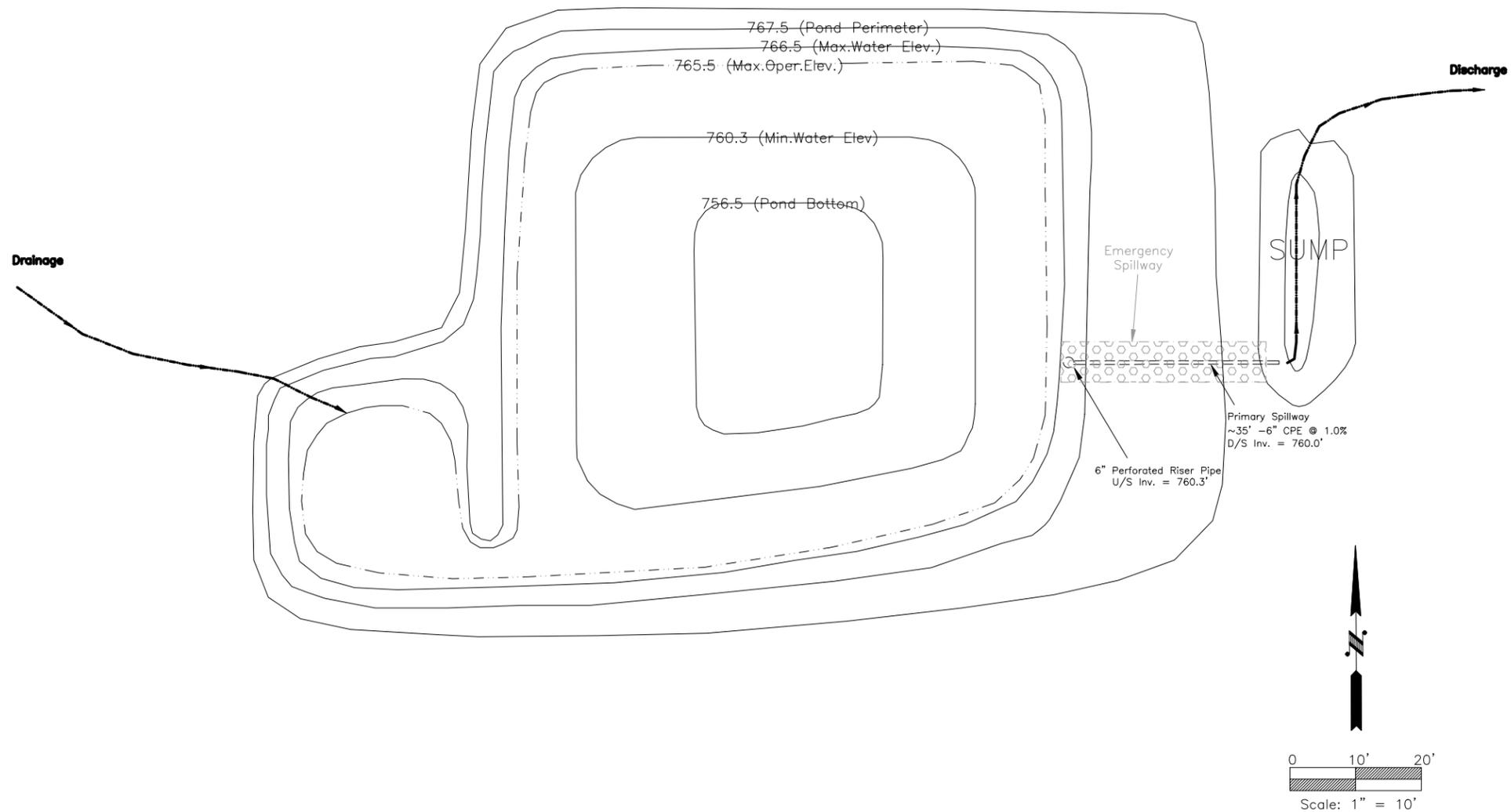
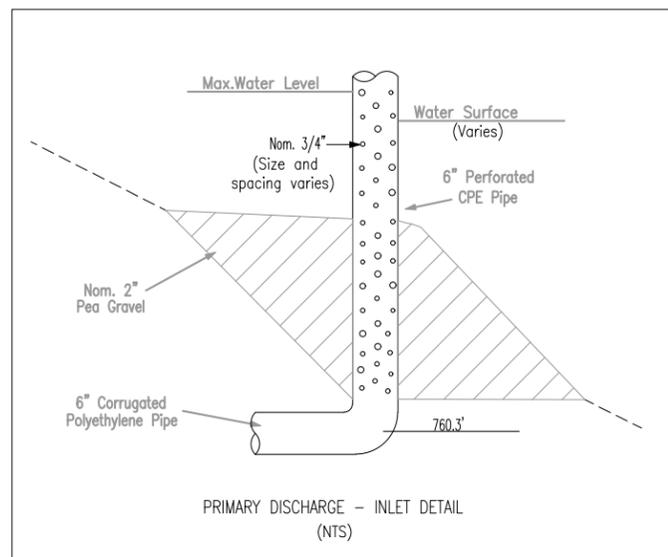
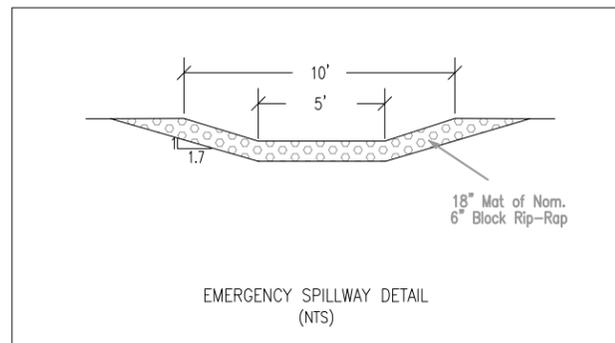
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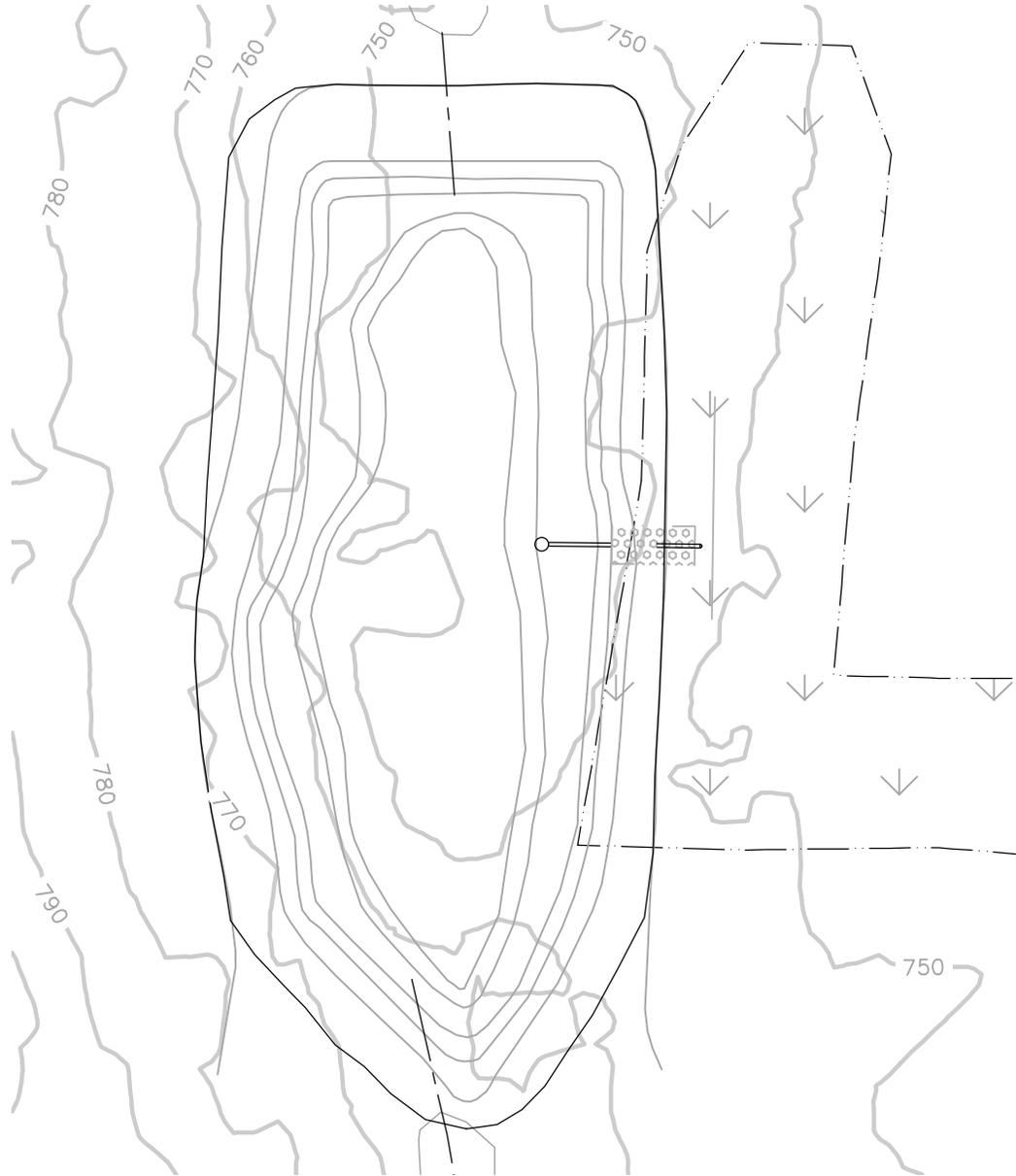
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Expiration Date

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JOHN HENRY NO. 1 MINE  
Black Diamond, Washington

POND A'  
AS-BUILT

Revision:							
Drawn By:	MCA	MCA	BS/MC				
Date:	1986	1989	12/98				

# POND A VOLUME VERIFICATION



## POND VOLUME

Pond A	CF	Ac-Ft
Live Storage Volume	96,513	2.22
Dead Storage Volume	18,324	0.42

### NOTE:

VOLUME CALCULATIONS WERE COMPLETED USING A SURFACE CREATED BASED ON THE CONTOURS PROVIDED BY PCCC. ESM ASSUMES NO LIABILITY OVER THE ACCURACY OF THIS INFORMATION

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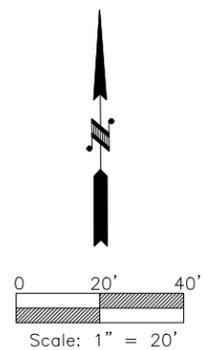
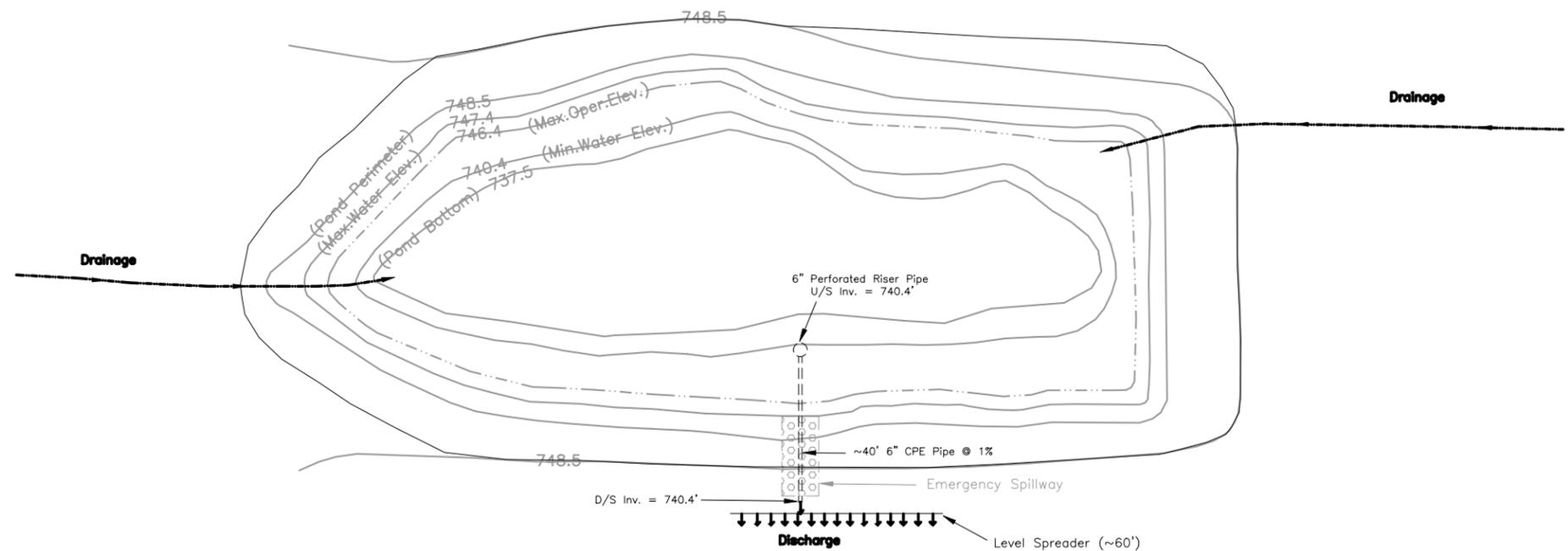
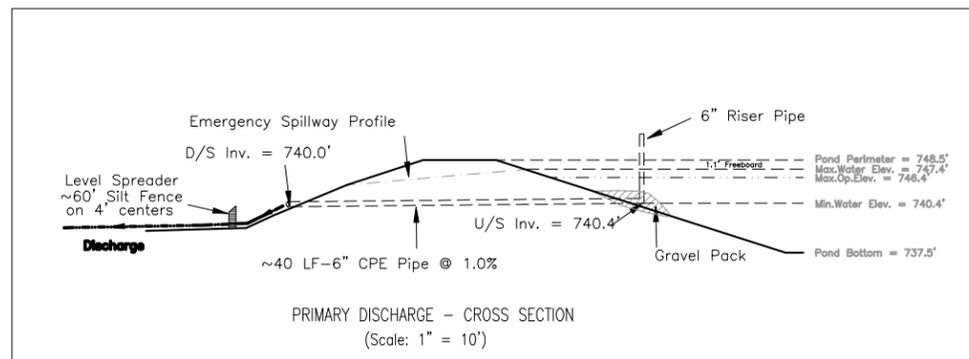
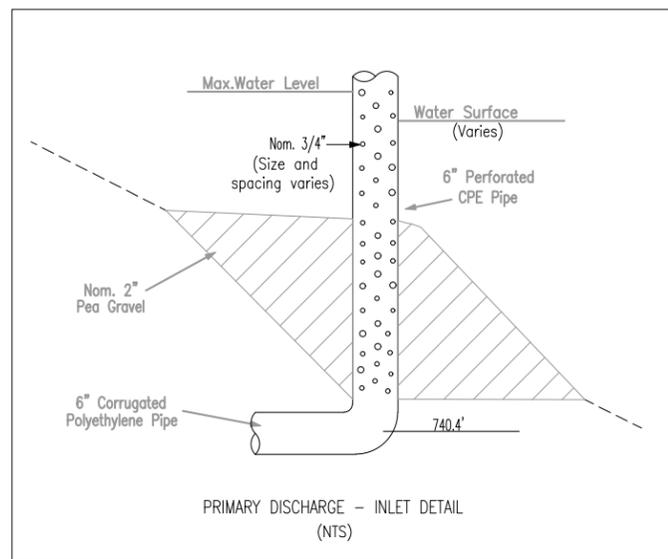
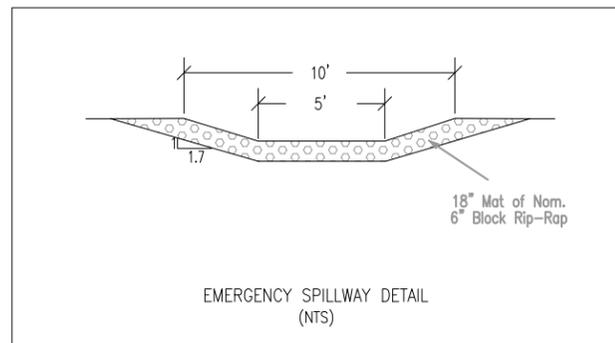
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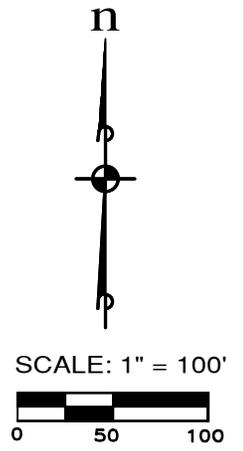
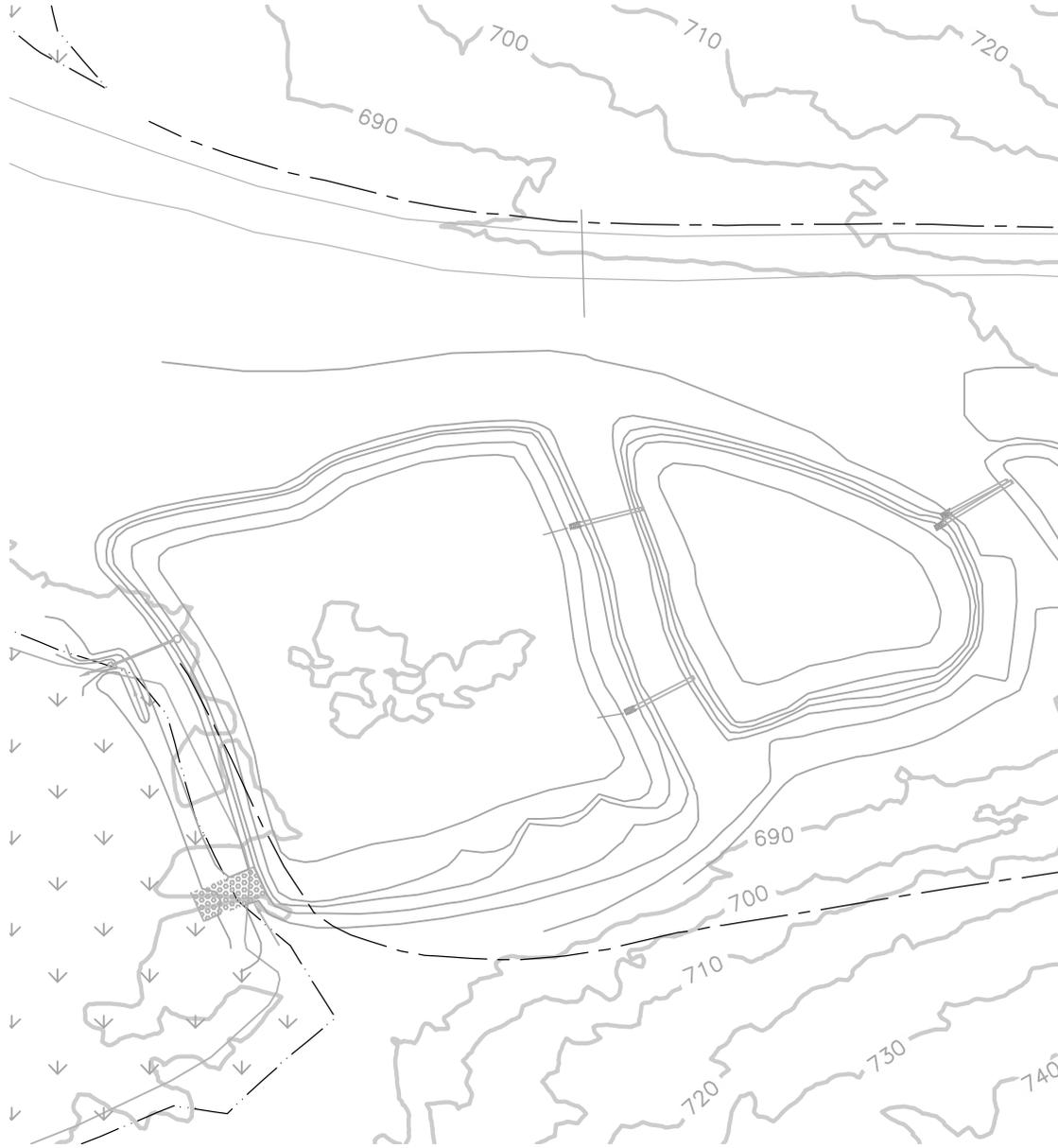
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Expiration Date

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Black Diamond, Washington

POND A  
AS-BUILT

Revision:									
Drawn By:	MCA	MCA	BS/MC						
Date:	1986	1989	12/98						

# POND B VOLUME VERIFICATION



## POND VOLUME

Pond B - Cell 1	CF	Ac-Ft	Pond B - Cell 2	CF	Ac-Ft
Live Storage Volume	41,010	0.94	Live Storage Volume	230,001	5.28
Dead Storage Volume	18,662	0.43	Dead Storage Volume	90,734	2.08

### NOTE:

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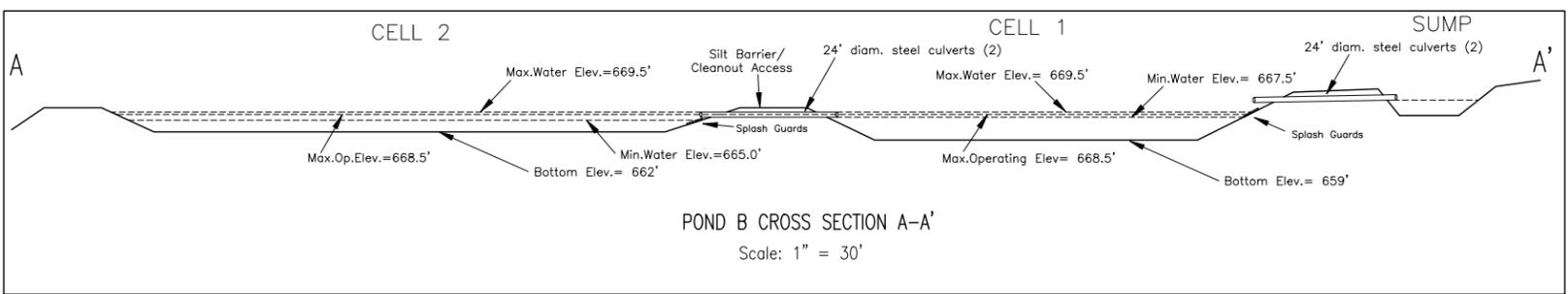
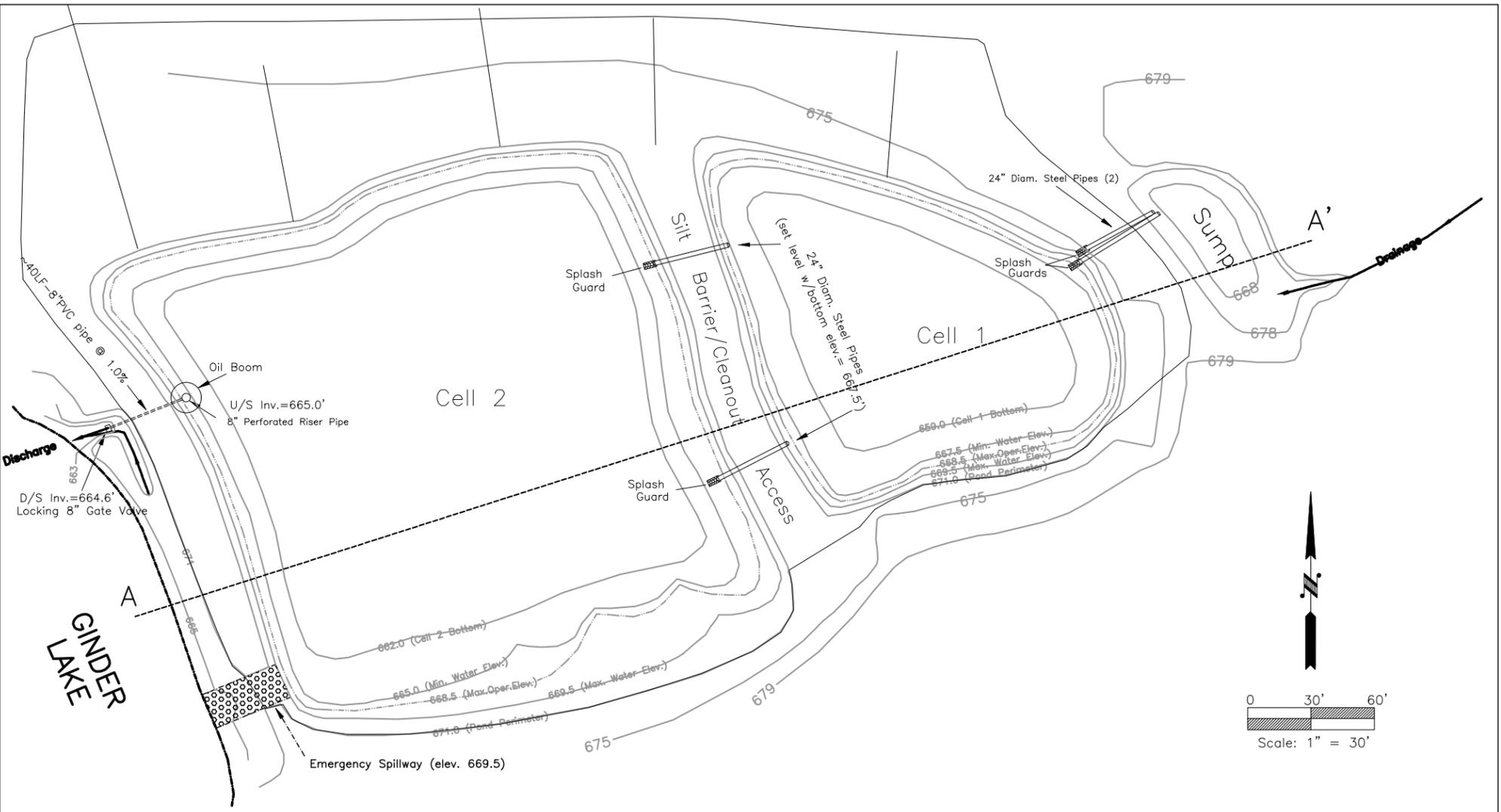
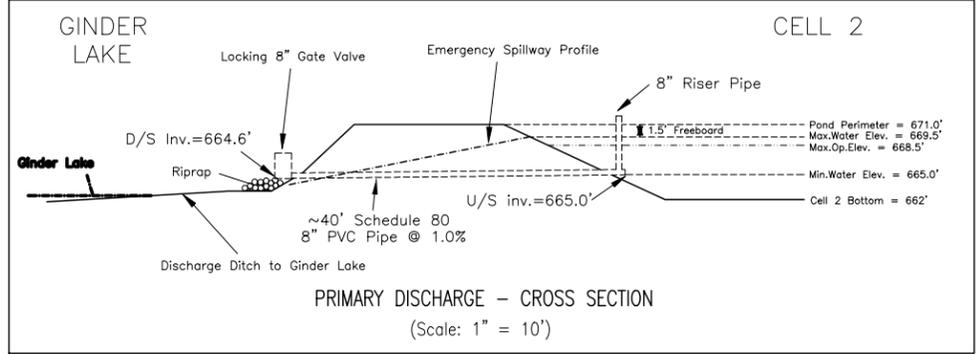
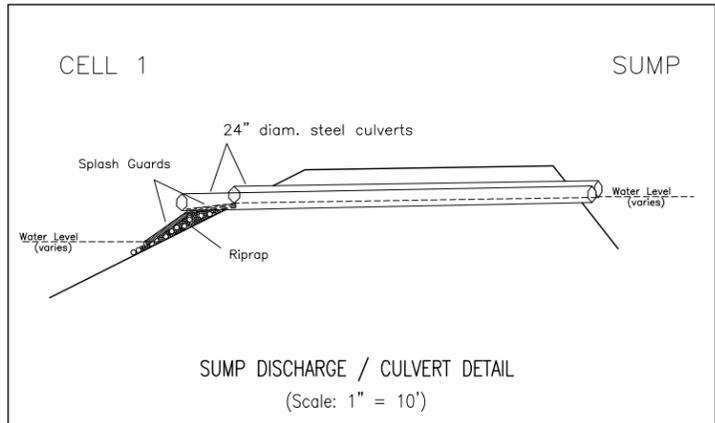
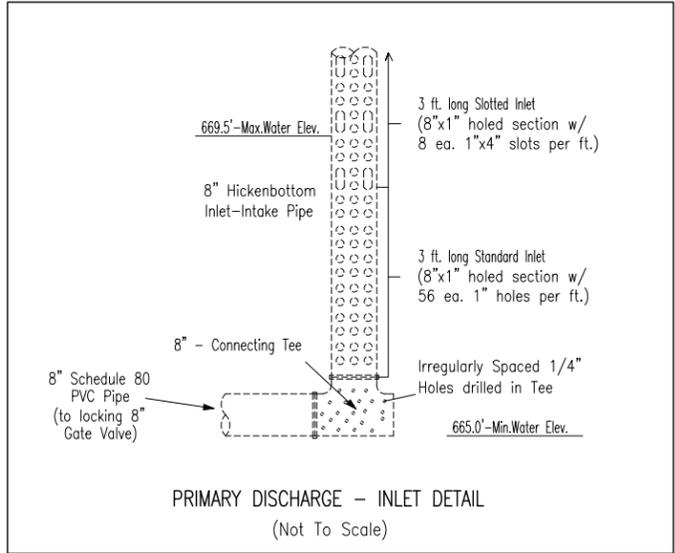
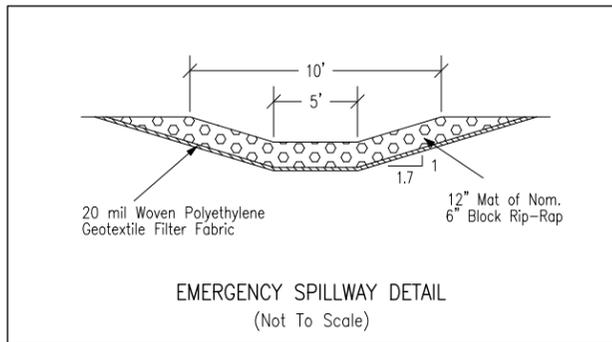
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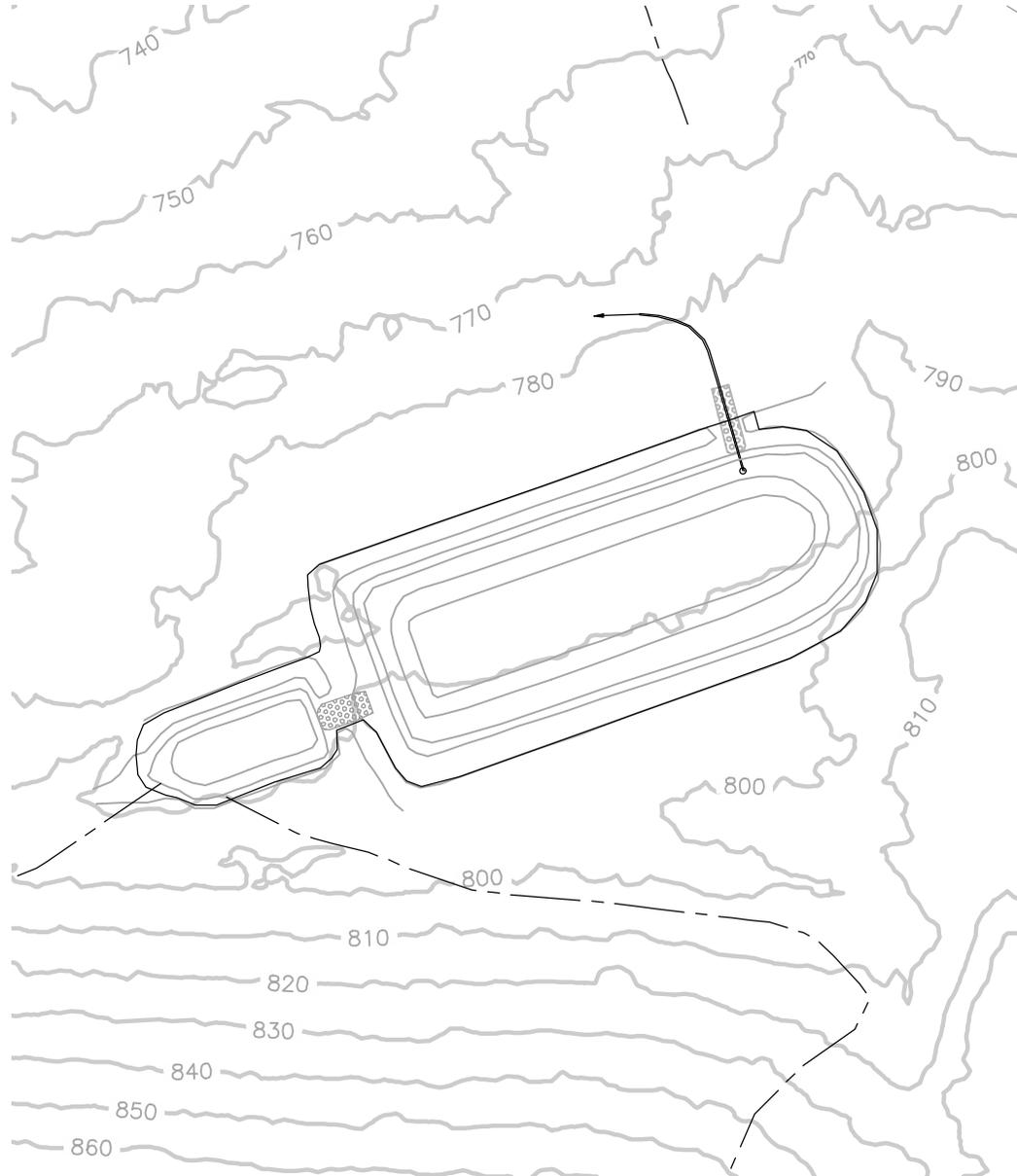
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Black Diamond, Washington

**POND B  
AS-BUILT**

Revision:	FCURV7	FCURV8			FCURV18	FCURV19
Drawn By:	MC/BS	MC/BS	MC/BS	MC/BS	MC/BS	MC/BS
Date:	05/97	08/97	01/98	05/98	07/98	08/98

# POND F VOLUME VERIFICATION



## POND VOLUME

Pond F	CF	Ac-Ft
Live Storage Volume	173,954	3.99
Dead Storage Volume	72,150	1.66

### NOTE:

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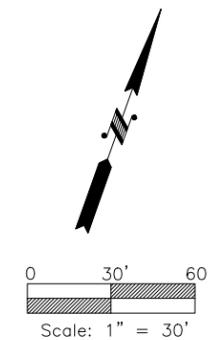
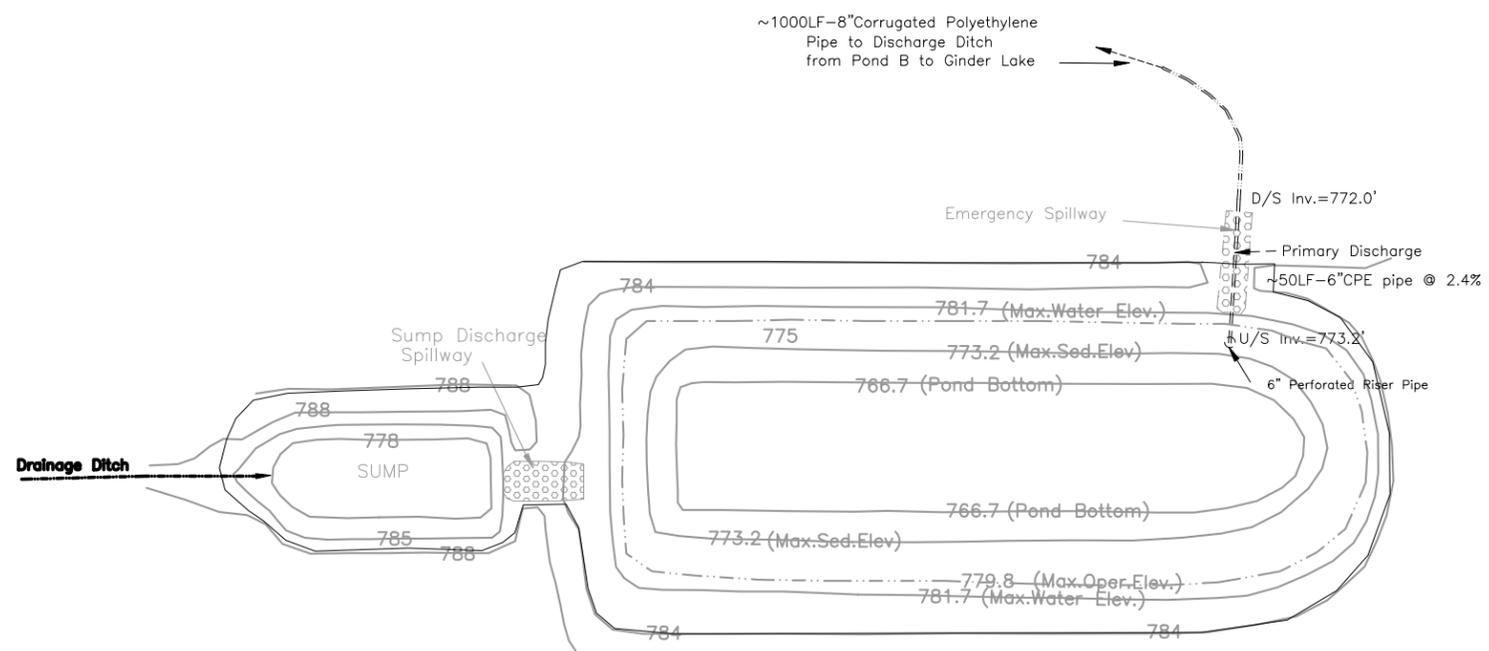
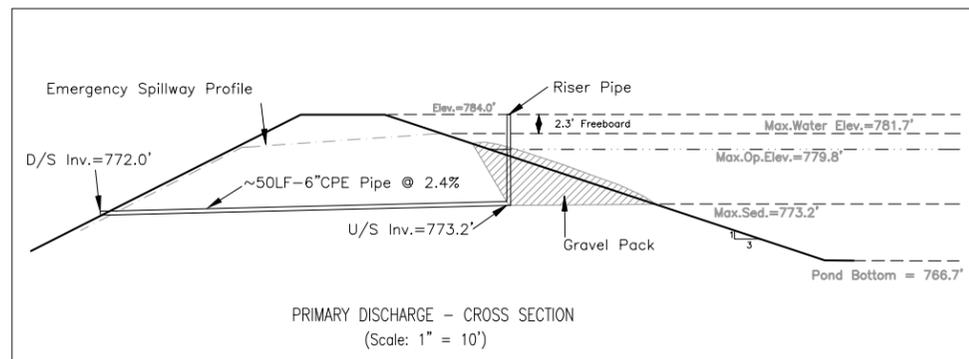
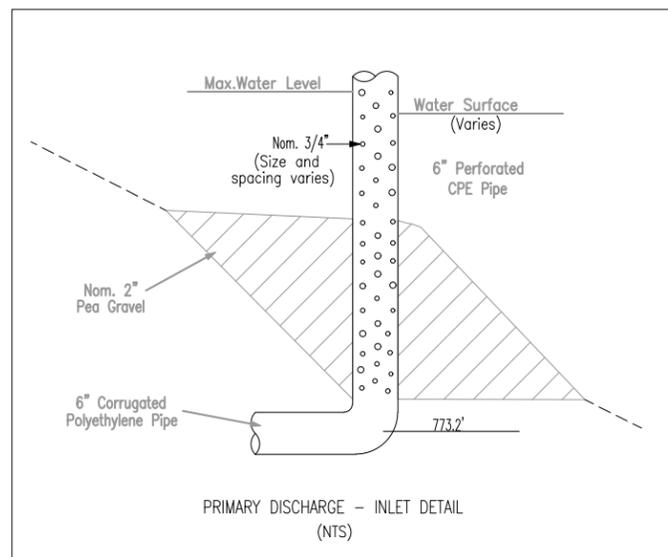
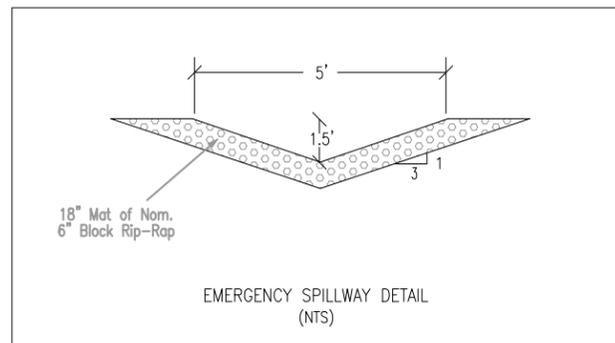
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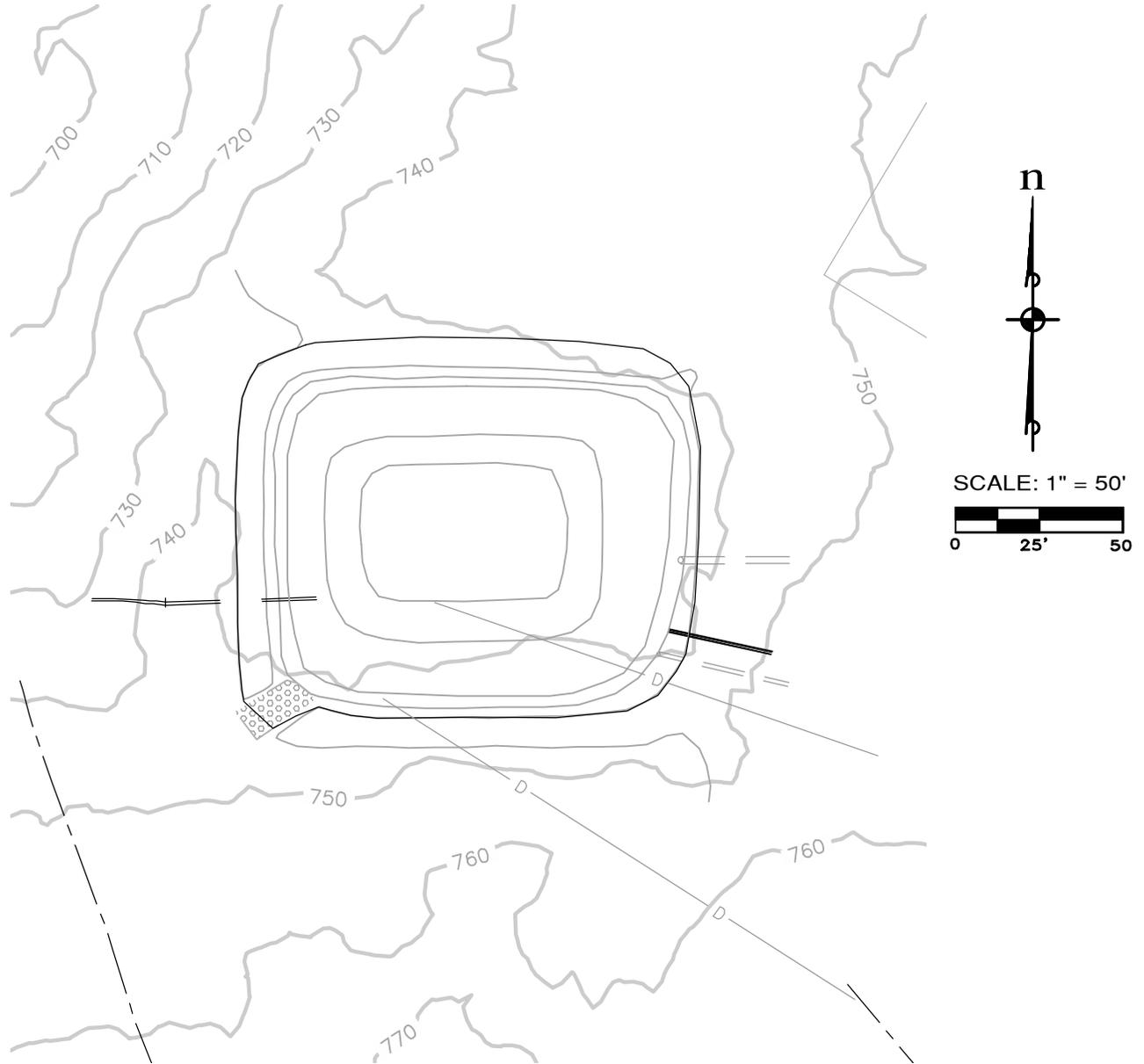
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Black Diamond, Washington

POND F  
AS-BUILT

Revision:	FCURV7	FCURV8	FCURV8				
Drawn By:	MC/BS	MC/BS	MC/BS				
Date:	05/97	08/97	08/98				

# POND G VOLUME VERIFICATION



## POND VOLUME

Pond G	CF	Ac-Ft
Live Storage Volume	64,693	1.49
Dead Storage Volume	17,403	0.40

### NOTE:

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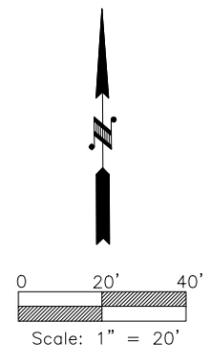
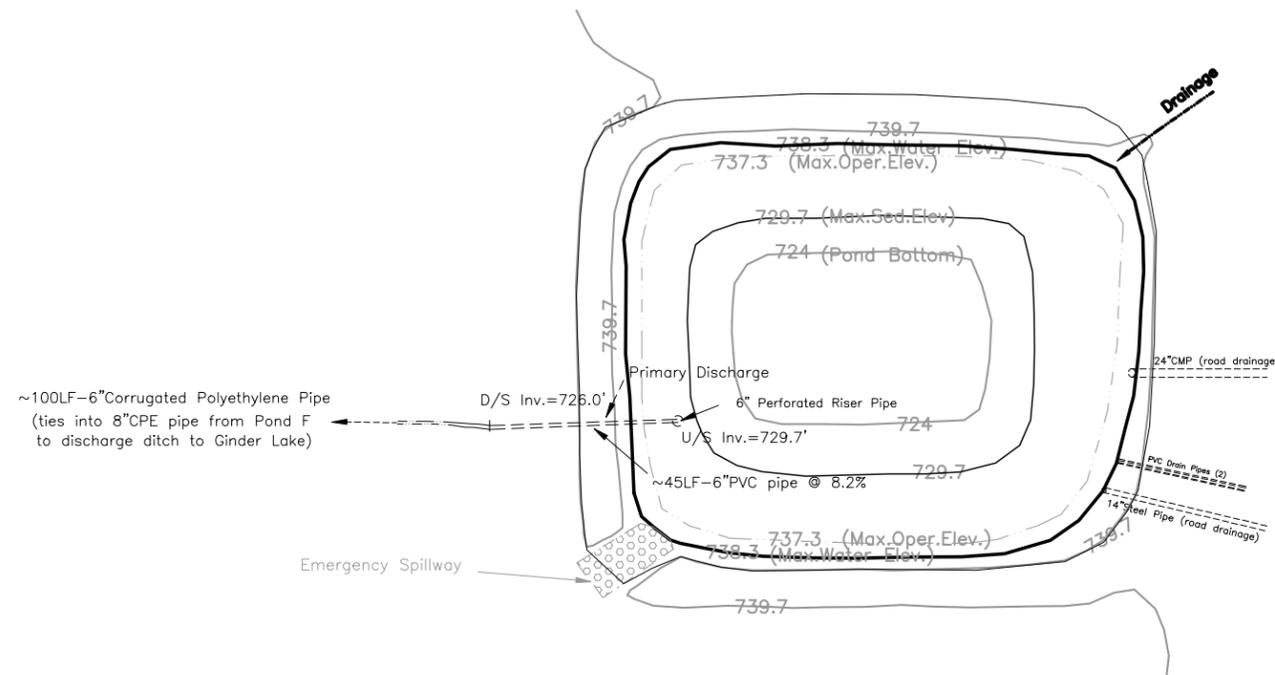
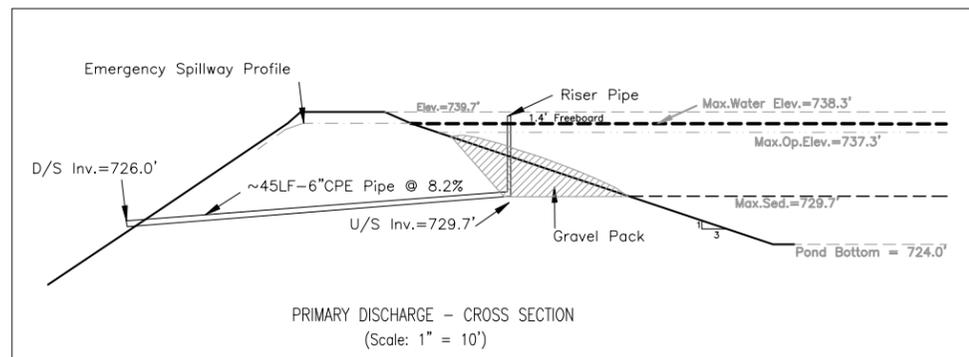
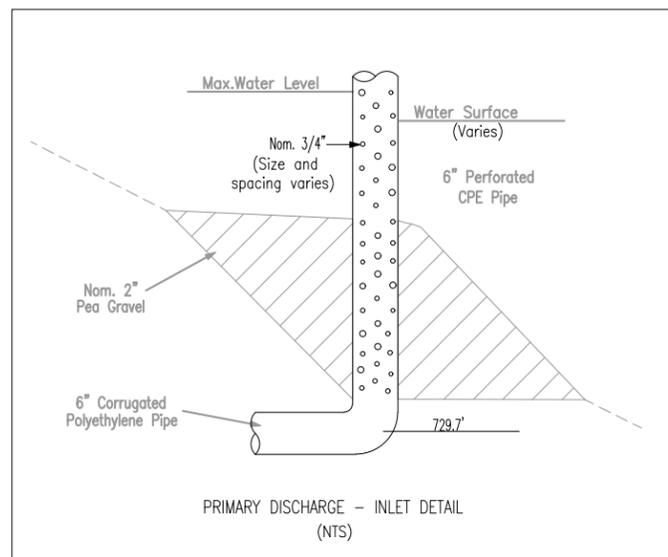
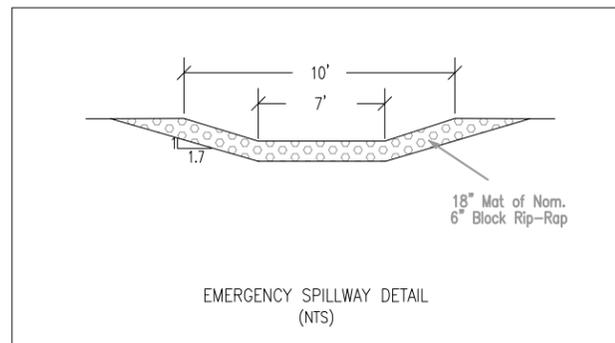
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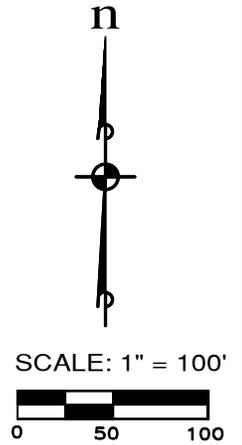
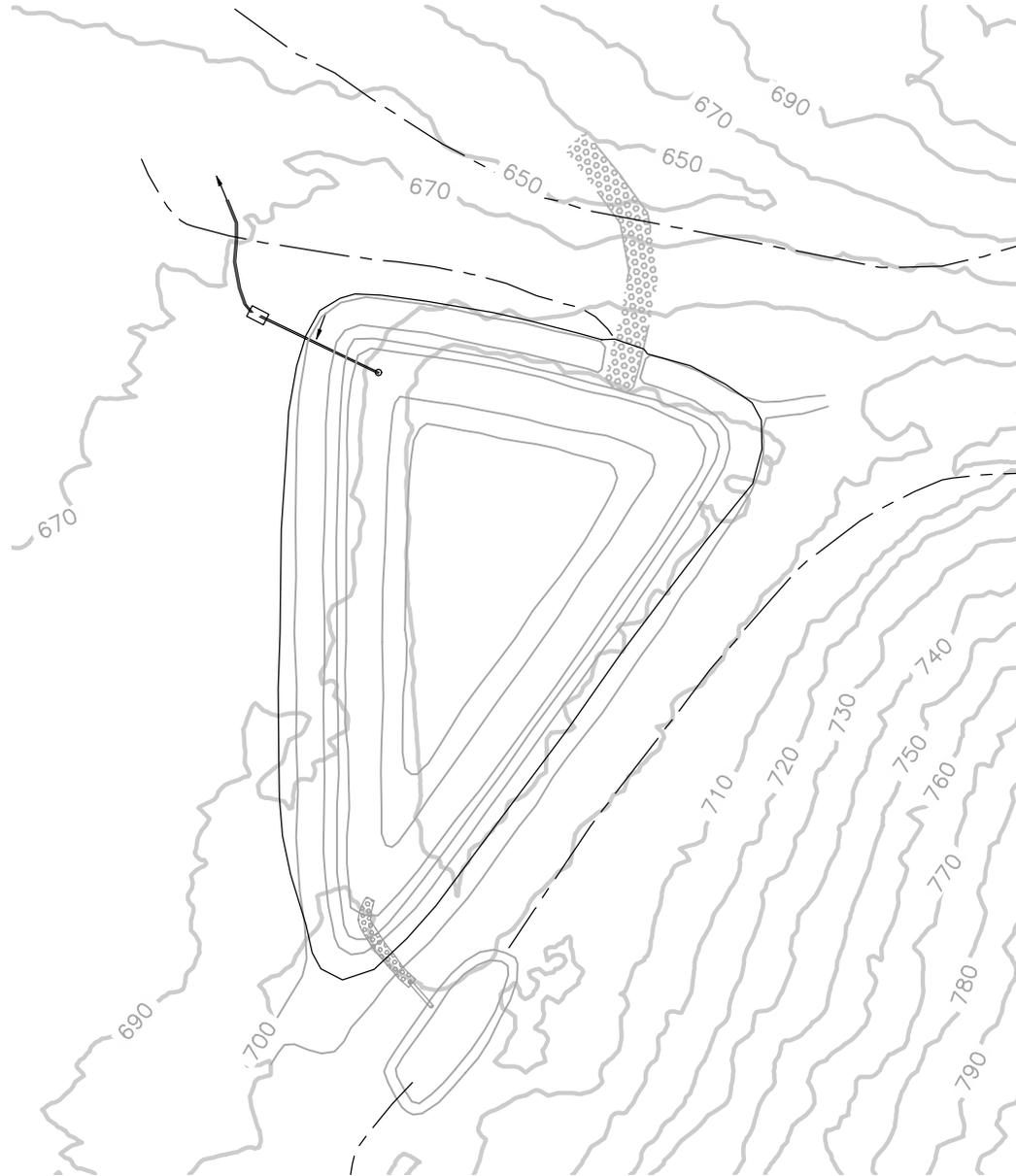
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POND G  
AS-BUILT

Revision:	FCLR17	FCLR18	FCLR19	REV09-1			
Drawn By:	MC/BS	MC/BS	MC/BS	MC			
Date:	05/97	08/97	08/98	03/09			

# POND H1 VOLUME VERIFICATION



## POND VOLUME

Pond H1	CF	Ac-Ft
Live Storage Volume	222,553	5.11
Dead Storage Volume	49,776	1.14

### NOTE:

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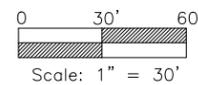
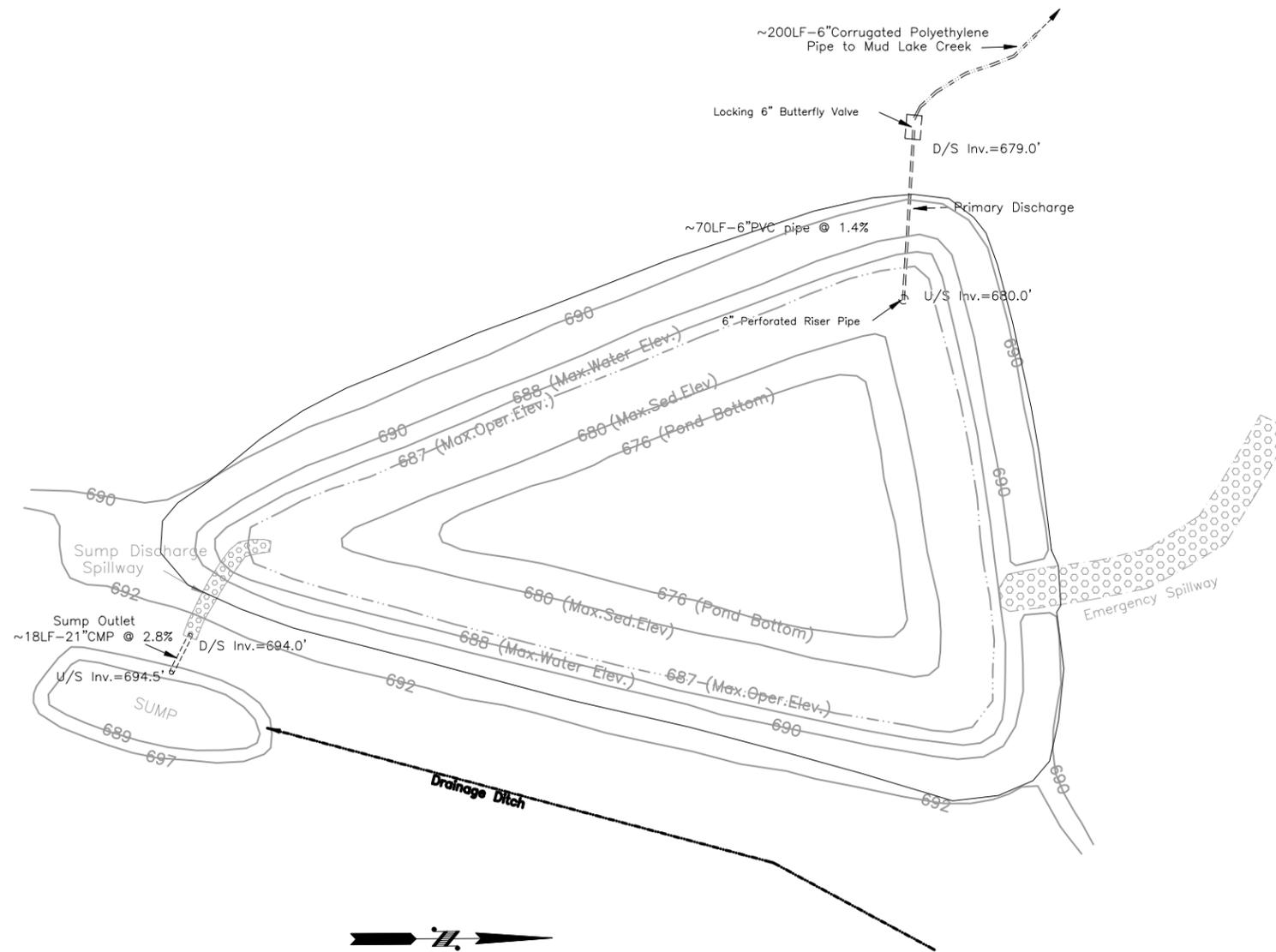
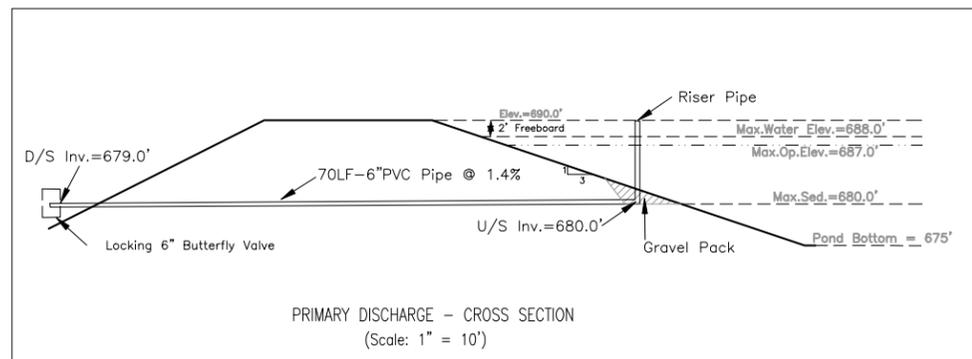
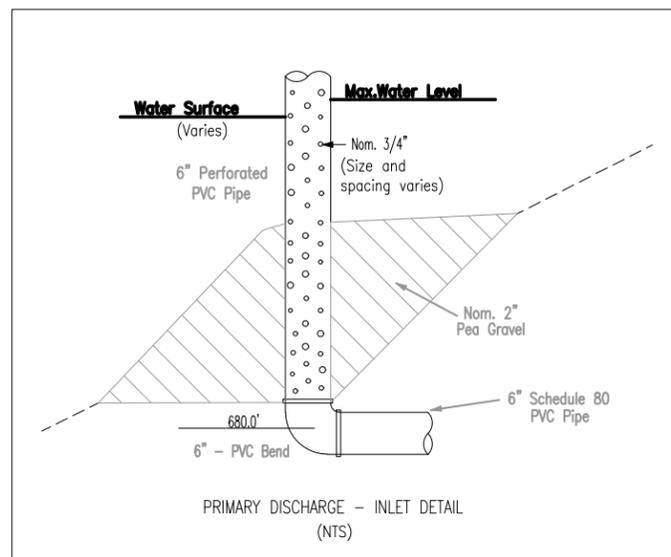
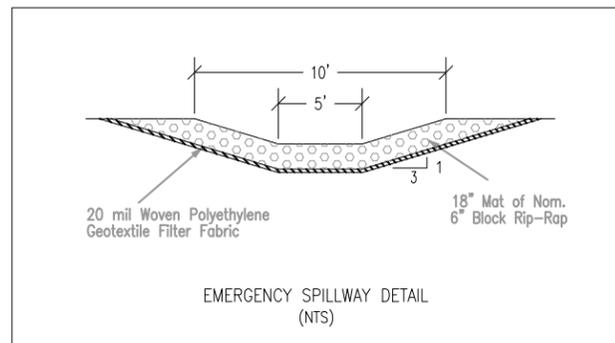
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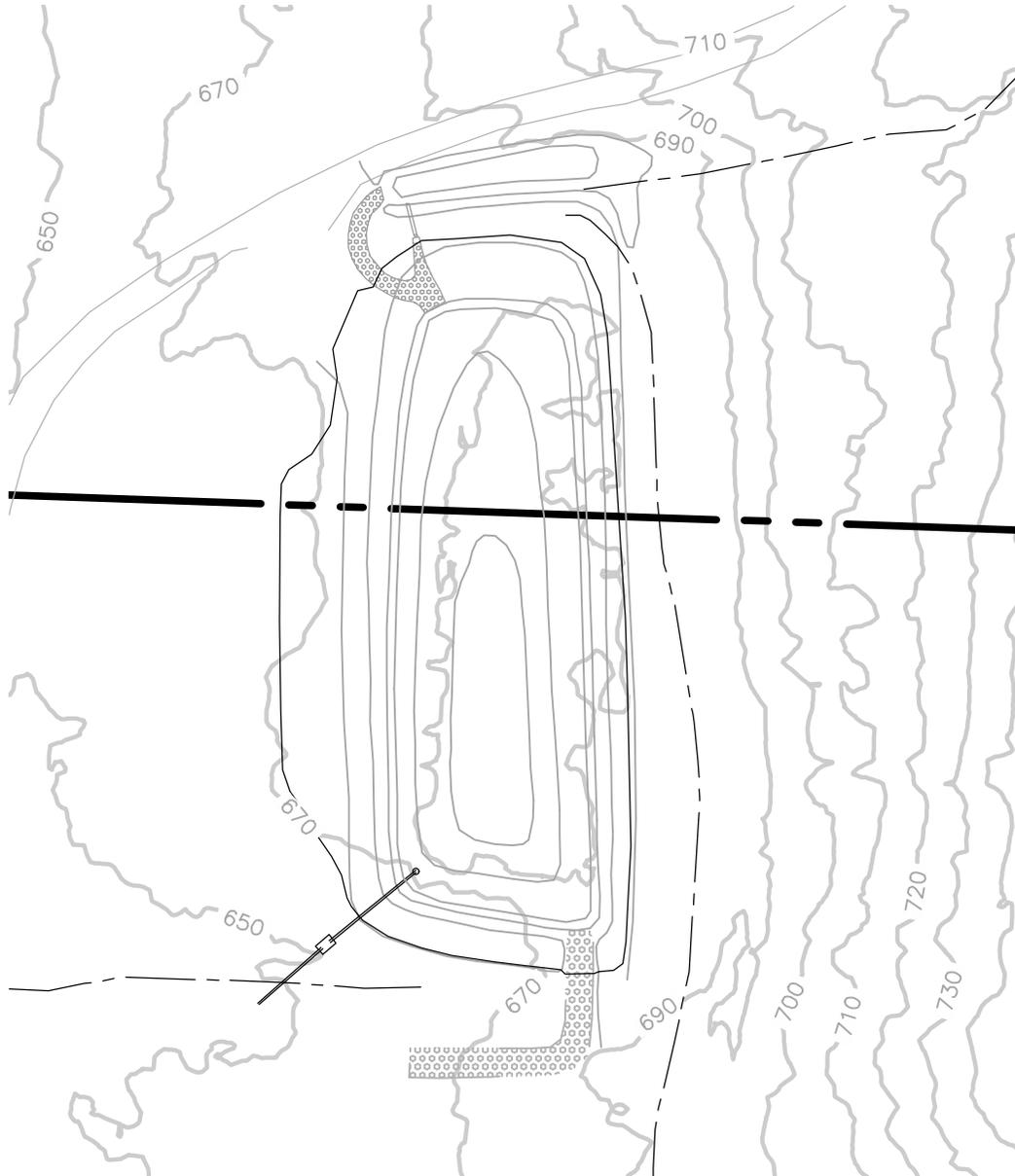
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POND H1  
AS-BUILT

Revision:	FCLR7	FCLR8				
Drawn By:	MC/BS	MC/BS				
Date:	05/97	08/97				

# POND H2 VOLUME VERIFICATION



## POND VOLUME

Pond H2	CF	Ac-Ft
Live Storage Volume	229,206	5.26
Dead Storage Volume	38,120	0.88

### NOTE:

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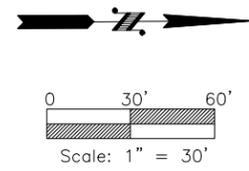
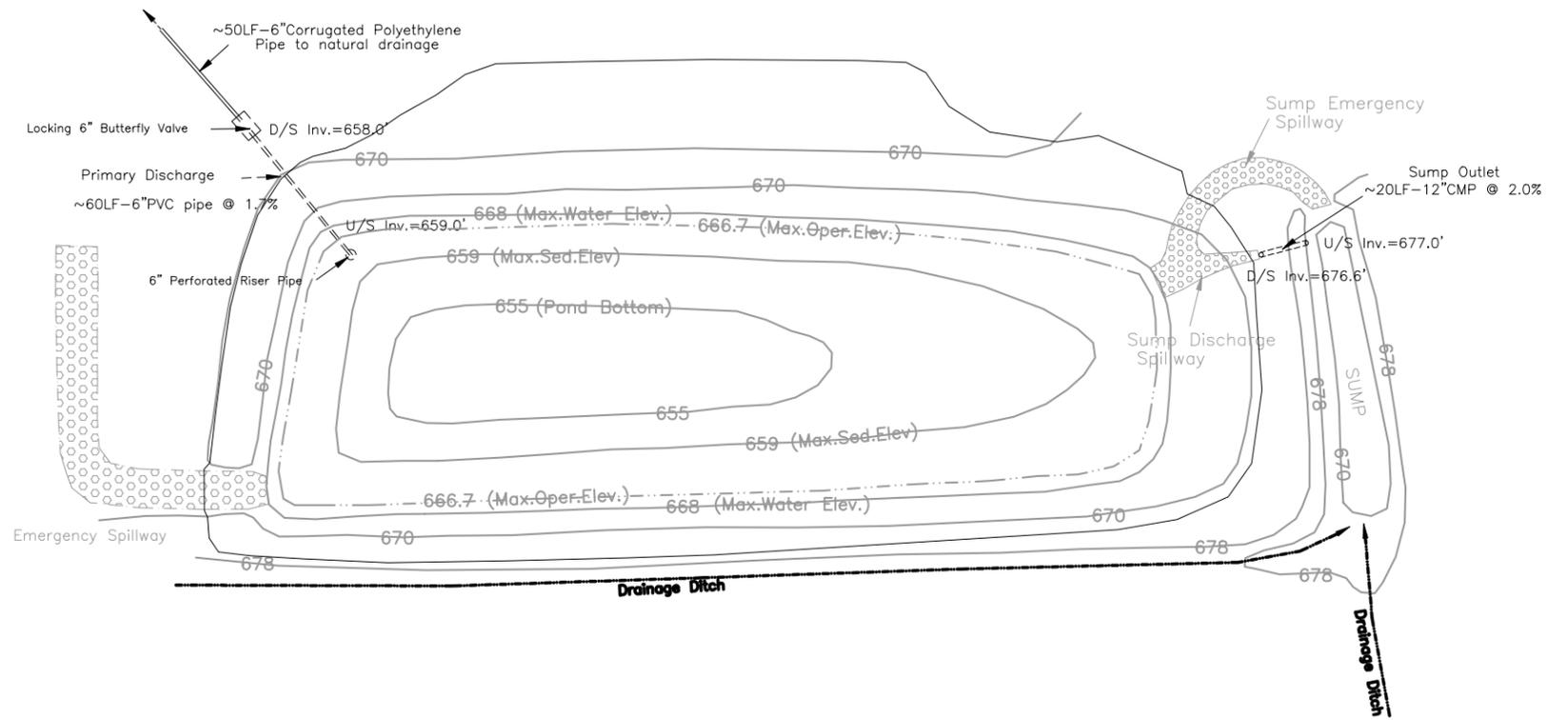
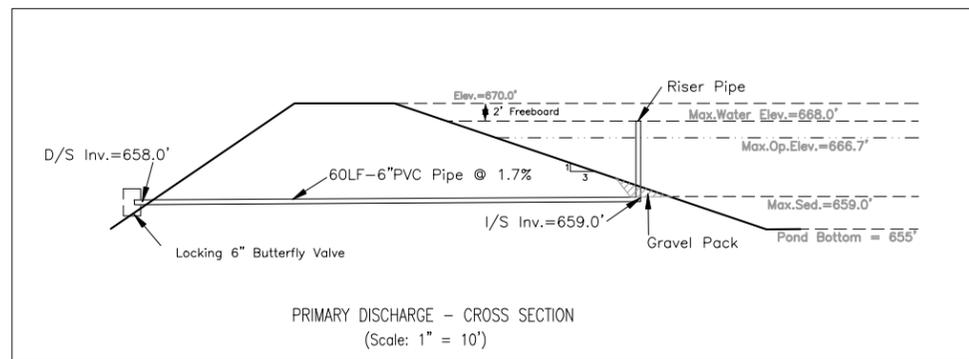
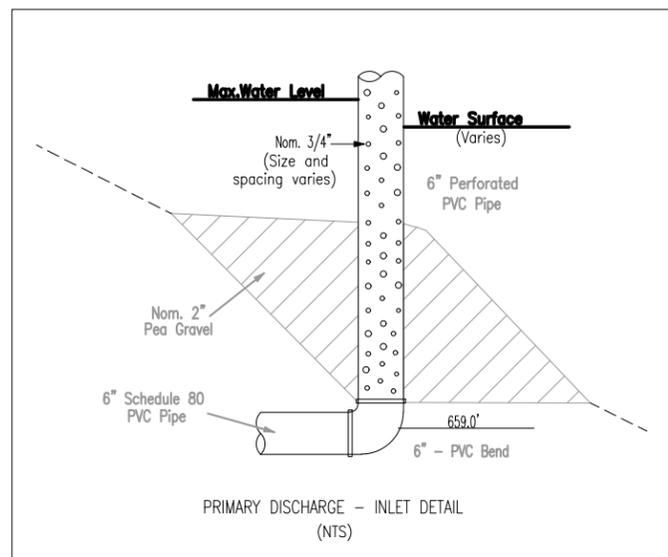
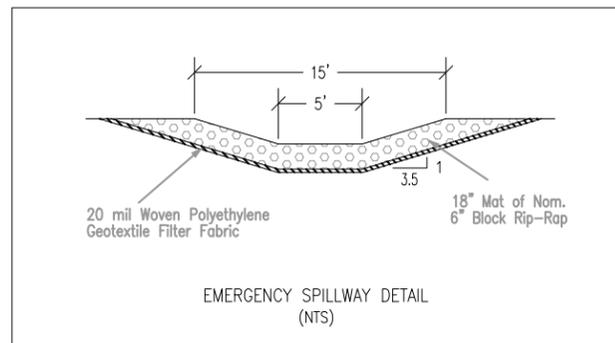
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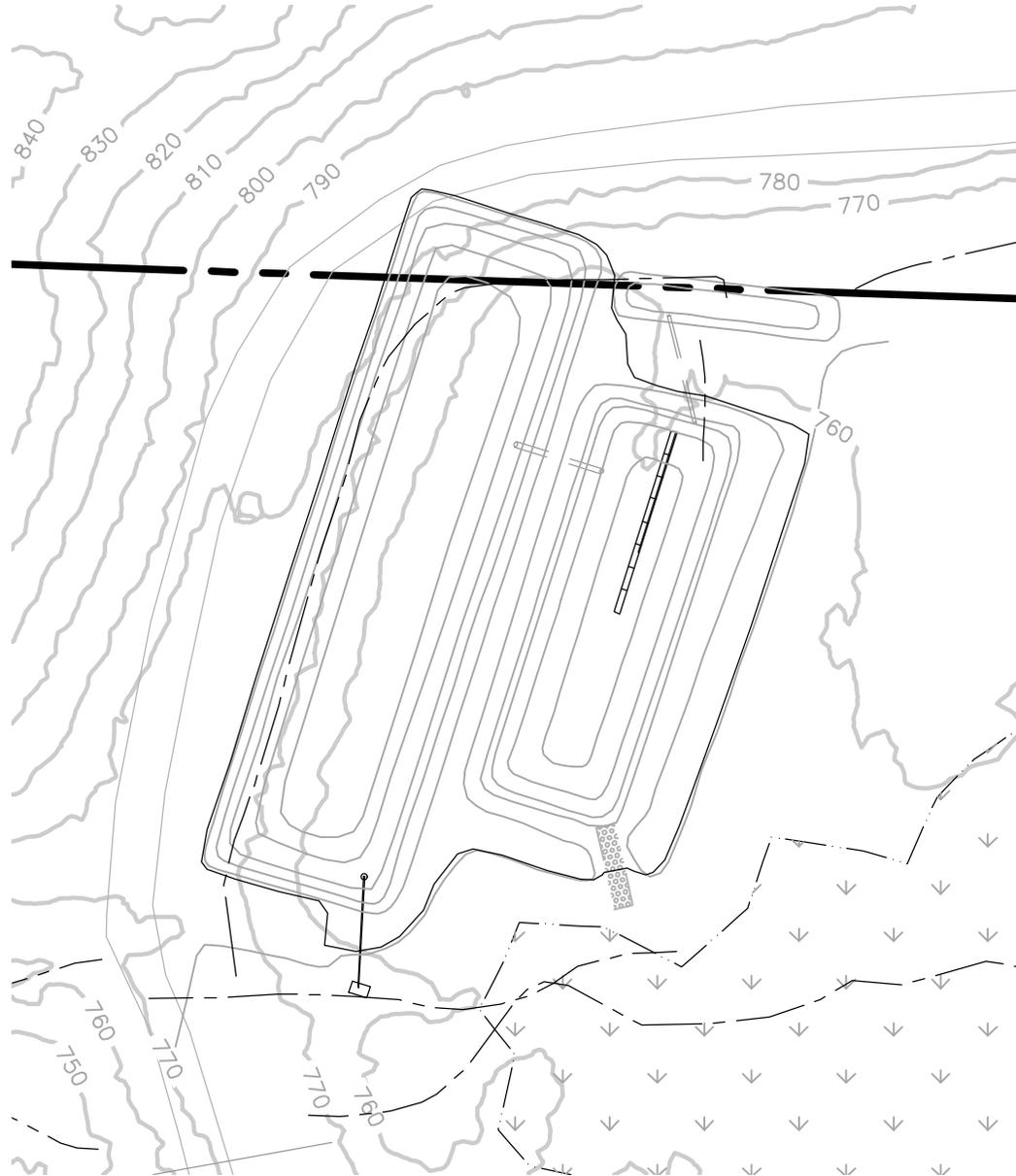
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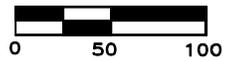
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<b>POND H2 AS-BUILT</b>				
Revision:	FCLR17	FCLR18	FCLR19	
Drawn By:	MC/BS	MC/BS	MC/BS	
Date:	05/97	08/97	08/98	

# POND I VOLUME VERIFICATION



SCALE: 1" = 100'



## POND VOLUME

Pond I - Cell 1	CF	Ac-Ft
Live Storage Volume	57,633	1.32
Dead Storage Volume	20,695	0.48

Pond I - Cell 2	CF	Ac-Ft
Live Storage Volume	201,074	4.62
Dead Storage Volume	51,939	1.19

### NOTE:

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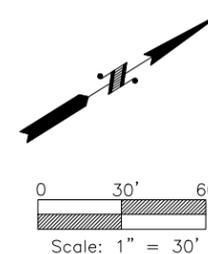
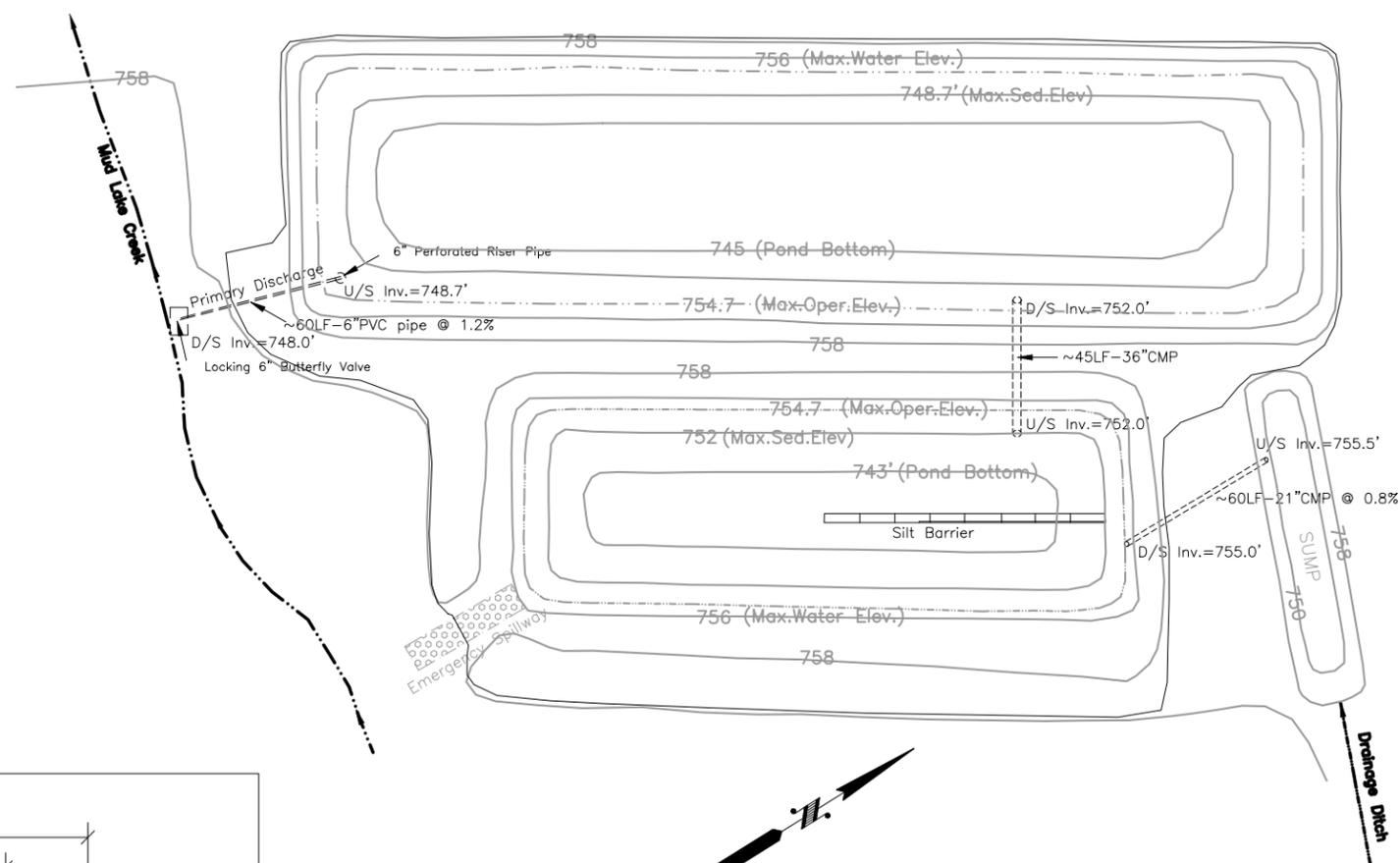
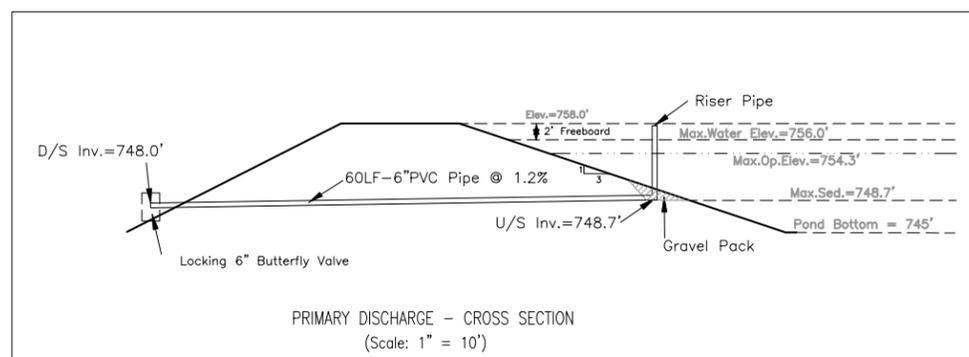
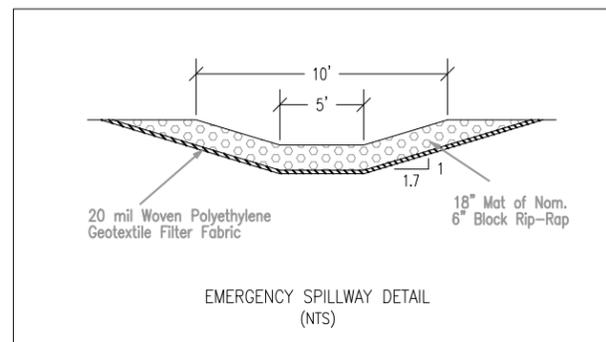
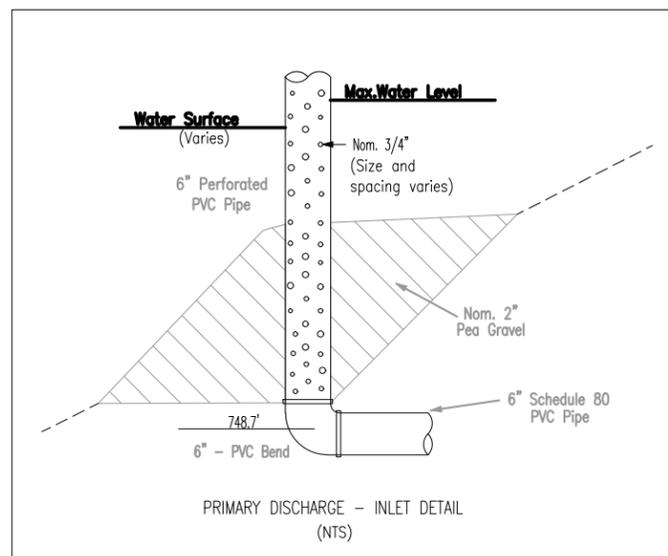
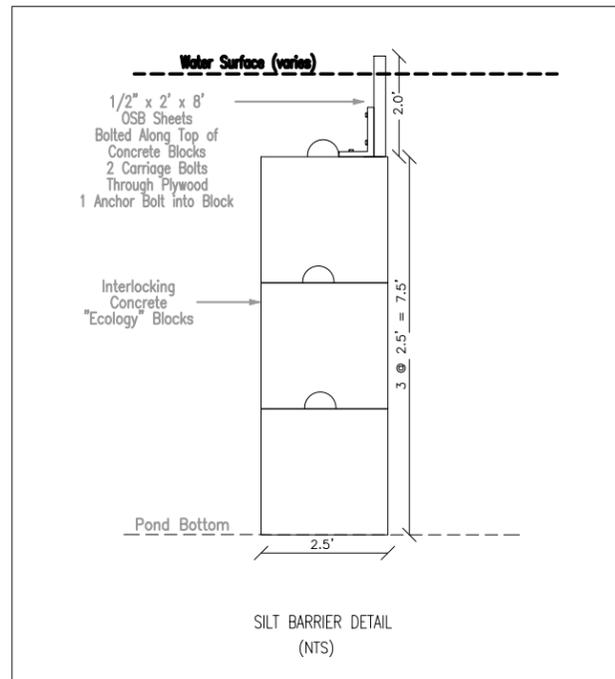
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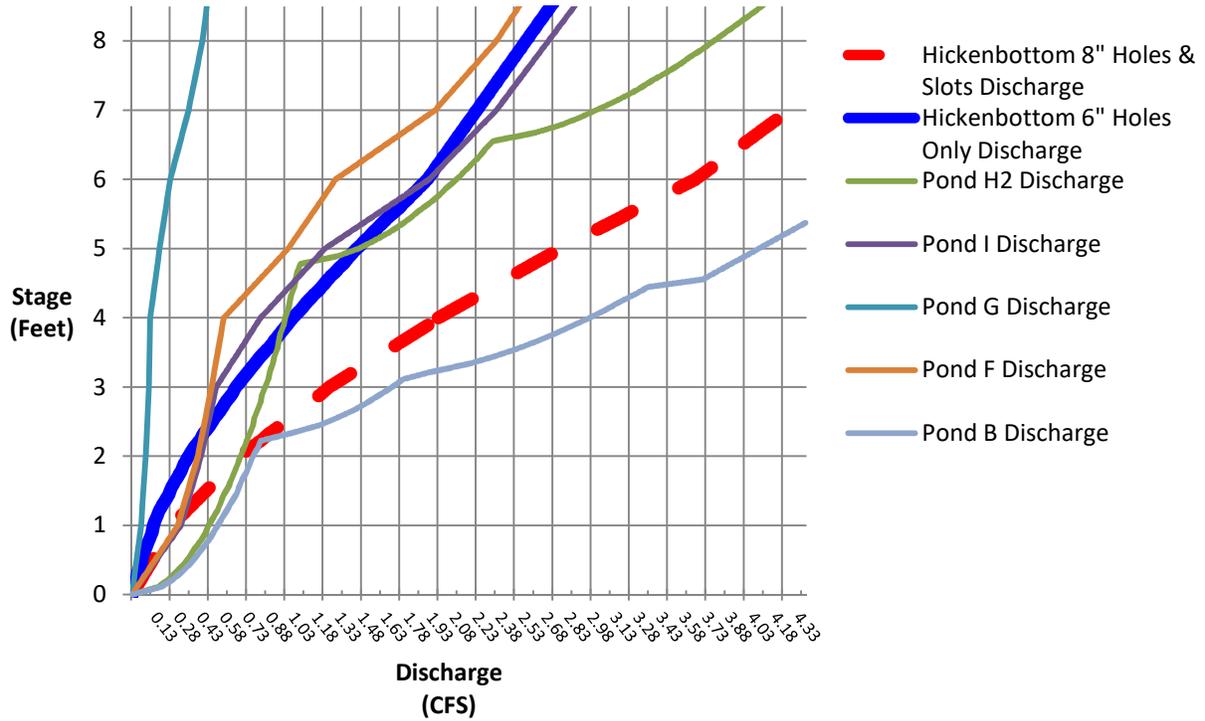
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JOHN HENRY NO. 1 MINE  
Black Diamond, Washington

POND I  
AS-BUILT

Revision:	FCLR17	FCLR18	FCLR19				
Drawn By:	MC/BS	MC/BS	MC/BS				
Date:	05/97	08/97	08/98				

# Pond Discharge Comparison



Stage (Ft)	Discharge					
	6" Hickenbottom	6" Orifice	WWHM 3-Orifice Riser			
	Advertised 40 Holes per Foot (CFS)		Pond F (CFS)	Pond G (CFS)	Pond I (CFS)	Pond H2 (CFS)
1	0.13	0.98	0.30	0.06	0.32	0.50
2	0.37	1.38	0.42	0.08	0.45	0.71
3	0.68	1.69	0.52	0.10	0.55	0.86
4	1.05	1.95	0.60	0.12	0.84	1.00
5	1.47	2.18	1.02	0.17	1.26	1.47
6	1.93	2.39	1.33	0.25	1.93	2.11

Stage (Ft)	Discharge			
	8" Hickenbottom		8" Orifice	WWHM
	Advertised 56 Holes per Foot (CFS)	Advertised 44 Holes per Foot with 8 1x4 slots per foot (CFS)		Pond B (CFS)
1	0.18	<b>0.26</b>	1.74	<b>0.56</b>
2	0.52	<b>0.70</b>	2.46	<b>0.79</b>
3	0.95	<b>1.29</b>	3.01	<b>1.70</b>
4	1.47	<b>2.00</b>	3.47	<b>2.98</b>
5	2.05	<b>2.79</b>	3.88	<b>10.66</b>
6	2.70	3.67	4.25	#N/A

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## Appendix C

**WWHM2012**

**PROJECT REPORT**

for

**John Henry Mine**

**Existing Conditions Analysis  
of Ponds B, G, F, H2, I & Pit 1 / Pit 2**

**March 15, 2018**

## General Model Information

Project Name: Ponds\_B\_G\_F\_I\_H2\_Pit1  
Site Name: John Henry Mine - Pond Sizing for Existing Conditions  
Site Address:  
City:  
Report Date: 3/13/2018  
Gage: Seatac  
Data Start: 1948/10/01  
Data End: 2009/09/30  
Timestep: 15 Minute  
Precip Scale: ~~0.000 (adjusted)~~ ← This is 1.167  
Version Date: 2017/07/05  
Version: 4.2.13

## POC Thresholds

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Low Flow Threshold for POC1: 50 Percent of the 2 Year  
High Flow Threshold for POC1: 50 Year

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Low Flow Threshold for POC2: 50 Percent of the 2 Year  
High Flow Threshold for POC2: 50 Year

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Low Flow Threshold for POC3: 50 Percent of the 2 Year  
High Flow Threshold for POC3: 50 Year

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Low Flow Threshold for POC4: 50 Percent of the 2 Year  
High Flow Threshold for POC4: 50 Year

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Low Flow Threshold for POC5: 50 Percent of the 2 Year  
High Flow Threshold for POC5: 50 Year

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Low Flow Threshold for POC6: 50 Percent of the 2 Year  
High Flow Threshold for POC6: 50 Year

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*Appendix*  
*Predeveloped Schematic*



Mitigated Schematic



## *Landuse Basin Data*

### *Predeveloped Land Use*

#### PreDev - Pond G Basin

Bypass: No

GroundWater: No

Pervious Land Use acre  
C, Forest, Mod 6.7

Pervious Total 6.7

Impervious Land Use acre

Impervious Total 0

Basin Total 6.7

Element Flows To:  
Surface

Interflow

Groundwater

## PreDev - Pond I Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 29.9
Pervious Total	29.9
Impervious Land Use	acre
Impervious Total	0
Basin Total	29.9

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pond B Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 41.6
Pervious Total	41.6
Impervious Land Use	acre
Impervious Total	0
Basin Total	41.6

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pond H2 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 55.6
Pervious Total	55.6
Impervious Land Use	acre
Impervious Total	0
Basin Total	55.6

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pit 1/Pit 2 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 101.5
Pervious Total	101.5
Impervious Land Use	acre
Impervious Total	0
Basin Total	101.5

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pond F Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 32.8
Pervious Total	32.8
Impervious Land Use	acre
Impervious Total	0
Basin Total	32.8

Element Flows To:		
Surface	Interflow	Groundwater

*Mitigated Land Use*

Dev - Pond I Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	14.7
C, Lawn, Mod	10.3
Pervious Total	25
Impervious Land Use	acre
ROADS MOD	4.1
POND	0.8
Impervious Total	4.9
Basin Total	29.9

Element Flows To:		
Surface	Interflow	Groundwater
Pond I	Pond I	

## Dev - Pond H2 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 55.2
Pervious Total	55.2
Impervious Land Use POND	acre 0.4
Impervious Total	0.4
Basin Total	55.6

Element Flows To:		
Surface	Interflow	Groundwater
Pond H2	Pond H2	

## Dev - Pond F Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	27
C, Lawn, Mod	5.4
Pervious Total	32.4
Impervious Land Use	acre
POND	0.4
Impervious Total	0.4
Basin Total	32.8

Element Flows To:		
Surface	Interflow	Groundwater
Pond F	Pond F	

## Dev - Pit 1 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	37.3
C, Lawn, Mod	23.6
Pervious Total	60.9
Impervious Land Use	acre
POND	40.6
Impervious Total	40.6
Basin Total	101.5

Element Flows To:		
Surface	Interflow	Groundwater

## Dev - Pond G Basin

Bypass: No

GroundWater: No

Pervious Land Use acre

C, Forest, Mod 1.1

C, Lawn, Mod 3.7

Pervious Total 4.8

Impervious Land Use acre

ROADS MOD 1.8

POND 0.1

Impervious Total 1.9

Basin Total 6.7

Element Flows To:

Surface

Interflow

Groundwater

Pond G

Pond G

## Dev - Pond B Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	33.4
C, Lawn, Mod	1.7
Pervious Total	35.1
Impervious Land Use	acre
ROADS MOD	5
POND	1.5
Impervious Total	6.5
Basin Total	41.6

### Element Flows To:

Surface Pond B	Interflow Pond B	Groundwater
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## Mitigated Routing

### Pond F

Bottom Length: 216.00 ft.  
 Bottom Width: 69.00 ft.  
 Depth: 9 ft.  
 Volume at riser head: 3.9882 acre-feet.  
 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: 8.5 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 3.322 in. Elevation:0 ft.  
 Orifice 2 Diameter: 4.218 in. Elevation:4.484 ft.  
 Orifice 3 Diameter: 4.128 in. Elevation:6.178 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
773.20	0.342	0.000	0.000	0.000
773.30	0.344	0.034	0.094	0.000
773.40	0.347	0.069	0.133	0.000
773.50	0.350	0.103	0.164	0.000
773.60	0.352	0.139	0.189	0.000
773.70	0.355	0.174	0.211	0.000
773.80	0.358	0.210	0.232	0.000
773.90	0.360	0.246	0.250	0.000
774.00	0.363	0.282	0.267	0.000
774.10	0.366	0.318	0.284	0.000
774.20	0.368	0.355	0.299	0.000
774.30	0.371	0.392	0.314	0.000
774.40	0.374	0.429	0.328	0.000
774.50	0.376	0.467	0.341	0.000
774.60	0.379	0.505	0.354	0.000
774.70	0.382	0.543	0.366	0.000
774.80	0.385	0.581	0.378	0.000
774.90	0.387	0.620	0.390	0.000
775.00	0.390	0.659	0.401	0.000
775.10	0.393	0.698	0.412	0.000
775.20	0.396	0.737	0.423	0.000
775.30	0.398	0.777	0.434	0.000
775.40	0.401	0.817	0.444	0.000
775.50	0.404	0.857	0.454	0.000
775.60	0.407	0.898	0.463	0.000
775.70	0.409	0.939	0.473	0.000
775.80	0.412	0.980	0.482	0.000
775.90	0.415	1.021	0.492	0.000
776.00	0.418	1.063	0.501	0.000
776.10	0.421	1.105	0.510	0.000
776.20	0.424	1.147	0.518	0.000
776.30	0.426	1.190	0.527	0.000
776.40	0.429	1.232	0.535	0.000

776.50	0.432	1.276	0.544	0.000
776.60	0.435	1.319	0.552	0.000
776.70	0.438	1.363	0.560	0.000
776.80	0.441	1.407	0.568	0.000
776.90	0.444	1.451	0.576	0.000
777.00	0.446	1.495	0.583	0.000
777.10	0.449	1.540	0.591	0.000
777.20	0.452	1.585	0.598	0.000
777.30	0.455	1.631	0.606	0.000
777.40	0.458	1.676	0.613	0.000
777.50	0.461	1.722	0.621	0.000
777.60	0.464	1.769	0.628	0.000
777.70	0.467	1.815	0.696	0.000
777.80	0.470	1.862	0.806	0.000
777.90	0.473	1.909	0.873	0.000
778.00	0.476	1.957	0.927	0.000
778.10	0.479	2.005	0.974	0.000
778.20	0.482	2.053	1.016	0.000
778.30	0.485	2.101	1.055	0.000
778.40	0.488	2.150	1.091	0.000
778.50	0.491	2.199	1.125	0.000
778.60	0.494	2.248	1.158	0.000
778.70	0.497	2.298	1.189	0.000
778.80	0.500	2.347	1.218	0.000
778.90	0.503	2.398	1.247	0.000
779.00	0.506	2.448	1.275	0.000
779.10	0.509	2.499	1.301	0.000
779.20	0.512	2.550	1.328	0.000
779.30	0.515	2.601	1.353	0.000
779.40	0.518	2.653	1.446	0.000
779.50	0.521	2.705	1.563	0.000
779.60	0.524	2.757	1.643	0.000
779.70	0.527	2.810	1.711	0.000
779.80	0.530	2.863	1.772	0.000
779.90	0.534	2.916	1.828	0.000
780.00	0.537	2.970	1.880	0.000
780.10	0.540	3.024	1.930	0.000
780.20	0.543	3.078	1.977	0.000
780.30	0.546	3.132	2.022	0.000
780.40	0.549	3.187	2.066	0.000
780.50	0.552	3.242	2.109	0.000
780.60	0.555	3.298	2.150	0.000
780.70	0.559	3.353	2.190	0.000
780.80	0.562	3.409	2.229	0.000
780.90	0.565	3.466	2.267	0.000
781.00	0.568	3.523	2.304	0.000
781.10	0.571	3.580	2.340	0.000
781.20	0.575	3.637	2.376	0.000
781.30	0.578	3.695	2.411	0.000
781.40	0.581	3.753	2.445	0.000
781.50	0.584	3.811	2.479	0.000
781.60	0.587	3.869	2.512	0.000
781.70	0.591	3.928	2.545	0.000
781.80	0.594	3.988	3.247	0.000
781.90	0.597	4.047	4.495	0.000
782.00	0.600	4.107	6.061	0.000
782.10	0.604	4.167	7.805	0.000
782.20	0.607	4.228	9.588	0.000

## Pond H2

Bottom Length: 211.00 ft.  
 Bottom Width: 76.00 ft.  
 Depth: 10 ft.  
 Volume at riser head: 5.2033 acre-feet.  
 Side slope 1: 3 To 1  
 Side slope 2: 3 To 1  
 Side slope 3: 3 To 1  
 Side slope 4: 3 To 1  
 Discharge Structure  
 Riser Height: 9 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 4.288 in. Elevation:0 ft.  
 Orifice 2 Diameter: 5.481 in. Elevation:4.81 ft.  
 Orifice 3 Diameter: 5.371 in. Elevation:6.588 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
659.00	0.368	0.000	0.000	0.000
659.11	0.372	0.041	0.166	0.000
659.22	0.377	0.082	0.235	0.000
659.33	0.381	0.124	0.288	0.000
659.44	0.385	0.167	0.332	0.000
659.56	0.390	0.210	0.371	0.000
659.67	0.394	0.254	0.407	0.000
659.78	0.399	0.298	0.440	0.000
659.89	0.403	0.343	0.470	0.000
660.00	0.408	0.388	0.499	0.000
660.11	0.413	0.433	0.526	0.000
660.22	0.417	0.480	0.551	0.000
660.33	0.422	0.526	0.576	0.000
660.44	0.427	0.573	0.599	0.000
660.56	0.431	0.621	0.622	0.000
660.67	0.436	0.669	0.644	0.000
660.78	0.441	0.718	0.665	0.000
660.89	0.445	0.767	0.685	0.000
661.00	0.450	0.817	0.705	0.000
661.11	0.455	0.867	0.725	0.000
661.22	0.460	0.918	0.743	0.000
661.33	0.464	0.970	0.762	0.000
661.44	0.469	1.022	0.780	0.000
661.56	0.474	1.074	0.797	0.000
661.67	0.479	1.127	0.814	0.000
661.78	0.484	1.181	0.831	0.000
661.89	0.489	1.235	0.848	0.000
662.00	0.494	1.289	0.864	0.000
662.11	0.499	1.344	0.880	0.000
662.22	0.504	1.400	0.895	0.000
662.33	0.509	1.456	0.911	0.000
662.44	0.514	1.513	0.926	0.000
662.56	0.519	1.571	0.940	0.000
662.67	0.524	1.629	0.955	0.000
662.78	0.529	1.687	0.969	0.000

662.89	0.534	1.746	0.984	0.000
663.00	0.539	1.806	0.997	0.000
663.11	0.544	1.866	1.011	0.000
663.22	0.549	1.927	1.025	0.000
663.33	0.555	1.988	1.038	0.000
663.44	0.560	2.050	1.051	0.000
663.56	0.565	2.113	1.065	0.000
663.67	0.570	2.176	1.077	0.000
663.78	0.575	2.240	1.090	0.000
663.89	0.581	2.304	1.332	0.000
664.00	0.586	2.369	1.471	0.000
664.11	0.591	2.434	1.575	0.000
664.22	0.597	2.500	1.663	0.000
664.33	0.602	2.567	1.742	0.000
664.44	0.607	2.634	1.813	0.000
664.56	0.613	2.702	1.880	0.000
664.67	0.618	2.770	1.942	0.000
664.78	0.624	2.840	2.001	0.000
664.89	0.629	2.909	2.057	0.000
665.00	0.635	2.979	2.111	0.000
665.11	0.640	3.050	2.163	0.000
665.22	0.646	3.122	2.213	0.000
665.33	0.651	3.194	2.261	0.000
665.44	0.657	3.267	2.308	0.000
665.56	0.662	3.340	2.354	0.000
665.67	0.668	3.414	2.618	0.000
665.78	0.674	3.488	2.783	0.000
665.89	0.679	3.564	2.914	0.000
666.00	0.685	3.640	3.029	0.000
666.11	0.691	3.716	3.133	0.000
666.22	0.696	3.793	3.230	0.000
666.33	0.702	3.871	3.322	0.000
666.44	0.708	3.949	3.409	0.000
666.56	0.714	4.028	3.492	0.000
666.67	0.719	4.108	3.572	0.000
666.78	0.725	4.188	3.649	0.000
666.89	0.731	4.269	3.724	0.000
667.00	0.737	4.351	3.797	0.000
667.11	0.743	4.433	3.868	0.000
667.22	0.749	4.516	3.937	0.000
667.33	0.755	4.599	4.004	0.000
667.44	0.760	4.684	4.070	0.000
667.56	0.766	4.769	4.135	0.000
667.67	0.772	4.854	4.198	0.000
667.78	0.778	4.940	4.260	0.000
667.89	0.784	5.027	4.321	0.000
668.00	0.790	5.115	4.381	0.000
668.11	0.796	5.203	5.225	0.000
668.22	0.803	5.292	6.703	0.000
668.33	0.809	5.381	8.534	0.000
668.44	0.815	5.472	10.52	0.000
668.56	0.821	5.562	12.49	0.000
668.67	0.827	5.654	14.24	0.000
668.78	0.833	5.746	15.64	0.000
668.89	0.839	5.839	16.64	0.000
669.00	0.846	5.933	17.34	0.000
669.11	0.852	6.027	18.21	0.000

## Pond I

Bottom Length: 334.00 ft.  
 Bottom Width: 63.00 ft.  
 Depth: 8 ft.  
 Volume at riser head: 4.6052 acre-feet.  
 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: 7.3 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 3.415 in. Elevation:0 ft.  
 Orifice 2 Diameter: 4.326 in. Elevation:3.835 ft.  
 Orifice 3 Diameter: 4.232 in. Elevation:5.293 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
748.70	0.483	0.000	0.000	0.000
748.79	0.486	0.043	0.094	0.000
748.88	0.489	0.086	0.133	0.000
748.97	0.492	0.130	0.163	0.000
749.06	0.496	0.174	0.188	0.000
749.14	0.499	0.218	0.211	0.000
749.23	0.502	0.262	0.231	0.000
749.32	0.505	0.307	0.249	0.000
749.41	0.509	0.352	0.266	0.000
749.50	0.512	0.398	0.283	0.000
749.59	0.515	0.443	0.298	0.000
749.68	0.519	0.489	0.312	0.000
749.77	0.522	0.536	0.326	0.000
749.86	0.525	0.582	0.340	0.000
749.94	0.529	0.629	0.353	0.000
750.03	0.532	0.676	0.365	0.000
750.12	0.535	0.724	0.377	0.000
750.21	0.539	0.772	0.389	0.000
750.30	0.542	0.820	0.400	0.000
750.39	0.545	0.868	0.411	0.000
750.48	0.549	0.917	0.422	0.000
750.57	0.552	0.966	0.432	0.000
750.66	0.555	1.015	0.442	0.000
750.74	0.559	1.064	0.452	0.000
750.83	0.562	1.114	0.462	0.000
750.92	0.565	1.164	0.471	0.000
751.01	0.569	1.215	0.481	0.000
751.10	0.572	1.266	0.490	0.000
751.19	0.576	1.317	0.499	0.000
751.28	0.579	1.368	0.508	0.000
751.37	0.582	1.420	0.516	0.000
751.46	0.586	1.472	0.525	0.000
751.54	0.589	1.524	0.533	0.000
751.63	0.593	1.576	0.542	0.000
751.72	0.596	1.629	0.550	0.000

751.81	0.600	1.683	0.558	0.000
751.90	0.603	1.736	0.566	0.000
751.99	0.606	1.790	0.573	0.000
752.08	0.610	1.844	0.581	0.000
752.17	0.613	1.898	0.589	0.000
752.26	0.617	1.953	0.596	0.000
752.34	0.620	2.008	0.604	0.000
752.43	0.624	2.063	0.611	0.000
752.52	0.627	2.119	0.618	0.000
752.61	0.631	2.175	0.766	0.000
752.70	0.634	2.231	0.839	0.000
752.79	0.638	2.288	0.895	0.000
752.88	0.641	2.345	0.944	0.000
752.97	0.645	2.402	0.987	0.000
753.06	0.648	2.459	1.026	0.000
753.14	0.652	2.517	1.063	0.000
753.23	0.655	2.575	1.098	0.000
753.32	0.659	2.634	1.131	0.000
753.41	0.663	2.693	1.162	0.000
753.50	0.666	2.752	1.192	0.000
753.59	0.670	2.811	1.221	0.000
753.68	0.673	2.871	1.249	0.000
753.77	0.677	2.931	1.276	0.000
753.86	0.680	2.991	1.302	0.000
753.94	0.684	3.052	1.327	0.000
754.03	0.687	3.113	1.450	0.000
754.12	0.691	3.174	1.551	0.000
754.21	0.695	3.236	1.627	0.000
754.30	0.698	3.298	1.692	0.000
754.39	0.702	3.360	1.752	0.000
754.48	0.706	3.423	1.807	0.000
754.57	0.709	3.486	1.858	0.000
754.66	0.713	3.549	1.907	0.000
754.74	0.716	3.612	1.954	0.000
754.83	0.720	3.676	1.999	0.000
754.92	0.724	3.740	2.042	0.000
755.01	0.727	3.805	2.084	0.000
755.10	0.731	3.870	2.125	0.000
755.19	0.735	3.935	2.165	0.000
755.28	0.738	4.001	2.203	0.000
755.37	0.742	4.066	2.241	0.000
755.46	0.746	4.132	2.278	0.000
755.54	0.749	4.199	2.314	0.000
755.63	0.753	4.266	2.349	0.000
755.72	0.757	4.333	2.384	0.000
755.81	0.760	4.400	2.418	0.000
755.90	0.764	4.468	2.451	0.000
755.99	0.768	4.536	2.484	0.000
756.08	0.772	4.605	2.977	0.000
756.17	0.775	4.674	3.987	0.000
756.26	0.779	4.743	5.289	0.000
756.34	0.783	4.812	6.780	0.000
756.43	0.786	4.882	8.363	0.000
756.52	0.790	4.952	9.940	0.000
756.61	0.794	5.022	11.41	0.000
756.70	0.798	5.093	12.69	0.000
756.79	0.802	5.164	13.74	0.000

## Pond B

Bottom Length: 216.00 ft.  
 Bottom Width: 204.00 ft.  
 Depth: 5 ft.  
 Volume at riser head: 5.2346 acre-feet.  
 Side slope 1: 3 To 1  
 Side slope 2: 3 To 1  
 Side slope 3: 3 To 1  
 Side slope 4: 3 To 1  
 Discharge Structure  
 Riser Height: 4.5 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 4.533 in. Elevation:0 ft.  
 Orifice 2 Diameter: 5.647 in. Elevation:2.289 ft.  
 Orifice 3 Diameter: 5.507 in. Elevation:3.203 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
665.00	1.011	0.000	0.000	0.000
665.06	1.014	0.056	0.131	0.000
665.11	1.018	0.112	0.185	0.000
665.17	1.021	0.169	0.227	0.000
665.22	1.024	0.226	0.262	0.000
665.28	1.027	0.283	0.293	0.000
665.33	1.030	0.340	0.321	0.000
665.39	1.034	0.397	0.347	0.000
665.44	1.037	0.455	0.371	0.000
665.50	1.040	0.513	0.394	0.000
665.56	1.044	0.571	0.415	0.000
665.61	1.047	0.629	0.435	0.000
665.67	1.050	0.687	0.455	0.000
665.72	1.053	0.745	0.473	0.000
665.78	1.057	0.804	0.491	0.000
665.83	1.060	0.863	0.509	0.000
665.89	1.063	0.922	0.525	0.000
665.94	1.066	0.981	0.541	0.000
666.00	1.070	1.040	0.557	0.000
666.06	1.073	1.100	0.572	0.000
666.11	1.076	1.160	0.587	0.000
666.17	1.080	1.220	0.602	0.000
666.22	1.083	1.280	0.616	0.000
666.28	1.086	1.340	0.630	0.000
666.33	1.090	1.400	0.643	0.000
666.39	1.093	1.461	0.657	0.000
666.44	1.096	1.522	0.670	0.000
666.50	1.100	1.583	0.682	0.000
666.56	1.103	1.644	0.695	0.000
666.61	1.106	1.706	0.707	0.000
666.67	1.110	1.767	0.719	0.000
666.72	1.113	1.829	0.731	0.000
666.78	1.117	1.891	0.743	0.000
666.83	1.120	1.953	0.755	0.000
666.89	1.123	2.015	0.766	0.000

666.94	1.127	2.078	0.777	0.000
667.00	1.130	2.141	0.788	0.000
667.06	1.134	2.204	0.799	0.000
667.11	1.137	2.267	0.810	0.000
667.17	1.140	2.330	0.820	0.000
667.22	1.144	2.393	0.831	0.000
667.28	1.147	2.457	0.841	0.000
667.33	1.151	2.521	1.034	0.000
667.39	1.154	2.585	1.135	0.000
667.44	1.157	2.649	1.213	0.000
667.50	1.161	2.714	1.279	0.000
667.56	1.164	2.778	1.338	0.000
667.61	1.168	2.843	1.392	0.000
667.67	1.171	2.908	1.442	0.000
667.72	1.175	2.973	1.489	0.000
667.78	1.178	3.039	1.534	0.000
667.83	1.182	3.104	1.577	0.000
667.89	1.185	3.170	1.618	0.000
667.94	1.189	3.236	1.657	0.000
668.00	1.192	3.302	1.695	0.000
668.06	1.196	3.368	1.732	0.000
668.11	1.199	3.435	1.768	0.000
668.17	1.203	3.502	1.803	0.000
668.22	1.206	3.569	1.951	0.000
668.28	1.210	3.636	2.095	0.000
668.33	1.213	3.703	2.199	0.000
668.39	1.217	3.771	2.288	0.000
668.44	1.220	3.838	2.369	0.000
668.50	1.224	3.906	2.444	0.000
668.56	1.227	3.974	2.514	0.000
668.61	1.231	4.043	2.580	0.000
668.67	1.234	4.111	2.643	0.000
668.72	1.238	4.180	2.704	0.000
668.78	1.241	4.249	2.763	0.000
668.83	1.245	4.318	2.820	0.000
668.89	1.249	4.387	2.875	0.000
668.94	1.252	4.457	2.929	0.000
669.00	1.256	4.526	2.981	0.000
669.06	1.259	4.596	3.033	0.000
669.11	1.263	4.666	3.083	0.000
669.17	1.267	4.737	3.131	0.000
669.22	1.270	4.807	3.179	0.000
669.28	1.274	4.878	3.226	0.000
669.33	1.277	4.949	3.273	0.000
669.39	1.281	5.020	3.318	0.000
669.44	1.285	5.091	3.363	0.000
669.50	1.288	5.162	3.406	0.000
669.56	1.292	5.234	3.727	0.000
669.61	1.295	5.306	4.277	0.000
669.67	1.299	5.378	4.973	0.000
669.72	1.303	5.450	5.781	0.000
669.78	1.306	5.523	6.676	0.000
669.83	1.310	5.596	7.636	0.000
669.89	1.314	5.669	8.636	0.000
669.94	1.317	5.742	9.653	0.000
670.00	1.321	5.815	10.66	0.000
670.06	1.325	5.888	11.64	0.000

## Pond G

Bottom Length: 75.00 ft.  
 Bottom Width: 60.00 ft.  
 Depth: 9 ft.  
 Volume at riser head: 1.4485 acre-feet.  
 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: 8.6 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 1.538 in. Elevation:0 ft.  
 Orifice 2 Diameter: 1.771 in. Elevation:4.811 ft.  
 Orifice 3 Diameter: 1.919 in. Elevation:6.454 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

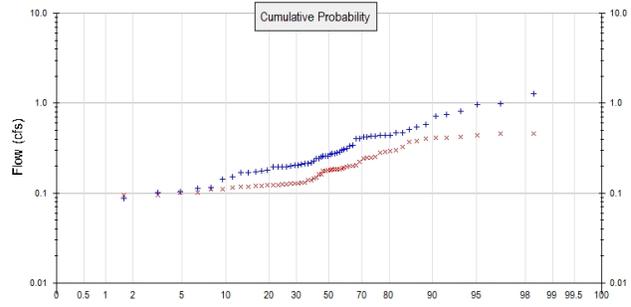
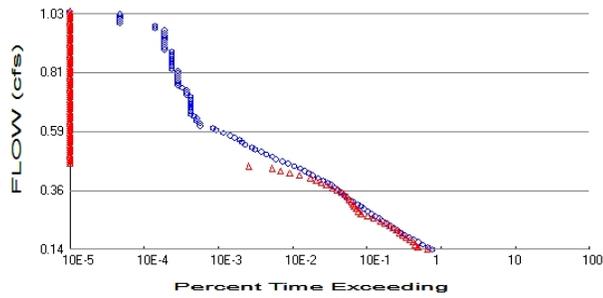
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
729.70	0.103	0.000	0.000	0.000
729.80	0.104	0.010	0.020	0.000
729.90	0.105	0.020	0.028	0.000
730.00	0.107	0.031	0.035	0.000
730.10	0.108	0.042	0.040	0.000
730.20	0.109	0.053	0.045	0.000
730.30	0.110	0.064	0.049	0.000
730.40	0.112	0.075	0.053	0.000
730.50	0.113	0.086	0.057	0.000
730.60	0.114	0.098	0.060	0.000
730.70	0.116	0.109	0.064	0.000
730.80	0.117	0.121	0.067	0.000
730.90	0.118	0.133	0.070	0.000
731.00	0.120	0.145	0.073	0.000
731.10	0.121	0.157	0.076	0.000
731.20	0.122	0.169	0.078	0.000
731.30	0.124	0.181	0.081	0.000
731.40	0.125	0.194	0.083	0.000
731.50	0.126	0.206	0.086	0.000
731.60	0.128	0.219	0.088	0.000
731.70	0.129	0.232	0.090	0.000
731.80	0.131	0.245	0.093	0.000
731.90	0.132	0.258	0.095	0.000
732.00	0.133	0.271	0.097	0.000
732.10	0.135	0.285	0.099	0.000
732.20	0.136	0.298	0.101	0.000
732.30	0.138	0.312	0.103	0.000
732.40	0.139	0.326	0.105	0.000
732.50	0.140	0.340	0.107	0.000
732.60	0.142	0.354	0.109	0.000
732.70	0.143	0.369	0.111	0.000
732.80	0.145	0.383	0.113	0.000
732.90	0.146	0.398	0.114	0.000
733.00	0.148	0.412	0.116	0.000
733.10	0.149	0.427	0.118	0.000

733.20	0.151	0.442	0.120	0.000
733.30	0.152	0.457	0.121	0.000
733.40	0.154	0.473	0.123	0.000
733.50	0.155	0.488	0.125	0.000
733.60	0.157	0.504	0.126	0.000
733.70	0.158	0.520	0.128	0.000
733.80	0.160	0.536	0.130	0.000
733.90	0.161	0.552	0.131	0.000
734.00	0.163	0.568	0.133	0.000
734.10	0.165	0.585	0.134	0.000
734.20	0.166	0.601	0.136	0.000
734.30	0.168	0.618	0.137	0.000
734.40	0.169	0.635	0.139	0.000
734.50	0.171	0.652	0.140	0.000
734.60	0.172	0.669	0.167	0.000
734.70	0.174	0.686	0.180	0.000
734.80	0.176	0.704	0.190	0.000
734.90	0.177	0.722	0.199	0.000
735.00	0.179	0.739	0.207	0.000
735.10	0.181	0.757	0.214	0.000
735.20	0.182	0.776	0.221	0.000
735.30	0.184	0.794	0.227	0.000
735.40	0.185	0.812	0.233	0.000
735.50	0.187	0.831	0.239	0.000
735.60	0.189	0.850	0.244	0.000
735.70	0.190	0.869	0.250	0.000
735.80	0.192	0.888	0.255	0.000
735.90	0.194	0.907	0.260	0.000
736.00	0.196	0.927	0.265	0.000
736.10	0.197	0.947	0.269	0.000
736.20	0.199	0.967	0.295	0.000
736.30	0.201	0.987	0.316	0.000
736.40	0.202	1.007	0.332	0.000
736.50	0.204	1.027	0.346	0.000
736.60	0.206	1.048	0.358	0.000
736.70	0.208	1.068	0.369	0.000
736.80	0.209	1.089	0.380	0.000
736.90	0.211	1.110	0.390	0.000
737.00	0.213	1.132	0.399	0.000
737.10	0.215	1.153	0.408	0.000
737.20	0.216	1.175	0.417	0.000
737.30	0.218	1.196	0.426	0.000
737.40	0.220	1.218	0.434	0.000
737.50	0.222	1.241	0.442	0.000
737.60	0.224	1.263	0.450	0.000
737.70	0.226	1.285	0.457	0.000
737.80	0.227	1.308	0.465	0.000
737.90	0.229	1.331	0.472	0.000
738.00	0.231	1.354	0.479	0.000
738.10	0.233	1.377	0.486	0.000
738.20	0.235	1.401	0.493	0.000
738.30	0.237	1.424	0.500	0.000
738.40	0.239	1.448	1.177	0.000
738.50	0.240	1.472	2.400	0.000
738.60	0.242	1.496	3.941	0.000
738.70	0.244	1.521	5.660	0.000
738.80	0.246	1.545	7.420	0.000

# Analysis Results

POC 1

**Pond G**



+ Predeveloped    x Mitigated

## Predeveloped Landuse Totals for POC #1

Total Pervious Area: 6.7  
Total Impervious Area: 0

## Mitigated Landuse Totals for POC #1

Total Pervious Area: 4.8  
Total Impervious Area: 1.9

Flow Frequency Method: Log Pearson Type III 17B

## Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.276139
5 year	0.46933
10 year	0.622952
25 year	0.846337
50 year	1.034171
100 year	1.240562

## Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.178034
5 year	0.268328
10 year	0.338556
25 year	0.439925
50 year	0.525111
100 year	0.619012

## Annual Peaks

### Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.402	0.123
1950	0.430	0.220
1951	0.542	0.426
1952	0.180	0.111
1953	0.152	0.126
1954	0.220	0.161
1955	0.339	0.184
1956	0.313	0.240
1957	0.275	0.145
1958	0.253	0.176

1959	0.215	0.128
1960	0.433	0.370
1961	0.209	0.162
1962	0.142	0.101
1963	0.204	0.150
1964	0.282	0.130
1965	0.213	0.200
1966	0.169	0.128
1967	0.470	0.179
1968	0.260	0.129
1969	0.244	0.123
1970	0.196	0.125
1971	0.261	0.193
1972	0.425	0.287
1973	0.194	0.184
1974	0.256	0.195
1975	0.332	0.140
1976	0.242	0.179
1977	0.101	0.095
1978	0.196	0.177
1979	0.116	0.102
1980	0.754	0.327
1981	0.171	0.130
1982	0.441	0.283
1983	0.288	0.183
1984	0.176	0.117
1985	0.103	0.116
1986	0.439	0.251
1987	0.409	0.292
1988	0.173	0.120
1989	0.112	0.109
1990	1.275	0.414
1991	0.583	0.381
1992	0.229	0.187
1993	0.204	0.123
1994	0.087	0.096
1995	0.272	0.204
1996	0.719	0.436
1997	0.514	0.402
1998	0.199	0.119
1999	0.819	0.299
2000	0.194	0.140
2001	0.051	0.088
2002	0.274	0.248
2003	0.470	0.120
2004	0.442	0.413
2005	0.304	0.199
2006	0.299	0.184
2007	0.978	0.462
2008	0.993	0.457
2009	0.422	0.249

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.2755	0.4619
2	0.9929	0.4570
3	0.9775	0.4360

4	0.8189	0.4261
5	0.7540	0.4136
6	0.7186	0.4128
7	0.5825	0.4024
8	0.5418	0.3813
9	0.5140	0.3695
10	0.4703	0.3271
11	0.4700	0.2991
12	0.4420	0.2916
13	0.4406	0.2874
14	0.4385	0.2825
15	0.4326	0.2513
16	0.4305	0.2493
17	0.4246	0.2477
18	0.4218	0.2402
19	0.4085	0.2204
20	0.4022	0.2040
21	0.3394	0.1995
22	0.3323	0.1988
23	0.3129	0.1948
24	0.3039	0.1933
25	0.2988	0.1865
26	0.2884	0.1840
27	0.2819	0.1836
28	0.2750	0.1835
29	0.2742	0.1833
30	0.2718	0.1791
31	0.2606	0.1787
32	0.2597	0.1766
33	0.2564	0.1763
34	0.2534	0.1617
35	0.2442	0.1611
36	0.2415	0.1499
37	0.2292	0.1453
38	0.2200	0.1402
39	0.2153	0.1400
40	0.2134	0.1297
41	0.2087	0.1297
42	0.2043	0.1289
43	0.2037	0.1284
44	0.1993	0.1280
45	0.1965	0.1264
46	0.1962	0.1255
47	0.1944	0.1234
48	0.1940	0.1231
49	0.1801	0.1231
50	0.1763	0.1205
51	0.1728	0.1200
52	0.1706	0.1186
53	0.1694	0.1168
54	0.1519	0.1158
55	0.1416	0.1108
56	0.1159	0.1093
57	0.1116	0.1017
58	0.1033	0.1009
59	0.1014	0.0957
60	0.0875	0.0946
61	0.0507	0.0879

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1381	16236	14012	86	Pass
0.1471	14142	10307	72	Pass
0.1562	12222	9646	78	Pass
0.1652	10549	9011	85	Pass
0.1743	9180	8113	88	Pass
0.1833	7999	7146	89	Pass
0.1924	6996	6444	92	Pass
0.2014	6164	5792	93	Pass
0.2105	5469	5311	97	Pass
0.2195	4887	4860	99	Pass
0.2286	4400	4314	98	Pass
0.2376	3946	3784	95	Pass
0.2467	3508	3234	92	Pass
0.2557	3112	2637	84	Pass
0.2648	2755	2186	79	Pass
0.2738	2458	1782	72	Pass
0.2829	2182	1658	75	Pass
0.2919	1957	1544	78	Pass
0.3010	1780	1451	81	Pass
0.3100	1597	1394	87	Pass
0.3191	1395	1331	95	Pass
0.3282	1246	1224	98	Pass
0.3372	1123	1159	103	Pass
0.3463	1036	1072	103	Pass
0.3553	946	986	104	Pass
0.3644	876	852	97	Pass
0.3734	791	732	92	Pass
0.3825	717	609	84	Pass
0.3915	634	519	81	Pass
0.4006	551	441	80	Pass
0.4096	466	370	79	Pass
0.4187	394	264	67	Pass
0.4277	352	196	55	Pass
0.4368	311	147	47	Pass
0.4458	270	114	42	Pass
0.4549	224	55	24	Pass
0.4639	186	0	0	Pass
0.4730	155	0	0	Pass
0.4820	126	0	0	Pass
0.4911	113	0	0	Pass
0.5001	94	0	0	Pass
0.5092	80	0	0	Pass
0.5182	67	0	0	Pass
0.5273	60	0	0	Pass
0.5363	49	0	0	Pass
0.5454	44	0	0	Pass
0.5544	41	0	0	Pass
0.5635	35	0	0	Pass
0.5725	31	0	0	Pass
0.5816	25	0	0	Pass
0.5906	20	0	0	Pass
0.5997	18	0	0	Pass
0.6087	12	0	0	Pass

0.6178	12	0	0	Pass
0.6269	11	0	0	Pass
0.6359	11	0	0	Pass
0.6450	10	0	0	Pass
0.6540	9	0	0	Pass
0.6631	9	0	0	Pass
0.6721	9	0	0	Pass
0.6812	9	0	0	Pass
0.6902	9	0	0	Pass
0.6993	9	0	0	Pass
0.7083	9	0	0	Pass
0.7174	9	0	0	Pass
0.7264	8	0	0	Pass
0.7355	8	0	0	Pass
0.7445	8	0	0	Pass
0.7536	7	0	0	Pass
0.7626	6	0	0	Pass
0.7717	6	0	0	Pass
0.7807	6	0	0	Pass
0.7898	6	0	0	Pass
0.7988	6	0	0	Pass
0.8079	6	0	0	Pass
0.8169	6	0	0	Pass
0.8260	5	0	0	Pass
0.8350	5	0	0	Pass
0.8441	5	0	0	Pass
0.8531	5	0	0	Pass
0.8622	5	0	0	Pass
0.8712	5	0	0	Pass
0.8803	5	0	0	Pass
0.8893	5	0	0	Pass
0.8984	4	0	0	Pass
0.9074	4	0	0	Pass
0.9165	4	0	0	Pass
0.9256	4	0	0	Pass
0.9346	4	0	0	Pass
0.9437	4	0	0	Pass
0.9527	4	0	0	Pass
0.9618	4	0	0	Pass
0.9708	4	0	0	Pass
0.9799	3	0	0	Pass
0.9889	3	0	0	Pass
0.9980	1	0	0	Pass
1.0070	1	0	0	Pass
1.0161	1	0	0	Pass
1.0251	1	0	0	Pass
1.0342	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #1

**Pond G**

On-line facility volume: 0.4799 acre-feet

On-line facility target flow: 0.4204 cfs.

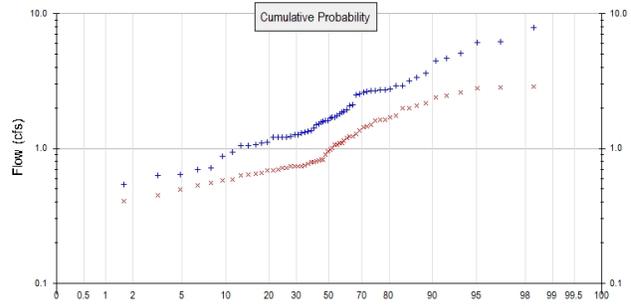
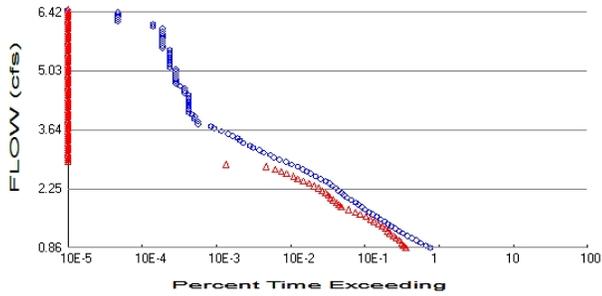
Adjusted for 15 min: 0.4204 cfs.

Off-line facility target flow: 0.2305 cfs.

Adjusted for 15 min: 0.2305 cfs.

POC 2

**Pond B**



+ Predeveloped    x Mitigated

Predeveloped Landuse Totals for POC #2

Total Pervious Area:     41.6  
 Total Impervious Area:    0

Mitigated Landuse Totals for POC #2

Total Pervious Area:     35.1  
 Total Impervious Area:    6.5

Flow Frequency Method:    Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	Flow(cfs)
2 year	1.714532
5 year	2.91405
10 year	3.86788
25 year	5.254873
50 year	6.421128
100 year	7.702601

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	Flow(cfs)
2 year	1.001352
5 year	1.576963
10 year	2.029747
25 year	2.687661
50 year	3.242958
100 year	3.856606

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	Predeveloped	Mitigated
1949	2.497	0.742
1950	2.673	1.438
1951	3.364	2.878
1952	1.118	0.636
1953	0.943	0.660
1954	1.366	1.060
1955	2.107	1.277
1956	1.943	1.492
1957	1.707	0.812
1958	1.574	1.013
1959	1.337	0.773

1960	2.686	2.178
1961	1.296	0.748
1962	0.879	0.579
1963	1.268	0.823
1964	1.750	0.790
1965	1.325	0.825
1966	1.052	0.696
1967	2.918	1.225
1968	1.613	0.740
1969	1.516	0.720
1970	1.218	0.735
1971	1.618	0.982
1972	2.636	2.005
1973	1.205	0.803
1974	1.592	1.152
1975	2.063	0.952
1976	1.500	1.096
1977	0.629	0.397
1978	1.220	0.794
1979	0.719	0.551
1980	4.682	1.627
1981	1.059	0.721
1982	2.736	1.466
1983	1.790	1.096
1984	1.095	0.633
1985	0.641	0.533
1986	2.723	1.707
1987	2.537	1.742
1988	1.073	0.688
1989	0.693	0.494
1990	7.919	2.388
1991	3.617	2.604
1992	1.423	0.906
1993	1.265	0.735
1994	0.543	0.451
1995	1.687	1.362
1996	4.462	2.832
1997	3.192	2.473
1998	1.238	0.590
1999	5.085	1.622
2000	1.207	0.651
2001	0.315	0.404
2002	1.702	1.187
2003	2.920	0.682
2004	2.744	1.994
2005	1.887	1.226
2006	1.855	1.063
2007	6.069	2.084
2008	6.165	2.812
2009	2.619	1.611

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	7.9192	2.8780
2	6.1651	2.8323
3	6.0694	2.8123
4	5.0847	2.6037

5	4.6816	2.4732
6	4.4616	2.3879
7	3.6168	2.1783
8	3.3640	2.0839
9	3.1916	2.0047
10	2.9204	1.9942
11	2.9183	1.7418
12	2.7445	1.7073
13	2.7358	1.6270
14	2.7228	1.6217
15	2.6860	1.6113
16	2.6728	1.4919
17	2.6362	1.4660
18	2.6192	1.4376
19	2.5365	1.3617
20	2.4973	1.2770
21	2.1070	1.2260
22	2.0632	1.2255
23	1.9430	1.1871
24	1.8868	1.1524
25	1.8550	1.0965
26	1.7905	1.0965
27	1.7501	1.0630
28	1.7072	1.0595
29	1.7023	1.0132
30	1.6873	0.9821
31	1.6181	0.9517
32	1.6126	0.9061
33	1.5921	0.8251
34	1.5736	0.8227
35	1.5160	0.8122
36	1.4997	0.8034
37	1.4228	0.7938
38	1.3660	0.7899
39	1.3368	0.7731
40	1.3250	0.7482
41	1.2958	0.7422
42	1.2685	0.7402
43	1.2645	0.7353
44	1.2378	0.7349
45	1.2198	0.7208
46	1.2179	0.7199
47	1.2072	0.6958
48	1.2048	0.6876
49	1.1183	0.6819
50	1.0949	0.6599
51	1.0731	0.6510
52	1.0590	0.6362
53	1.0516	0.6329
54	0.9433	0.5903
55	0.8791	0.5788
56	0.7195	0.5514
57	0.6928	0.5329
58	0.6411	0.4944
59	0.6294	0.4506
60	0.5430	0.4037
61	0.3148	0.3972

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.8573	16228	7578	46	Pass
0.9135	14132	7073	50	Pass
0.9697	12209	6648	54	Pass
1.0259	10534	6216	59	Pass
1.0821	9161	5619	61	Pass
1.1383	7967	5168	64	Pass
1.1945	6956	4706	67	Pass
1.2507	6151	4357	70	Pass
1.3069	5454	4034	73	Pass
1.3631	4860	3632	74	Pass
1.4193	4361	3243	74	Pass
1.4755	3918	2868	73	Pass
1.5317	3486	2556	73	Pass
1.5879	3093	2205	71	Pass
1.6441	2731	1831	67	Pass
1.7003	2417	1586	65	Pass
1.7565	2160	1295	59	Pass
1.8127	1933	1019	52	Pass
1.8689	1761	952	54	Pass
1.9251	1597	882	55	Pass
1.9813	1393	803	57	Pass
2.0375	1246	733	58	Pass
2.0937	1121	682	60	Pass
2.1499	1036	631	60	Pass
2.2061	942	560	59	Pass
2.2623	875	509	58	Pass
2.3185	789	443	56	Pass
2.3747	714	379	53	Pass
2.4309	633	318	50	Pass
2.4871	545	267	48	Pass
2.5433	465	234	50	Pass
2.5995	392	188	47	Pass
2.6557	351	160	45	Pass
2.7119	310	132	42	Pass
2.7681	265	100	37	Pass
2.8243	218	29	13	Pass
2.8805	184	0	0	Pass
2.9367	152	0	0	Pass
2.9929	126	0	0	Pass
3.0491	113	0	0	Pass
3.1053	93	0	0	Pass
3.1615	80	0	0	Pass
3.2177	67	0	0	Pass
3.2739	60	0	0	Pass
3.3301	49	0	0	Pass
3.3863	44	0	0	Pass
3.4425	41	0	0	Pass
3.4987	35	0	0	Pass
3.5549	31	0	0	Pass
3.6111	25	0	0	Pass
3.6673	20	0	0	Pass
3.7235	18	0	0	Pass
3.7797	12	0	0	Pass

3.8359	12	0	0	Pass
3.8921	11	0	0	Pass
3.9483	11	0	0	Pass
4.0045	10	0	0	Pass
4.0607	9	0	0	Pass
4.1169	9	0	0	Pass
4.1731	9	0	0	Pass
4.2293	9	0	0	Pass
4.2855	9	0	0	Pass
4.3417	9	0	0	Pass
4.3979	9	0	0	Pass
4.4541	9	0	0	Pass
4.5103	8	0	0	Pass
4.5665	8	0	0	Pass
4.6227	8	0	0	Pass
4.6789	7	0	0	Pass
4.7351	6	0	0	Pass
4.7913	6	0	0	Pass
4.8475	6	0	0	Pass
4.9037	6	0	0	Pass
4.9599	6	0	0	Pass
5.0161	6	0	0	Pass
5.0723	6	0	0	Pass
5.1285	5	0	0	Pass
5.1847	5	0	0	Pass
5.2409	5	0	0	Pass
5.2971	5	0	0	Pass
5.3533	5	0	0	Pass
5.4095	5	0	0	Pass
5.4657	5	0	0	Pass
5.5219	5	0	0	Pass
5.5781	4	0	0	Pass
5.6343	4	0	0	Pass
5.6905	4	0	0	Pass
5.7467	4	0	0	Pass
5.8029	4	0	0	Pass
5.8591	4	0	0	Pass
5.9153	4	0	0	Pass
5.9715	4	0	0	Pass
6.0277	4	0	0	Pass
6.0839	3	0	0	Pass
6.1401	3	0	0	Pass
6.1963	1	0	0	Pass
6.2525	1	0	0	Pass
6.3087	1	0	0	Pass
6.3649	1	0	0	Pass
6.4211	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #2

**Pond B**

On-line facility volume: 2.3108 acre-feet

On-line facility target flow: 1.6456 cfs.

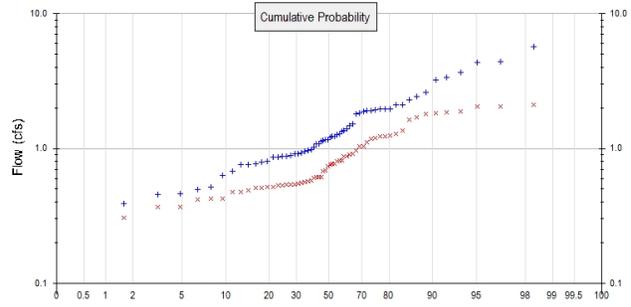
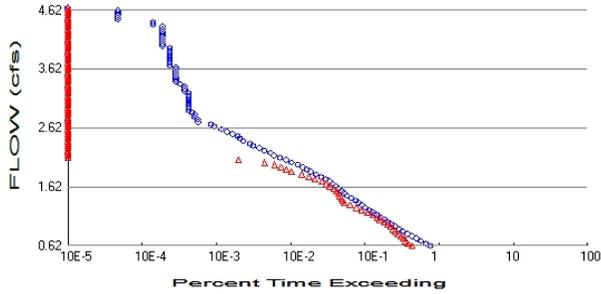
Adjusted for 15 min: 1.6456 cfs.

Off-line facility target flow: 0.9097 cfs.

Adjusted for 15 min: 0.9097 cfs.

POC 3

Pond I



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #3

Total Pervious Area: 29.9  
 Total Impervious Area: 0

Mitigated Landuse Totals for POC #3

Total Pervious Area: 25  
 Total Impervious Area: 4.9

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #3

Return Period	Flow(cfs)
2 year	1.23232
5 year	2.094473
10 year	2.780038
25 year	3.776939
50 year	4.615185
100 year	5.536243

Flow Frequency Return Periods for Mitigated. POC #3

Return Period	Flow(cfs)
2 year	0.757214
5 year	1.186126
10 year	1.52216
25 year	2.008892
50 year	2.418593
100 year	2.870387

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #3

Year	Predeveloped	Mitigated
1949	1.795	0.543
1950	1.921	1.039
1951	2.418	2.043
1952	0.804	0.474
1953	0.678	0.515
1954	0.982	0.761
1955	1.514	0.903
1956	1.397	1.111
1957	1.227	0.609
1958	1.131	0.766
1959	0.961	0.564

1960	1.931	1.644
1961	0.931	0.579
1962	0.632	0.426
1963	0.912	0.615
1964	1.258	0.575
1965	0.952	0.687
1966	0.756	0.534
1967	2.098	0.868
1968	1.159	0.552
1969	1.090	0.535
1970	0.875	0.543
1971	1.163	0.812
1972	1.895	1.359
1973	0.866	0.616
1974	1.144	0.869
1975	1.483	0.674
1976	1.078	0.804
1977	0.452	0.305
1978	0.877	0.606
1979	0.517	0.419
1980	3.365	1.242
1981	0.761	0.550
1982	1.966	1.203
1983	1.287	0.818
1984	0.787	0.486
1985	0.461	0.427
1986	1.957	1.225
1987	1.823	1.285
1988	0.771	0.512
1989	0.498	0.370
1990	5.692	1.870
1991	2.600	1.828
1992	1.023	0.771
1993	0.909	0.538
1994	0.390	0.366
1995	1.213	0.968
1996	3.207	2.059
1997	2.294	1.802
1998	0.890	0.474
1999	3.655	1.235
2000	0.868	0.515
2001	0.226	0.306
2002	1.224	1.034
2003	2.099	0.510
2004	1.973	1.710
2005	1.356	0.909
2006	1.333	0.741
2007	4.362	1.855
2008	4.431	2.103
2009	1.883	1.179

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #3

Rank	Predeveloped	Mitigated
1	5.6920	2.1035
2	4.4312	2.0588
3	4.3624	2.0430
4	3.6546	1.8698

5	3.3649	1.8551
6	3.2068	1.8285
7	2.5996	1.8020
8	2.4179	1.7096
9	2.2940	1.6437
10	2.0990	1.3589
11	2.0975	1.2852
12	1.9726	1.2420
13	1.9663	1.2345
14	1.9570	1.2254
15	1.9306	1.2032
16	1.9211	1.1792
17	1.8948	1.1106
18	1.8826	1.0391
19	1.8231	1.0339
20	1.7950	0.9675
21	1.5144	0.9086
22	1.4829	0.9026
23	1.3965	0.8685
24	1.3561	0.8685
25	1.3333	0.8180
26	1.2869	0.8123
27	1.2579	0.8041
28	1.2271	0.7706
29	1.2235	0.7660
30	1.2127	0.7607
31	1.1630	0.7413
32	1.1590	0.6871
33	1.1443	0.6744
34	1.1310	0.6162
35	1.0896	0.6151
36	1.0779	0.6090
37	1.0226	0.6055
38	0.9818	0.5787
39	0.9609	0.5746
40	0.9523	0.5644
41	0.9314	0.5520
42	0.9117	0.5501
43	0.9089	0.5434
44	0.8896	0.5431
45	0.8767	0.5384
46	0.8754	0.5350
47	0.8677	0.5344
48	0.8659	0.5152
49	0.8038	0.5145
50	0.7869	0.5119
51	0.7713	0.5096
52	0.7611	0.4857
53	0.7558	0.4742
54	0.6780	0.4736
55	0.6319	0.4267
56	0.5171	0.4265
57	0.4979	0.4193
58	0.4608	0.3698
59	0.4524	0.3656
60	0.3903	0.3064
61	0.2263	0.3054

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.6162	16226	9246	56	Pass
0.6566	14142	8087	57	Pass
0.6969	12232	7531	61	Pass
0.7373	10521	7050	67	Pass
0.7777	9174	6530	71	Pass
0.8181	7965	5925	74	Pass
0.8585	6960	5520	79	Pass
0.8989	6154	5127	83	Pass
0.9393	5452	4727	86	Pass
0.9797	4868	4301	88	Pass
1.0201	4359	3874	88	Pass
1.0605	3921	3418	87	Pass
1.1009	3495	3121	89	Pass
1.1413	3089	2753	89	Pass
1.1817	2736	2348	85	Pass
1.2221	2415	1939	80	Pass
1.2625	2160	1654	76	Pass
1.3029	1938	1352	69	Pass
1.3433	1761	1128	64	Pass
1.3836	1599	1075	67	Pass
1.4240	1391	1036	74	Pass
1.4644	1246	991	79	Pass
1.5048	1123	944	84	Pass
1.5452	1035	895	86	Pass
1.5856	943	815	86	Pass
1.6260	875	725	82	Pass
1.6664	789	647	82	Pass
1.7068	716	563	78	Pass
1.7472	633	453	71	Pass
1.7876	548	375	68	Pass
1.8280	466	303	65	Pass
1.8684	392	220	56	Pass
1.9088	351	187	53	Pass
1.9492	309	158	51	Pass
1.9896	265	131	49	Pass
2.0300	219	96	43	Pass
2.0704	184	42	22	Pass
2.1107	153	0	0	Pass
2.1511	126	0	0	Pass
2.1915	113	0	0	Pass
2.2319	94	0	0	Pass
2.2723	80	0	0	Pass
2.3127	67	0	0	Pass
2.3531	60	0	0	Pass
2.3935	49	0	0	Pass
2.4339	44	0	0	Pass
2.4743	41	0	0	Pass
2.5147	35	0	0	Pass
2.5551	30	0	0	Pass
2.5955	25	0	0	Pass
2.6359	20	0	0	Pass
2.6763	18	0	0	Pass
2.7167	12	0	0	Pass

2.7571	12	0	0	Pass
2.7974	11	0	0	Pass
2.8378	11	0	0	Pass
2.8782	10	0	0	Pass
2.9186	9	0	0	Pass
2.9590	9	0	0	Pass
2.9994	9	0	0	Pass
3.0398	9	0	0	Pass
3.0802	9	0	0	Pass
3.1206	9	0	0	Pass
3.1610	9	0	0	Pass
3.2014	9	0	0	Pass
3.2418	8	0	0	Pass
3.2822	8	0	0	Pass
3.3226	8	0	0	Pass
3.3630	7	0	0	Pass
3.4034	6	0	0	Pass
3.4438	6	0	0	Pass
3.4841	6	0	0	Pass
3.5245	6	0	0	Pass
3.5649	6	0	0	Pass
3.6053	6	0	0	Pass
3.6457	6	0	0	Pass
3.6861	5	0	0	Pass
3.7265	5	0	0	Pass
3.7669	5	0	0	Pass
3.8073	5	0	0	Pass
3.8477	5	0	0	Pass
3.8881	5	0	0	Pass
3.9285	5	0	0	Pass
3.9689	5	0	0	Pass
4.0093	4	0	0	Pass
4.0497	4	0	0	Pass
4.0901	4	0	0	Pass
4.1305	4	0	0	Pass
4.1708	4	0	0	Pass
4.2112	4	0	0	Pass
4.2516	4	0	0	Pass
4.2920	4	0	0	Pass
4.3324	4	0	0	Pass
4.3728	3	0	0	Pass
4.4132	3	0	0	Pass
4.4536	1	0	0	Pass
4.4940	1	0	0	Pass
4.5344	1	0	0	Pass
4.5748	1	0	0	Pass
4.6152	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #3

Pond I

On-line facility volume: 1.7857 acre-feet

On-line facility target flow: 1.2735 cfs.

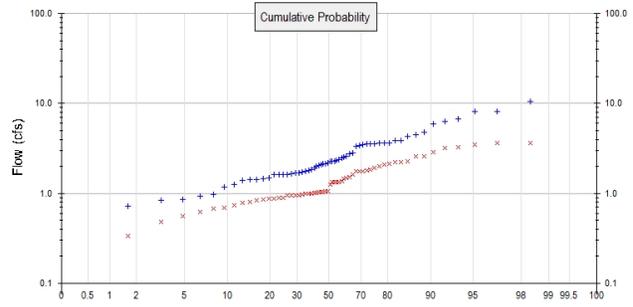
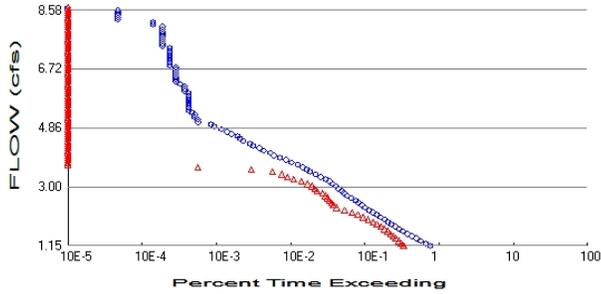
Adjusted for 15 min: 1.2735 cfs.

Off-line facility target flow: 0.7048 cfs.

Adjusted for 15 min: 0.7048 cfs.

POC 4

Pond H2



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #4

Total Pervious Area: 55.6  
 Total Impervious Area: 0

Mitigated Landuse Totals for POC #4

Total Pervious Area: 55.2  
 Total Impervious Area: 0.4

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #4

Return Period	Flow(cfs)
2 year	2.291537
5 year	3.89474
10 year	5.169572
25 year	7.023342
50 year	8.582088
100 year	10.294829

Flow Frequency Return Periods for Mitigated. POC #4

Return Period	Flow(cfs)
2 year	1.270671
5 year	2.022373
10 year	2.565018
25 year	3.292082
50 year	3.859716
100 year	4.447108

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #4

Year	Predeveloped	Mitigated
1949	3.338	0.998
1950	3.572	1.803
1951	4.496	3.633
1952	1.495	0.834
1953	1.261	0.789
1954	1.826	1.358
1955	2.816	1.751
1956	2.597	1.825
1957	2.282	1.014
1958	2.103	1.332
1959	1.787	1.018

1960	3.590	2.599
1961	1.732	0.988
1962	1.175	0.740
1963	1.695	1.044
1964	2.339	1.045
1965	1.771	1.055
1966	1.406	0.890
1967	3.900	1.624
1968	2.155	0.948
1969	2.026	0.954
1970	1.628	0.948
1971	2.163	1.052
1972	3.523	2.574
1973	1.610	0.985
1974	2.128	1.339
1975	2.758	1.327
1976	2.004	1.335
1977	0.841	0.260
1978	1.630	0.973
1979	0.962	0.675
1980	6.257	1.927
1981	1.415	0.900
1982	3.656	1.749
1983	2.393	1.454
1984	1.463	0.808
1985	0.857	0.560
1986	3.639	2.293
1987	3.390	2.208
1988	1.434	0.872
1989	0.926	0.618
1990	10.584	2.870
1991	4.834	3.264
1992	1.902	1.041
1993	1.690	0.959
1994	0.726	0.483
1995	2.255	1.749
1996	5.963	3.512
1997	4.266	3.205
1998	1.654	0.693
1999	6.796	2.014
2000	1.614	0.853
2001	0.421	0.339
2002	2.275	1.256
2003	3.903	0.865
2004	3.668	2.130
2005	2.522	1.482
2006	2.479	1.511
2007	8.112	2.205
2008	8.240	3.598
2009	3.501	2.085

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #4

Rank	Predeveloped	Mitigated
1	10.5844	3.6333
2	8.2399	3.5983
3	8.1120	3.5121
4	6.7959	3.2644

5	6.2572	3.2046
6	5.9631	2.8700
7	4.8340	2.5992
8	4.4961	2.5745
9	4.2657	2.2932
10	3.9032	2.2082
11	3.9005	2.2047
12	3.6681	2.1302
13	3.6564	2.0853
14	3.6391	2.0141
15	3.5899	1.9270
16	3.5723	1.8255
17	3.5234	1.8031
18	3.5007	1.7507
19	3.3902	1.7491
20	3.3378	1.7490
21	2.8161	1.6240
22	2.7575	1.5109
23	2.5969	1.4819
24	2.5218	1.4543
25	2.4793	1.3580
26	2.3931	1.3387
27	2.3391	1.3351
28	2.2817	1.3323
29	2.2752	1.3270
30	2.2551	1.2562
31	2.1627	1.0554
32	2.1553	1.0522
33	2.1279	1.0449
34	2.1032	1.0442
35	2.0262	1.0410
36	2.0044	1.0179
37	1.9016	1.0136
38	1.8257	0.9982
39	1.7867	0.9875
40	1.7709	0.9849
41	1.7319	0.9728
42	1.6954	0.9588
43	1.6901	0.9541
44	1.6543	0.9485
45	1.6302	0.9480
46	1.6278	0.9001
47	1.6135	0.8898
48	1.6102	0.8721
49	1.4946	0.8645
50	1.4633	0.8529
51	1.4342	0.8335
52	1.4154	0.8082
53	1.4055	0.7888
54	1.2608	0.7396
55	1.1750	0.6929
56	0.9616	0.6751
57	0.9259	0.6181
58	0.8568	0.5604
59	0.8412	0.4827
60	0.7257	0.3388
61	0.4208	0.2599

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.1458	16243	7069	43	Pass
1.2209	14140	6586	46	Pass
1.2960	12211	6115	50	Pass
1.3711	10506	5533	52	Pass
1.4462	9163	5144	56	Pass
1.5213	7965	4733	59	Pass
1.5965	6953	4372	62	Pass
1.6716	6147	3957	64	Pass
1.7467	5454	3495	64	Pass
1.8218	4864	3082	63	Pass
1.8969	4363	2742	62	Pass
1.9720	3918	2368	60	Pass
2.0471	3482	2029	58	Pass
2.1223	3084	1724	55	Pass
2.1974	2731	1430	52	Pass
2.2725	2417	1136	47	Pass
2.3476	2160	890	41	Pass
2.4227	1932	808	41	Pass
2.4978	1761	761	43	Pass
2.5729	1598	709	44	Pass
2.6481	1391	667	47	Pass
2.7232	1246	631	50	Pass
2.7983	1118	577	51	Pass
2.8734	1035	482	46	Pass
2.9485	943	450	47	Pass
3.0236	875	410	46	Pass
3.0987	789	364	46	Pass
3.1739	713	299	41	Pass
3.2490	633	234	36	Pass
3.3241	545	193	35	Pass
3.3992	465	162	34	Pass
3.4743	391	121	30	Pass
3.5494	349	63	18	Pass
3.6245	309	12	3	Pass
3.6997	265	0	0	Pass
3.7748	218	0	0	Pass
3.8499	184	0	0	Pass
3.9250	153	0	0	Pass
4.0001	126	0	0	Pass
4.0752	113	0	0	Pass
4.1503	93	0	0	Pass
4.2255	80	0	0	Pass
4.3006	67	0	0	Pass
4.3757	60	0	0	Pass
4.4508	49	0	0	Pass
4.5259	44	0	0	Pass
4.6010	41	0	0	Pass
4.6761	34	0	0	Pass
4.7513	30	0	0	Pass
4.8264	25	0	0	Pass
4.9015	20	0	0	Pass
4.9766	18	0	0	Pass
5.0517	12	0	0	Pass

5.1268	12	0	0	Pass
5.2019	11	0	0	Pass
5.2771	11	0	0	Pass
5.3522	10	0	0	Pass
5.4273	9	0	0	Pass
5.5024	9	0	0	Pass
5.5775	9	0	0	Pass
5.6526	9	0	0	Pass
5.7277	9	0	0	Pass
5.8029	9	0	0	Pass
5.8780	9	0	0	Pass
5.9531	9	0	0	Pass
6.0282	8	0	0	Pass
6.1033	8	0	0	Pass
6.1784	8	0	0	Pass
6.2535	7	0	0	Pass
6.3287	6	0	0	Pass
6.4038	6	0	0	Pass
6.4789	6	0	0	Pass
6.5540	6	0	0	Pass
6.6291	6	0	0	Pass
6.7042	6	0	0	Pass
6.7793	6	0	0	Pass
6.8545	5	0	0	Pass
6.9296	5	0	0	Pass
7.0047	5	0	0	Pass
7.0798	5	0	0	Pass
7.1549	5	0	0	Pass
7.2300	5	0	0	Pass
7.3051	5	0	0	Pass
7.3803	5	0	0	Pass
7.4554	4	0	0	Pass
7.5305	4	0	0	Pass
7.6056	4	0	0	Pass
7.6807	4	0	0	Pass
7.7558	4	0	0	Pass
7.8309	4	0	0	Pass
7.9061	4	0	0	Pass
7.9812	4	0	0	Pass
8.0563	4	0	0	Pass
8.1314	3	0	0	Pass
8.2065	3	0	0	Pass
8.2816	1	0	0	Pass
8.3567	1	0	0	Pass
8.4319	1	0	0	Pass
8.5070	1	0	0	Pass
8.5821	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #4

Pond H2

On-line facility volume: 3.0311 acre-feet

On-line facility target flow: 1.6504 cfs.

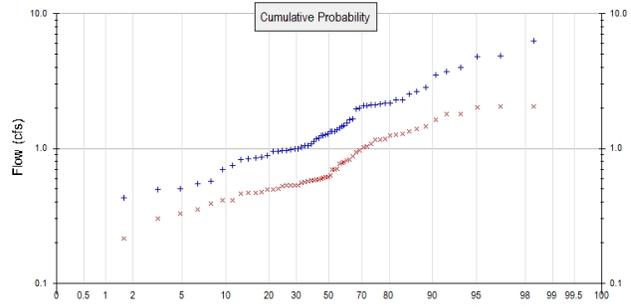
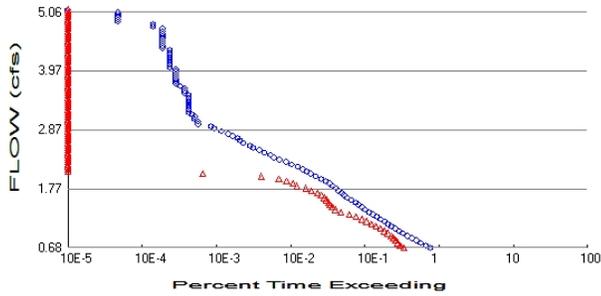
Adjusted for 15 min: 1.6504 cfs.

Off-line facility target flow: 0.9045 cfs.

Adjusted for 15 min: 0.9045 cfs.

POC 5

**Pond F**



+ Predeveloped    x Mitigated

Predeveloped Landuse Totals for POC #5

Total Pervious Area:     32.8  
 Total Impervious Area:    0

Mitigated Landuse Totals for POC #5

Total Pervious Area:     32.4  
 Total Impervious Area:    0.4

Flow Frequency Method:    Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #5

Return Period	Flow(cfs)
2 year	1.351843
5 year	2.297617
10 year	3.049675
25 year	4.143266
50 year	5.062813
100 year	6.073206

Flow Frequency Return Periods for Mitigated. POC #5

Return Period	Flow(cfs)
2 year	0.716722
5 year	1.131988
10 year	1.437463
25 year	1.854559
50 year	2.186329
100 year	2.535167

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #5

Year	Predeveloped	Mitigated
1949	1.969	0.553
1950	2.107	1.037
1951	2.652	2.055
1952	0.882	0.466
1953	0.744	0.470
1954	1.077	0.704
1955	1.661	0.937
1956	1.532	1.080
1957	1.346	0.592
1958	1.241	0.692
1959	1.054	0.570

1960	2.118	1.454
1961	1.022	0.559
1962	0.693	0.414
1963	1.000	0.599
1964	1.380	0.581
1965	1.045	0.604
1966	0.829	0.504
1967	2.301	0.872
1968	1.271	0.536
1969	1.195	0.535
1970	0.960	0.533
1971	1.276	0.610
1972	2.079	1.396
1973	0.950	0.585
1974	1.255	0.767
1975	1.627	0.627
1976	1.182	0.692
1977	0.496	0.174
1978	0.962	0.581
1979	0.567	0.390
1980	3.691	1.166
1981	0.835	0.528
1982	2.157	1.028
1983	1.412	0.779
1984	0.863	0.459
1985	0.505	0.327
1986	2.147	1.265
1987	2.000	1.244
1988	0.846	0.493
1989	0.546	0.353
1990	6.244	1.641
1991	2.852	1.813
1992	1.122	0.617
1993	0.997	0.536
1994	0.428	0.303
1995	1.330	0.960
1996	3.518	2.010
1997	2.516	1.808
1998	0.976	0.415
1999	4.009	1.179
2000	0.952	0.477
2001	0.248	0.215
2002	1.342	0.813
2003	2.303	0.498
2004	2.164	1.275
2005	1.488	0.823
2006	1.463	0.791
2007	4.785	1.330
2008	4.861	2.038
2009	2.065	1.168

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #5

Rank	Predeveloped	Mitigated
1	6.2440	2.0549
2	4.8610	2.0383
3	4.7855	2.0102
4	4.0091	1.8131

5	3.6913	1.8076
6	3.5178	1.6412
7	2.8517	1.4543
8	2.6524	1.3959
9	2.5165	1.3304
10	2.3026	1.2752
11	2.3010	1.2653
12	2.1639	1.2441
13	2.1570	1.1786
14	2.1468	1.1675
15	2.1178	1.1656
16	2.1074	1.0804
17	2.0786	1.0366
18	2.0652	1.0280
19	2.0000	0.9604
20	1.9691	0.9372
21	1.6613	0.8723
22	1.6267	0.8233
23	1.5320	0.8133
24	1.4877	0.7912
25	1.4626	0.7791
26	1.4117	0.7672
27	1.3799	0.7045
28	1.3461	0.6924
29	1.3422	0.6923
30	1.3304	0.6272
31	1.2758	0.6170
32	1.2715	0.6104
33	1.2553	0.6041
34	1.2407	0.5986
35	1.1953	0.5917
36	1.1825	0.5847
37	1.1218	0.5811
38	1.0771	0.5810
39	1.0541	0.5699
40	1.0447	0.5593
41	1.0217	0.5531
42	1.0001	0.5358
43	0.9970	0.5357
44	0.9759	0.5348
45	0.9617	0.5331
46	0.9603	0.5278
47	0.9519	0.5037
48	0.9499	0.4976
49	0.8817	0.4935
50	0.8632	0.4774
51	0.8461	0.4702
52	0.8350	0.4658
53	0.8292	0.4593
54	0.7438	0.4149
55	0.6932	0.4136
56	0.5673	0.3900
57	0.5462	0.3533
58	0.5055	0.3274
59	0.4963	0.3026
60	0.4281	0.2148
61	0.2482	0.1736

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.6759	16270	7144	43	Pass
0.7202	14123	6406	45	Pass
0.7645	12209	5929	48	Pass
0.8089	10538	5544	52	Pass
0.8532	9163	5165	56	Pass
0.8975	7972	4821	60	Pass
0.9418	6964	4391	63	Pass
0.9861	6143	3914	63	Pass
1.0304	5454	3465	63	Pass
1.0747	4866	3029	62	Pass
1.1190	4359	2642	60	Pass
1.1634	3918	2259	57	Pass
1.2077	3489	1953	55	Pass
1.2520	3095	1624	52	Pass
1.2963	2731	1316	48	Pass
1.3406	2419	1013	41	Pass
1.3849	2162	849	39	Pass
1.4292	1931	777	40	Pass
1.4735	1761	722	40	Pass
1.5179	1600	692	43	Pass
1.5622	1392	657	47	Pass
1.6065	1246	610	48	Pass
1.6508	1122	550	49	Pass
1.6951	1035	489	47	Pass
1.7394	943	406	43	Pass
1.7837	876	342	39	Pass
1.8280	788	260	32	Pass
1.8723	713	228	31	Pass
1.9167	633	188	29	Pass
1.9610	548	148	27	Pass
2.0053	465	86	18	Pass
2.0496	392	14	3	Pass
2.0939	351	0	0	Pass
2.1382	309	0	0	Pass
2.1825	265	0	0	Pass
2.2268	218	0	0	Pass
2.2712	184	0	0	Pass
2.3155	152	0	0	Pass
2.3598	126	0	0	Pass
2.4041	113	0	0	Pass
2.4484	94	0	0	Pass
2.4927	80	0	0	Pass
2.5370	67	0	0	Pass
2.5813	60	0	0	Pass
2.6257	49	0	0	Pass
2.6700	44	0	0	Pass
2.7143	41	0	0	Pass
2.7586	35	0	0	Pass
2.8029	31	0	0	Pass
2.8472	25	0	0	Pass
2.8915	20	0	0	Pass
2.9358	18	0	0	Pass
2.9801	12	0	0	Pass

3.0245	12	0	0	Pass
3.0688	11	0	0	Pass
3.1131	11	0	0	Pass
3.1574	10	0	0	Pass
3.2017	9	0	0	Pass
3.2460	9	0	0	Pass
3.2903	9	0	0	Pass
3.3346	9	0	0	Pass
3.3790	9	0	0	Pass
3.4233	9	0	0	Pass
3.4676	9	0	0	Pass
3.5119	9	0	0	Pass
3.5562	8	0	0	Pass
3.6005	8	0	0	Pass
3.6448	8	0	0	Pass
3.6891	7	0	0	Pass
3.7335	6	0	0	Pass
3.7778	6	0	0	Pass
3.8221	6	0	0	Pass
3.8664	6	0	0	Pass
3.9107	6	0	0	Pass
3.9550	6	0	0	Pass
3.9993	6	0	0	Pass
4.0436	5	0	0	Pass
4.0879	5	0	0	Pass
4.1323	5	0	0	Pass
4.1766	5	0	0	Pass
4.2209	5	0	0	Pass
4.2652	5	0	0	Pass
4.3095	5	0	0	Pass
4.3538	5	0	0	Pass
4.3981	4	0	0	Pass
4.4424	4	0	0	Pass
4.4868	4	0	0	Pass
4.5311	4	0	0	Pass
4.5754	4	0	0	Pass
4.6197	4	0	0	Pass
4.6640	4	0	0	Pass
4.7083	4	0	0	Pass
4.7526	4	0	0	Pass
4.7969	3	0	0	Pass
4.8413	3	0	0	Pass
4.8856	1	0	0	Pass
4.9299	1	0	0	Pass
4.9742	1	0	0	Pass
5.0185	1	0	0	Pass
5.0628	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #5

Pond F

On-line facility volume: 1.7949 acre-feet

On-line facility target flow: 1.0044 cfs.

Adjusted for 15 min: 1.0044 cfs.

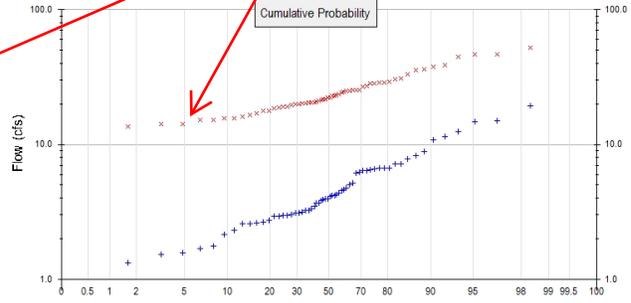
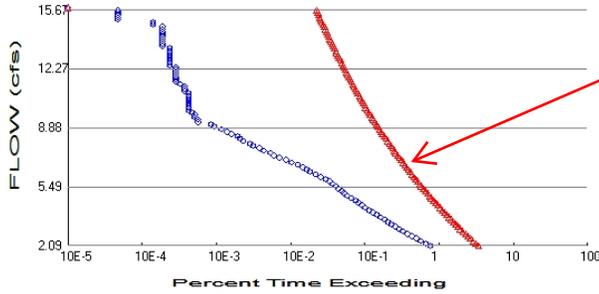
Off-line facility target flow: 0.5494 cfs.

Adjusted for 15 min: 0.5494 cfs.

POC 6

Pit 1 / Pit 2

Developed inflow curves



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #6

Total Pervious Area: 101.5  
Total Impervious Area: 0

Mitigated Landuse Totals for POC #6

Total Pervious Area: 60.9  
Total Impervious Area: 40.6

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #6

Return Period	Flow(cfs)
2 year	4.183294
5 year	7.110003
10 year	9.437256
25 year	12.821385
50 year	15.666936
100 year	18.793607

Flow Frequency Return Periods for Mitigated. POC #6

Return Period	Flow(cfs)
2 year	22.65303
5 year	30.030802
10 year	35.233315
25 year	42.181844
50 year	47.638156
100 year	53.340435

These are the Pit 1 / Pit 2 inflows.  
The Pit 1 / Pit 2 outflows are limited by the pumps to 1.11 cfs max.

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #6

Year	Predeveloped	Mitigated
1949	6.093	33.211
1950	6.521	28.680
1951	8.208	20.539
1952	2.728	14.170
1953	2.302	15.148
1954	3.333	19.029
1955	5.141	20.275
1956	4.741	19.519
1957	4.165	24.855
1958	3.839	17.832
1959	3.262	16.177

1960	6.554	21.659
1961	3.162	20.180
1962	2.145	15.313
1963	3.095	20.574
1964	4.270	17.807
1965	3.233	24.871
1966	2.566	15.697
1967	7.120	28.970
1968	3.935	30.951
1969	3.699	22.868
1970	2.972	21.798
1971	3.948	25.283
1972	6.432	29.186
1973	2.940	13.633
1974	3.885	24.201
1975	5.034	25.352
1976	3.659	18.992
1977	1.536	18.538
1978	2.976	21.387
1979	1.755	28.472
1980	11.423	35.940
1981	2.584	23.358
1982	6.675	35.536
1983	4.369	24.472
1984	2.671	16.649
1985	1.564	22.295
1986	6.643	20.829
1987	6.189	28.282
1988	2.618	15.545
1989	1.690	21.118
1990	19.322	52.418
1991	8.825	38.860
1992	3.471	16.980
1993	3.085	14.069
1994	1.325	13.487
1995	4.117	19.901
1996	10.886	26.955
1997	7.787	23.739
1998	3.020	19.900
1999	12.406	46.886
2000	2.946	23.038
2001	0.768	22.426
2002	4.153	30.564
2003	7.125	27.082
2004	6.696	44.436
2005	4.604	20.399
2006	4.526	18.796
2007	14.809	46.383
2008	15.042	37.490
2009	6.391	25.285

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #6

Rank	Predeveloped	Mitigated
1	19.3222	52.4175
2	15.0423	46.8860
3	14.8087	46.3830
4	12.4062	44.4355

5	11.4228	38.8596
6	10.8859	37.4895
7	8.8247	35.9403
8	8.2078	35.5363
9	7.7872	33.2113
10	7.1254	30.9512
11	7.1204	30.5642
12	6.6963	29.1863
13	6.6750	28.9704
14	6.6433	28.6798
15	6.5535	28.4722
16	6.5214	28.2817
17	6.4322	27.0818
18	6.3906	26.9552
19	6.1889	25.3519
20	6.0933	25.2850
21	5.1410	25.2825
22	5.0339	24.8713
23	4.7408	24.8553
24	4.6036	24.4718
25	4.5260	24.2013
26	4.3686	23.7389
27	4.2700	23.3581
28	4.1654	23.0376
29	4.1534	22.8684
30	4.1168	22.4255
31	3.9481	22.2953
32	3.9345	21.7976
33	3.8847	21.6588
34	3.8394	21.3870
35	3.6989	21.1175
36	3.6591	20.8292
37	3.4715	20.5744
38	3.3330	20.5392
39	3.2618	20.3987
40	3.2328	20.2745
41	3.1617	20.1799
42	3.0949	19.9008
43	3.0853	19.9001
44	3.0200	19.5188
45	2.9761	19.0285
46	2.9716	18.9921
47	2.9456	18.7962
48	2.9395	18.5381
49	2.7285	17.8316
50	2.6713	17.8068
51	2.6181	16.9796
52	2.5838	16.6489
53	2.5658	16.1767
54	2.3016	15.6966
55	2.1450	15.5453
56	1.7555	15.3133
57	1.6903	15.1476
58	1.5642	14.1696
59	1.5357	14.0691
60	1.3248	13.6326
61	0.7681	13.4873

## Water Quality

Water Quality BMP Flow and Volume for POC #6

On-line facility volume: 7.8443 acre-feet

On-line facility target flow: 7.815 cfs.

Adjusted for 15 min: 7.815 cfs.

Off-line facility target flow: 4.3299 cfs.

Adjusted for 15 min: 4.3299 cfs.

Available dead storage  
in Pit 1 / Pit 2 is much  
larger than required



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**WWHM2012**

**PROJECT REPORT**

for

**John Henry Mine**

**Mining Conditions Analysis  
of Ponds H2, I & Pit 1 / Pit 2**  
(Ponds B, G, & F included for continuity)

**March 15, 2018**

## General Model Information

Project Name: Ponds\_I\_H2  
Site Name: John Henry Mine - Pond Sizing for Mining Conditions - Pumped to Pit 1  
Site Address:  
City:  
Report Date: 3/13/2018  
Gage: Seatac  
Data Start: 1948/10/01  
Data End: 2009/09/30  
Timestep: 15 Minute  
Precip Scale: ~~0.000 (adjusted)~~ ← This is 1.167  
Version Date: 2017/07/05  
Version: 4.2.13

## POC Thresholds

---

Low Flow Threshold for POC1: 50 Percent of the 2 Year  
High Flow Threshold for POC1: 50 Year

---

Low Flow Threshold for POC2: 50 Percent of the 2 Year  
High Flow Threshold for POC2: 50 Year

---

Low Flow Threshold for POC3: 50 Percent of the 2 Year  
High Flow Threshold for POC3: 50 Year

---

Low Flow Threshold for POC4: 50 Percent of the 2 Year  
High Flow Threshold for POC4: 50 Year

---

Low Flow Threshold for POC5: 50 Percent of the 2 Year  
High Flow Threshold for POC5: 50 Year

---

Low Flow Threshold for POC6: 50 Percent of the 2 Year  
High Flow Threshold for POC6: 50 Year

---

*Appendix*  
*Predeveloped Schematic*



PreDev -  
Pond G  
Basin  
6.70ac



PreDev -  
Pond B  
Basin  
41.60ac



PreDev -  
Pond I Basin  
15.50ac



PreDev -  
Pond H2  
Basin  
42.70ac



PreDev -  
Pond F  
Basin  
32.80ac



PreDev - Pit  
1/Pit 2 Basin  
128.80ac

Mitigated Schematic



## *Landuse Basin Data*

### *Predeveloped Land Use*

#### PreDev - Pond G Basin

Bypass: No

GroundWater: No

Pervious Land Use acre  
C, Forest, Mod 6.7

Pervious Total 6.7

Impervious Land Use acre

Impervious Total 0

Basin Total 6.7

Element Flows To:  
Surface

Interflow

Groundwater

## PreDev - Pond I Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 15.5
Pervious Total	15.5
Impervious Land Use	acre
Impervious Total	0
Basin Total	15.5

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pond B Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 41.6
Pervious Total	41.6
Impervious Land Use	acre
Impervious Total	0
Basin Total	41.6

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pond H2 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 42.7
Pervious Total	42.7
Impervious Land Use	acre
Impervious Total	0
Basin Total	42.7

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pit 1/Pit 2 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 128.8
Pervious Total	128.8
Impervious Land Use	acre
Impervious Total	0
Basin Total	128.8

Element Flows To:		
Surface	Interflow	Groundwater

## PreDev - Pond F Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 32.8
Pervious Total	32.8
Impervious Land Use	acre
Impervious Total	0
Basin Total	32.8

Element Flows To:		
Surface	Interflow	Groundwater

*Mitigated Land Use*

Dev - Pond I Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	4.7
C, Lawn, Mod	7.9
Pervious Total	12.6
Impervious Land Use	acre
ROADS MOD	2.1
POND	0.8
Impervious Total	2.9
Basin Total	15.5

Element Flows To:		
Surface	Interflow	Groundwater
Pond I	Pond I	

## Dev - Pond H2 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 42.3
Pervious Total	42.3
Impervious Land Use POND	acre 0.4
Impervious Total	0.4
Basin Total	42.7

Element Flows To:		
Surface	Interflow	Groundwater
Pond H2	Pond H2	

## Dev - Pond F Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	27
C, Lawn, Mod	5.4
Pervious Total	32.4
Impervious Land Use	acre
POND	0.4
Impervious Total	0.4
Basin Total	32.8

Element Flows To:		
Surface	Interflow	Groundwater
Pond F	Pond F	

## Dev - Pit 1 Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	37.3
C, Lawn, Mod	23
Pervious Total	60.3
Impervious Land Use	acre
ROADS FLAT	27.9
POND	40.6
Impervious Total	68.5
Basin Total	128.8

Element Flows To:		
Surface	Interflow	Groundwater

## Dev - Pond G Basin

Bypass: No

GroundWater: No

Pervious Land Use acre

C, Forest, Mod 1.1

C, Lawn, Mod 3.7

Pervious Total 4.8

Impervious Land Use acre

ROADS MOD 1.8

POND 0.1

Impervious Total 1.9

Basin Total 6.7

Element Flows To:

Surface

Interflow

Groundwater

Pond G

Pond G

## Dev - Pond B Basin

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Mod	33.4
C, Lawn, Mod	1.7
Pervious Total	35.1
Impervious Land Use	acre
ROADS MOD	5
POND	1.5
Impervious Total	6.5
Basin Total	41.6

### Element Flows To:

Surface Pond B	Interflow Pond B	Groundwater
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## Mitigated Routing

### Pond F

Bottom Length: 216.00 ft.  
Bottom Width: 69.00 ft.  
Depth: 9 ft.  
Volume at riser head: 3.9882 acre-feet.  
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: 8.5 ft.  
Riser Diameter: 24 in.  
Orifice 1 Diameter: 3.322 in. Elevation:0 ft.  
Orifice 2 Diameter: 4.218 in. Elevation:4.484 ft.  
Orifice 3 Diameter: 4.128 in. Elevation:6.178 ft.  
Element Flows To:  
Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
773.20	0.342	0.000	0.000	0.000
773.30	0.344	0.034	0.094	0.000
773.40	0.347	0.069	0.133	0.000
773.50	0.350	0.103	0.164	0.000
773.60	0.352	0.139	0.189	0.000
773.70	0.355	0.174	0.211	0.000
773.80	0.358	0.210	0.232	0.000
773.90	0.360	0.246	0.250	0.000
774.00	0.363	0.282	0.267	0.000
774.10	0.366	0.318	0.284	0.000
774.20	0.368	0.355	0.299	0.000
774.30	0.371	0.392	0.314	0.000
774.40	0.374	0.429	0.328	0.000
774.50	0.376	0.467	0.341	0.000
774.60	0.379	0.505	0.354	0.000
774.70	0.382	0.543	0.366	0.000
774.80	0.385	0.581	0.378	0.000
774.90	0.387	0.620	0.390	0.000
775.00	0.390	0.659	0.401	0.000
775.10	0.393	0.698	0.412	0.000
775.20	0.396	0.737	0.423	0.000
775.30	0.398	0.777	0.434	0.000
775.40	0.401	0.817	0.444	0.000
775.50	0.404	0.857	0.454	0.000
775.60	0.407	0.898	0.463	0.000
775.70	0.409	0.939	0.473	0.000
775.80	0.412	0.980	0.482	0.000
775.90	0.415	1.021	0.492	0.000
776.00	0.418	1.063	0.501	0.000
776.10	0.421	1.105	0.510	0.000
776.20	0.424	1.147	0.518	0.000
776.30	0.426	1.190	0.527	0.000
776.40	0.429	1.232	0.535	0.000

776.50	0.432	1.276	0.544	0.000
776.60	0.435	1.319	0.552	0.000
776.70	0.438	1.363	0.560	0.000
776.80	0.441	1.407	0.568	0.000
776.90	0.444	1.451	0.576	0.000
777.00	0.446	1.495	0.583	0.000
777.10	0.449	1.540	0.591	0.000
777.20	0.452	1.585	0.598	0.000
777.30	0.455	1.631	0.606	0.000
777.40	0.458	1.676	0.613	0.000
777.50	0.461	1.722	0.621	0.000
777.60	0.464	1.769	0.628	0.000
777.70	0.467	1.815	0.696	0.000
777.80	0.470	1.862	0.806	0.000
777.90	0.473	1.909	0.873	0.000
778.00	0.476	1.957	0.927	0.000
778.10	0.479	2.005	0.974	0.000
778.20	0.482	2.053	1.016	0.000
778.30	0.485	2.101	1.055	0.000
778.40	0.488	2.150	1.091	0.000
778.50	0.491	2.199	1.125	0.000
778.60	0.494	2.248	1.158	0.000
778.70	0.497	2.298	1.189	0.000
778.80	0.500	2.347	1.218	0.000
778.90	0.503	2.398	1.247	0.000
779.00	0.506	2.448	1.275	0.000
779.10	0.509	2.499	1.301	0.000
779.20	0.512	2.550	1.328	0.000
779.30	0.515	2.601	1.353	0.000
779.40	0.518	2.653	1.446	0.000
779.50	0.521	2.705	1.563	0.000
779.60	0.524	2.757	1.643	0.000
779.70	0.527	2.810	1.711	0.000
779.80	0.530	2.863	1.772	0.000
779.90	0.534	2.916	1.828	0.000
780.00	0.537	2.970	1.880	0.000
780.10	0.540	3.024	1.930	0.000
780.20	0.543	3.078	1.977	0.000
780.30	0.546	3.132	2.022	0.000
780.40	0.549	3.187	2.066	0.000
780.50	0.552	3.242	2.109	0.000
780.60	0.555	3.298	2.150	0.000
780.70	0.559	3.353	2.190	0.000
780.80	0.562	3.409	2.229	0.000
780.90	0.565	3.466	2.267	0.000
781.00	0.568	3.523	2.304	0.000
781.10	0.571	3.580	2.340	0.000
781.20	0.575	3.637	2.376	0.000
781.30	0.578	3.695	2.411	0.000
781.40	0.581	3.753	2.445	0.000
781.50	0.584	3.811	2.479	0.000
781.60	0.587	3.869	2.512	0.000
781.70	0.591	3.928	2.545	0.000
781.80	0.594	3.988	3.247	0.000
781.90	0.597	4.047	4.495	0.000
782.00	0.600	4.107	6.061	0.000
782.10	0.604	4.167	7.805	0.000
782.20	0.607	4.228	9.588	0.000

## Pond H2

Bottom Length: 211.00 ft.  
 Bottom Width: 76.00 ft.  
 Depth: 10 ft.  
 Volume at riser head: 5.2033 acre-feet.  
 Side slope 1: 3 To 1  
 Side slope 2: 3 To 1  
 Side slope 3: 3 To 1  
 Side slope 4: 3 To 1  
 Discharge Structure  
 Riser Height: 9 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 4.288 in. Elevation:0 ft.  
 Orifice 2 Diameter: 5.481 in. Elevation:4.81 ft.  
 Orifice 3 Diameter: 5.371 in. Elevation:6.588 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
659.00	0.368	0.000	0.000	0.000
659.11	0.372	0.041	0.166	0.000
659.22	0.377	0.082	0.235	0.000
659.33	0.381	0.124	0.288	0.000
659.44	0.385	0.167	0.332	0.000
659.56	0.390	0.210	0.371	0.000
659.67	0.394	0.254	0.407	0.000
659.78	0.399	0.298	0.440	0.000
659.89	0.403	0.343	0.470	0.000
660.00	0.408	0.388	0.499	0.000
660.11	0.413	0.433	0.526	0.000
660.22	0.417	0.480	0.551	0.000
660.33	0.422	0.526	0.576	0.000
660.44	0.427	0.573	0.599	0.000
660.56	0.431	0.621	0.622	0.000
660.67	0.436	0.669	0.644	0.000
660.78	0.441	0.718	0.665	0.000
660.89	0.445	0.767	0.685	0.000
661.00	0.450	0.817	0.705	0.000
661.11	0.455	0.867	0.725	0.000
661.22	0.460	0.918	0.743	0.000
661.33	0.464	0.970	0.762	0.000
661.44	0.469	1.022	0.780	0.000
661.56	0.474	1.074	0.797	0.000
661.67	0.479	1.127	0.814	0.000
661.78	0.484	1.181	0.831	0.000
661.89	0.489	1.235	0.848	0.000
662.00	0.494	1.289	0.864	0.000
662.11	0.499	1.344	0.880	0.000
662.22	0.504	1.400	0.895	0.000
662.33	0.509	1.456	0.911	0.000
662.44	0.514	1.513	0.926	0.000
662.56	0.519	1.571	0.940	0.000
662.67	0.524	1.629	0.955	0.000
662.78	0.529	1.687	0.969	0.000

662.89	0.534	1.746	0.984	0.000
663.00	0.539	1.806	0.997	0.000
663.11	0.544	1.866	1.011	0.000
663.22	0.549	1.927	1.025	0.000
663.33	0.555	1.988	1.038	0.000
663.44	0.560	2.050	1.051	0.000
663.56	0.565	2.113	1.065	0.000
663.67	0.570	2.176	1.077	0.000
663.78	0.575	2.240	1.090	0.000
663.89	0.581	2.304	1.332	0.000
664.00	0.586	2.369	1.471	0.000
664.11	0.591	2.434	1.575	0.000
664.22	0.597	2.500	1.663	0.000
664.33	0.602	2.567	1.742	0.000
664.44	0.607	2.634	1.813	0.000
664.56	0.613	2.702	1.880	0.000
664.67	0.618	2.770	1.942	0.000
664.78	0.624	2.840	2.001	0.000
664.89	0.629	2.909	2.057	0.000
665.00	0.635	2.979	2.111	0.000
665.11	0.640	3.050	2.163	0.000
665.22	0.646	3.122	2.213	0.000
665.33	0.651	3.194	2.261	0.000
665.44	0.657	3.267	2.308	0.000
665.56	0.662	3.340	2.354	0.000
665.67	0.668	3.414	2.618	0.000
665.78	0.674	3.488	2.783	0.000
665.89	0.679	3.564	2.914	0.000
666.00	0.685	3.640	3.029	0.000
666.11	0.691	3.716	3.133	0.000
666.22	0.696	3.793	3.230	0.000
666.33	0.702	3.871	3.322	0.000
666.44	0.708	3.949	3.409	0.000
666.56	0.714	4.028	3.492	0.000
666.67	0.719	4.108	3.572	0.000
666.78	0.725	4.188	3.649	0.000
666.89	0.731	4.269	3.724	0.000
667.00	0.737	4.351	3.797	0.000
667.11	0.743	4.433	3.868	0.000
667.22	0.749	4.516	3.937	0.000
667.33	0.755	4.599	4.004	0.000
667.44	0.760	4.684	4.070	0.000
667.56	0.766	4.769	4.135	0.000
667.67	0.772	4.854	4.198	0.000
667.78	0.778	4.940	4.260	0.000
667.89	0.784	5.027	4.321	0.000
668.00	0.790	5.115	4.381	0.000
668.11	0.796	5.203	5.225	0.000
668.22	0.803	5.292	6.703	0.000
668.33	0.809	5.381	8.534	0.000
668.44	0.815	5.472	10.52	0.000
668.56	0.821	5.562	12.49	0.000
668.67	0.827	5.654	14.24	0.000
668.78	0.833	5.746	15.64	0.000
668.89	0.839	5.839	16.64	0.000
669.00	0.846	5.933	17.34	0.000
669.11	0.852	6.027	18.21	0.000

## Pond I

Bottom Length: 334.00 ft.  
 Bottom Width: 63.00 ft.  
 Depth: 8 ft.  
 Volume at riser head: 4.6052 acre-feet.  
 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: 7.3 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 2.439 in. Elevation:0 ft.  
 Orifice 2 Diameter: 3.09 in. Elevation:3.835 ft.  
 Orifice 3 Diameter: 3.023 in. Elevation:5.293 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
748.70	0.483	0.000	0.000	0.000
748.79	0.486	0.043	0.048	0.000
748.88	0.489	0.086	0.068	0.000
748.97	0.492	0.130	0.083	0.000
749.06	0.496	0.174	0.096	0.000
749.14	0.499	0.218	0.107	0.000
749.23	0.502	0.262	0.117	0.000
749.32	0.505	0.307	0.127	0.000
749.41	0.509	0.352	0.136	0.000
749.50	0.512	0.398	0.144	0.000
749.59	0.515	0.443	0.152	0.000
749.68	0.519	0.489	0.159	0.000
749.77	0.522	0.536	0.166	0.000
749.86	0.525	0.582	0.173	0.000
749.94	0.529	0.629	0.180	0.000
750.03	0.532	0.676	0.186	0.000
750.12	0.535	0.724	0.192	0.000
750.21	0.539	0.772	0.198	0.000
750.30	0.542	0.820	0.204	0.000
750.39	0.545	0.868	0.209	0.000
750.48	0.549	0.917	0.215	0.000
750.57	0.552	0.966	0.220	0.000
750.66	0.555	1.015	0.225	0.000
750.74	0.559	1.064	0.230	0.000
750.83	0.562	1.114	0.235	0.000
750.92	0.565	1.164	0.240	0.000
751.01	0.569	1.215	0.245	0.000
751.10	0.572	1.266	0.250	0.000
751.19	0.576	1.317	0.254	0.000
751.28	0.579	1.368	0.259	0.000
751.37	0.582	1.420	0.263	0.000
751.46	0.586	1.472	0.268	0.000
751.54	0.589	1.524	0.272	0.000
751.63	0.593	1.576	0.276	0.000
751.72	0.596	1.629	0.280	0.000

751.81	0.600	1.683	0.284	0.000
751.90	0.603	1.736	0.288	0.000
751.99	0.606	1.790	0.292	0.000
752.08	0.610	1.844	0.296	0.000
752.17	0.613	1.898	0.300	0.000
752.26	0.617	1.953	0.304	0.000
752.34	0.620	2.008	0.308	0.000
752.43	0.624	2.063	0.311	0.000
752.52	0.627	2.119	0.315	0.000
752.61	0.631	2.175	0.390	0.000
752.70	0.634	2.231	0.428	0.000
752.79	0.638	2.288	0.457	0.000
752.88	0.641	2.345	0.481	0.000
752.97	0.645	2.402	0.503	0.000
753.06	0.648	2.459	0.523	0.000
753.14	0.652	2.517	0.542	0.000
753.23	0.655	2.575	0.560	0.000
753.32	0.659	2.634	0.577	0.000
753.41	0.663	2.693	0.592	0.000
753.50	0.666	2.752	0.608	0.000
753.59	0.670	2.811	0.622	0.000
753.68	0.673	2.871	0.637	0.000
753.77	0.677	2.931	0.650	0.000
753.86	0.680	2.991	0.664	0.000
753.94	0.684	3.052	0.677	0.000
754.03	0.687	3.113	0.739	0.000
754.12	0.691	3.174	0.791	0.000
754.21	0.695	3.236	0.830	0.000
754.30	0.698	3.298	0.863	0.000
754.39	0.702	3.360	0.893	0.000
754.48	0.706	3.423	0.921	0.000
754.57	0.709	3.486	0.948	0.000
754.66	0.713	3.549	0.973	0.000
754.74	0.716	3.612	0.997	0.000
754.83	0.720	3.676	1.019	0.000
754.92	0.724	3.740	1.042	0.000
755.01	0.727	3.805	1.063	0.000
755.10	0.731	3.870	1.084	0.000
755.19	0.735	3.935	1.104	0.000
755.28	0.738	4.001	1.124	0.000
755.37	0.742	4.066	1.143	0.000
755.46	0.746	4.132	1.162	0.000
755.54	0.749	4.199	1.180	0.000
755.63	0.753	4.266	1.198	0.000
755.72	0.757	4.333	1.216	0.000
755.81	0.760	4.400	1.233	0.000
755.90	0.764	4.468	1.250	0.000
755.99	0.768	4.536	1.267	0.000
756.08	0.772	4.605	1.744	0.000
756.17	0.775	4.674	2.739	0.000
756.26	0.779	4.743	4.025	0.000
756.34	0.783	4.812	5.501	0.000
756.43	0.786	4.882	7.069	0.000
756.52	0.790	4.952	8.631	0.000
756.61	0.794	5.022	10.09	0.000
756.70	0.798	5.093	11.36	0.000
756.79	0.802	5.164	12.38	0.000

## Pond B

Bottom Length: 216.00 ft.  
 Bottom Width: 204.00 ft.  
 Depth: 5 ft.  
 Volume at riser head: 5.2346 acre-feet.  
 Side slope 1: 3 To 1  
 Side slope 2: 3 To 1  
 Side slope 3: 3 To 1  
 Side slope 4: 3 To 1  
 Discharge Structure  
 Riser Height: 4.5 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 4.533 in. Elevation:0 ft.  
 Orifice 2 Diameter: 5.647 in. Elevation:2.289 ft.  
 Orifice 3 Diameter: 5.507 in. Elevation:3.203 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
665.00	1.011	0.000	0.000	0.000
665.06	1.014	0.056	0.131	0.000
665.11	1.018	0.112	0.185	0.000
665.17	1.021	0.169	0.227	0.000
665.22	1.024	0.226	0.262	0.000
665.28	1.027	0.283	0.293	0.000
665.33	1.030	0.340	0.321	0.000
665.39	1.034	0.397	0.347	0.000
665.44	1.037	0.455	0.371	0.000
665.50	1.040	0.513	0.394	0.000
665.56	1.044	0.571	0.415	0.000
665.61	1.047	0.629	0.435	0.000
665.67	1.050	0.687	0.455	0.000
665.72	1.053	0.745	0.473	0.000
665.78	1.057	0.804	0.491	0.000
665.83	1.060	0.863	0.509	0.000
665.89	1.063	0.922	0.525	0.000
665.94	1.066	0.981	0.541	0.000
666.00	1.070	1.040	0.557	0.000
666.06	1.073	1.100	0.572	0.000
666.11	1.076	1.160	0.587	0.000
666.17	1.080	1.220	0.602	0.000
666.22	1.083	1.280	0.616	0.000
666.28	1.086	1.340	0.630	0.000
666.33	1.090	1.400	0.643	0.000
666.39	1.093	1.461	0.657	0.000
666.44	1.096	1.522	0.670	0.000
666.50	1.100	1.583	0.682	0.000
666.56	1.103	1.644	0.695	0.000
666.61	1.106	1.706	0.707	0.000
666.67	1.110	1.767	0.719	0.000
666.72	1.113	1.829	0.731	0.000
666.78	1.117	1.891	0.743	0.000
666.83	1.120	1.953	0.755	0.000
666.89	1.123	2.015	0.766	0.000

666.94	1.127	2.078	0.777	0.000
667.00	1.130	2.141	0.788	0.000
667.06	1.134	2.204	0.799	0.000
667.11	1.137	2.267	0.810	0.000
667.17	1.140	2.330	0.820	0.000
667.22	1.144	2.393	0.831	0.000
667.28	1.147	2.457	0.841	0.000
667.33	1.151	2.521	1.034	0.000
667.39	1.154	2.585	1.135	0.000
667.44	1.157	2.649	1.213	0.000
667.50	1.161	2.714	1.279	0.000
667.56	1.164	2.778	1.338	0.000
667.61	1.168	2.843	1.392	0.000
667.67	1.171	2.908	1.442	0.000
667.72	1.175	2.973	1.489	0.000
667.78	1.178	3.039	1.534	0.000
667.83	1.182	3.104	1.577	0.000
667.89	1.185	3.170	1.618	0.000
667.94	1.189	3.236	1.657	0.000
668.00	1.192	3.302	1.695	0.000
668.06	1.196	3.368	1.732	0.000
668.11	1.199	3.435	1.768	0.000
668.17	1.203	3.502	1.803	0.000
668.22	1.206	3.569	1.951	0.000
668.28	1.210	3.636	2.095	0.000
668.33	1.213	3.703	2.199	0.000
668.39	1.217	3.771	2.288	0.000
668.44	1.220	3.838	2.369	0.000
668.50	1.224	3.906	2.444	0.000
668.56	1.227	3.974	2.514	0.000
668.61	1.231	4.043	2.580	0.000
668.67	1.234	4.111	2.643	0.000
668.72	1.238	4.180	2.704	0.000
668.78	1.241	4.249	2.763	0.000
668.83	1.245	4.318	2.820	0.000
668.89	1.249	4.387	2.875	0.000
668.94	1.252	4.457	2.929	0.000
669.00	1.256	4.526	2.981	0.000
669.06	1.259	4.596	3.033	0.000
669.11	1.263	4.666	3.083	0.000
669.17	1.267	4.737	3.131	0.000
669.22	1.270	4.807	3.179	0.000
669.28	1.274	4.878	3.226	0.000
669.33	1.277	4.949	3.273	0.000
669.39	1.281	5.020	3.318	0.000
669.44	1.285	5.091	3.363	0.000
669.50	1.288	5.162	3.406	0.000
669.56	1.292	5.234	3.727	0.000
669.61	1.295	5.306	4.277	0.000
669.67	1.299	5.378	4.973	0.000
669.72	1.303	5.450	5.781	0.000
669.78	1.306	5.523	6.676	0.000
669.83	1.310	5.596	7.636	0.000
669.89	1.314	5.669	8.636	0.000
669.94	1.317	5.742	9.653	0.000
670.00	1.321	5.815	10.66	0.000
670.06	1.325	5.888	11.64	0.000

## Pond G

Bottom Length: 75.00 ft.  
 Bottom Width: 60.00 ft.  
 Depth: 9 ft.  
 Volume at riser head: 1.4485 acre-feet.  
 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: 8.6 ft.  
 Riser Diameter: 24 in.  
 Orifice 1 Diameter: 1.538 in. Elevation:0 ft.  
 Orifice 2 Diameter: 1.771 in. Elevation:4.811 ft.  
 Orifice 3 Diameter: 1.919 in. Elevation:6.454 ft.  
 Element Flows To:  
 Outlet 1                      Outlet 2

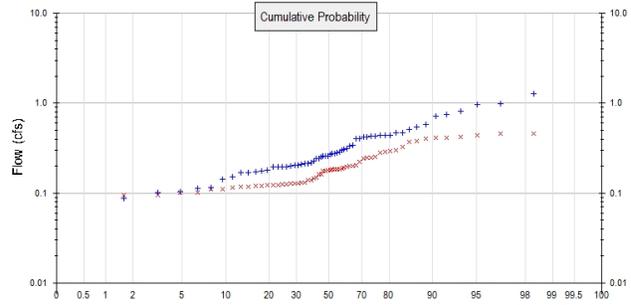
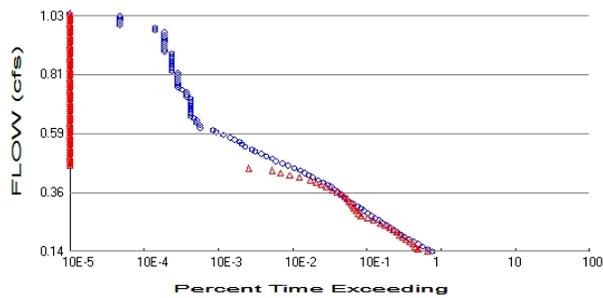
Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
729.70	0.103	0.000	0.000	0.000
729.80	0.104	0.010	0.020	0.000
729.90	0.105	0.020	0.028	0.000
730.00	0.107	0.031	0.035	0.000
730.10	0.108	0.042	0.040	0.000
730.20	0.109	0.053	0.045	0.000
730.30	0.110	0.064	0.049	0.000
730.40	0.112	0.075	0.053	0.000
730.50	0.113	0.086	0.057	0.000
730.60	0.114	0.098	0.060	0.000
730.70	0.116	0.109	0.064	0.000
730.80	0.117	0.121	0.067	0.000
730.90	0.118	0.133	0.070	0.000
731.00	0.120	0.145	0.073	0.000
731.10	0.121	0.157	0.076	0.000
731.20	0.122	0.169	0.078	0.000
731.30	0.124	0.181	0.081	0.000
731.40	0.125	0.194	0.083	0.000
731.50	0.126	0.206	0.086	0.000
731.60	0.128	0.219	0.088	0.000
731.70	0.129	0.232	0.090	0.000
731.80	0.131	0.245	0.093	0.000
731.90	0.132	0.258	0.095	0.000
732.00	0.133	0.271	0.097	0.000
732.10	0.135	0.285	0.099	0.000
732.20	0.136	0.298	0.101	0.000
732.30	0.138	0.312	0.103	0.000
732.40	0.139	0.326	0.105	0.000
732.50	0.140	0.340	0.107	0.000
732.60	0.142	0.354	0.109	0.000
732.70	0.143	0.369	0.111	0.000
732.80	0.145	0.383	0.113	0.000
732.90	0.146	0.398	0.114	0.000
733.00	0.148	0.412	0.116	0.000
733.10	0.149	0.427	0.118	0.000

733.20	0.151	0.442	0.120	0.000
733.30	0.152	0.457	0.121	0.000
733.40	0.154	0.473	0.123	0.000
733.50	0.155	0.488	0.125	0.000
733.60	0.157	0.504	0.126	0.000
733.70	0.158	0.520	0.128	0.000
733.80	0.160	0.536	0.130	0.000
733.90	0.161	0.552	0.131	0.000
734.00	0.163	0.568	0.133	0.000
734.10	0.165	0.585	0.134	0.000
734.20	0.166	0.601	0.136	0.000
734.30	0.168	0.618	0.137	0.000
734.40	0.169	0.635	0.139	0.000
734.50	0.171	0.652	0.140	0.000
734.60	0.172	0.669	0.167	0.000
734.70	0.174	0.686	0.180	0.000
734.80	0.176	0.704	0.190	0.000
734.90	0.177	0.722	0.199	0.000
735.00	0.179	0.739	0.207	0.000
735.10	0.181	0.757	0.214	0.000
735.20	0.182	0.776	0.221	0.000
735.30	0.184	0.794	0.227	0.000
735.40	0.185	0.812	0.233	0.000
735.50	0.187	0.831	0.239	0.000
735.60	0.189	0.850	0.244	0.000
735.70	0.190	0.869	0.250	0.000
735.80	0.192	0.888	0.255	0.000
735.90	0.194	0.907	0.260	0.000
736.00	0.196	0.927	0.265	0.000
736.10	0.197	0.947	0.269	0.000
736.20	0.199	0.967	0.295	0.000
736.30	0.201	0.987	0.316	0.000
736.40	0.202	1.007	0.332	0.000
736.50	0.204	1.027	0.346	0.000
736.60	0.206	1.048	0.358	0.000
736.70	0.208	1.068	0.369	0.000
736.80	0.209	1.089	0.380	0.000
736.90	0.211	1.110	0.390	0.000
737.00	0.213	1.132	0.399	0.000
737.10	0.215	1.153	0.408	0.000
737.20	0.216	1.175	0.417	0.000
737.30	0.218	1.196	0.426	0.000
737.40	0.220	1.218	0.434	0.000
737.50	0.222	1.241	0.442	0.000
737.60	0.224	1.263	0.450	0.000
737.70	0.226	1.285	0.457	0.000
737.80	0.227	1.308	0.465	0.000
737.90	0.229	1.331	0.472	0.000
738.00	0.231	1.354	0.479	0.000
738.10	0.233	1.377	0.486	0.000
738.20	0.235	1.401	0.493	0.000
738.30	0.237	1.424	0.500	0.000
738.40	0.239	1.448	1.177	0.000
738.50	0.240	1.472	2.400	0.000
738.60	0.242	1.496	3.941	0.000
738.70	0.244	1.521	5.660	0.000
738.80	0.246	1.545	7.420	0.000

# Analysis Results

## POC 1



+ Predeveloped    x Mitigated

### Predeveloped Landuse Totals for POC #1

Total Pervious Area: 6.7  
 Total Impervious Area: 0

### Mitigated Landuse Totals for POC #1

Total Pervious Area: 4.8  
 Total Impervious Area: 1.9

Flow Frequency Method: Log Pearson Type III 17B

### Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.276139
5 year	0.46933
10 year	0.622952
25 year	0.846337
50 year	1.034171
100 year	1.240562

### Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.178034
5 year	0.268328
10 year	0.338556
25 year	0.439925
50 year	0.525111
100 year	0.619012

## Annual Peaks

### Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.402	0.123
1950	0.430	0.220
1951	0.542	0.426
1952	0.180	0.111
1953	0.152	0.126
1954	0.220	0.161
1955	0.339	0.184
1956	0.313	0.240
1957	0.275	0.145
1958	0.253	0.176

1959	0.215	0.128
1960	0.433	0.370
1961	0.209	0.162
1962	0.142	0.101
1963	0.204	0.150
1964	0.282	0.130
1965	0.213	0.200
1966	0.169	0.128
1967	0.470	0.179
1968	0.260	0.129
1969	0.244	0.123
1970	0.196	0.125
1971	0.261	0.193
1972	0.425	0.287
1973	0.194	0.184
1974	0.256	0.195
1975	0.332	0.140
1976	0.242	0.179
1977	0.101	0.095
1978	0.196	0.177
1979	0.116	0.102
1980	0.754	0.327
1981	0.171	0.130
1982	0.441	0.283
1983	0.288	0.183
1984	0.176	0.117
1985	0.103	0.116
1986	0.439	0.251
1987	0.409	0.292
1988	0.173	0.120
1989	0.112	0.109
1990	1.275	0.414
1991	0.583	0.381
1992	0.229	0.187
1993	0.204	0.123
1994	0.087	0.096
1995	0.272	0.204
1996	0.719	0.436
1997	0.514	0.402
1998	0.199	0.119
1999	0.819	0.299
2000	0.194	0.140
2001	0.051	0.088
2002	0.274	0.248
2003	0.470	0.120
2004	0.442	0.413
2005	0.304	0.199
2006	0.299	0.184
2007	0.978	0.462
2008	0.993	0.457
2009	0.422	0.249

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.2755	0.4619
2	0.9929	0.4570
3	0.9775	0.4360

4	0.8189	0.4261
5	0.7540	0.4136
6	0.7186	0.4128
7	0.5825	0.4024
8	0.5418	0.3813
9	0.5140	0.3695
10	0.4703	0.3271
11	0.4700	0.2991
12	0.4420	0.2916
13	0.4406	0.2874
14	0.4385	0.2825
15	0.4326	0.2513
16	0.4305	0.2493
17	0.4246	0.2477
18	0.4218	0.2402
19	0.4085	0.2204
20	0.4022	0.2040
21	0.3394	0.1995
22	0.3323	0.1988
23	0.3129	0.1948
24	0.3039	0.1933
25	0.2988	0.1865
26	0.2884	0.1840
27	0.2819	0.1836
28	0.2750	0.1835
29	0.2742	0.1833
30	0.2718	0.1791
31	0.2606	0.1787
32	0.2597	0.1766
33	0.2564	0.1763
34	0.2534	0.1617
35	0.2442	0.1611
36	0.2415	0.1499
37	0.2292	0.1453
38	0.2200	0.1402
39	0.2153	0.1400
40	0.2134	0.1297
41	0.2087	0.1297
42	0.2043	0.1289
43	0.2037	0.1284
44	0.1993	0.1280
45	0.1965	0.1264
46	0.1962	0.1255
47	0.1944	0.1234
48	0.1940	0.1231
49	0.1801	0.1231
50	0.1763	0.1205
51	0.1728	0.1200
52	0.1706	0.1186
53	0.1694	0.1168
54	0.1519	0.1158
55	0.1416	0.1108
56	0.1159	0.1093
57	0.1116	0.1017
58	0.1033	0.1009
59	0.1014	0.0957
60	0.0875	0.0946
61	0.0507	0.0879

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1381	16236	14012	86	Pass
0.1471	14142	10307	72	Pass
0.1562	12222	9646	78	Pass
0.1652	10549	9011	85	Pass
0.1743	9180	8113	88	Pass
0.1833	7999	7146	89	Pass
0.1924	6996	6444	92	Pass
0.2014	6164	5792	93	Pass
0.2105	5469	5311	97	Pass
0.2195	4887	4860	99	Pass
0.2286	4400	4314	98	Pass
0.2376	3946	3784	95	Pass
0.2467	3508	3234	92	Pass
0.2557	3112	2637	84	Pass
0.2648	2755	2186	79	Pass
0.2738	2458	1782	72	Pass
0.2829	2182	1658	75	Pass
0.2919	1957	1544	78	Pass
0.3010	1780	1451	81	Pass
0.3100	1597	1394	87	Pass
0.3191	1395	1331	95	Pass
0.3282	1246	1224	98	Pass
0.3372	1123	1159	103	Pass
0.3463	1036	1072	103	Pass
0.3553	946	986	104	Pass
0.3644	876	852	97	Pass
0.3734	791	732	92	Pass
0.3825	717	609	84	Pass
0.3915	634	519	81	Pass
0.4006	551	441	80	Pass
0.4096	466	370	79	Pass
0.4187	394	264	67	Pass
0.4277	352	196	55	Pass
0.4368	311	147	47	Pass
0.4458	270	114	42	Pass
0.4549	224	55	24	Pass
0.4639	186	0	0	Pass
0.4730	155	0	0	Pass
0.4820	126	0	0	Pass
0.4911	113	0	0	Pass
0.5001	94	0	0	Pass
0.5092	80	0	0	Pass
0.5182	67	0	0	Pass
0.5273	60	0	0	Pass
0.5363	49	0	0	Pass
0.5454	44	0	0	Pass
0.5544	41	0	0	Pass
0.5635	35	0	0	Pass
0.5725	31	0	0	Pass
0.5816	25	0	0	Pass
0.5906	20	0	0	Pass
0.5997	18	0	0	Pass
0.6087	12	0	0	Pass

0.6178	12	0	0	Pass
0.6269	11	0	0	Pass
0.6359	11	0	0	Pass
0.6450	10	0	0	Pass
0.6540	9	0	0	Pass
0.6631	9	0	0	Pass
0.6721	9	0	0	Pass
0.6812	9	0	0	Pass
0.6902	9	0	0	Pass
0.6993	9	0	0	Pass
0.7083	9	0	0	Pass
0.7174	9	0	0	Pass
0.7264	8	0	0	Pass
0.7355	8	0	0	Pass
0.7445	8	0	0	Pass
0.7536	7	0	0	Pass
0.7626	6	0	0	Pass
0.7717	6	0	0	Pass
0.7807	6	0	0	Pass
0.7898	6	0	0	Pass
0.7988	6	0	0	Pass
0.8079	6	0	0	Pass
0.8169	6	0	0	Pass
0.8260	5	0	0	Pass
0.8350	5	0	0	Pass
0.8441	5	0	0	Pass
0.8531	5	0	0	Pass
0.8622	5	0	0	Pass
0.8712	5	0	0	Pass
0.8803	5	0	0	Pass
0.8893	5	0	0	Pass
0.8984	4	0	0	Pass
0.9074	4	0	0	Pass
0.9165	4	0	0	Pass
0.9256	4	0	0	Pass
0.9346	4	0	0	Pass
0.9437	4	0	0	Pass
0.9527	4	0	0	Pass
0.9618	4	0	0	Pass
0.9708	4	0	0	Pass
0.9799	3	0	0	Pass
0.9889	3	0	0	Pass
0.9980	1	0	0	Pass
1.0070	1	0	0	Pass
1.0161	1	0	0	Pass
1.0251	1	0	0	Pass
1.0342	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #1

**Pond G**

On-line facility volume: 0.4799 acre-feet

On-line facility target flow: 0.4204 cfs.

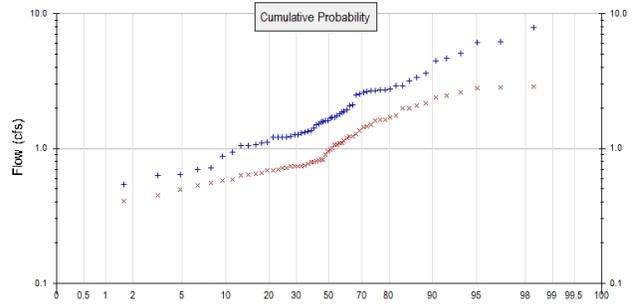
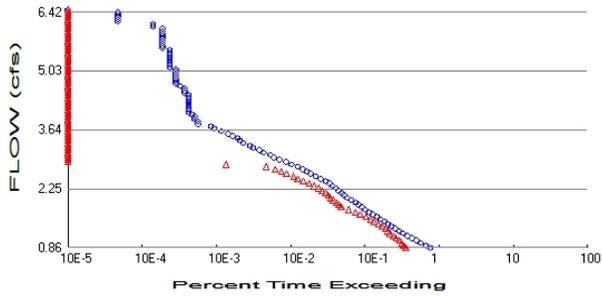
Adjusted for 15 min: 0.4204 cfs.

Off-line facility target flow: 0.2305 cfs.

Adjusted for 15 min: 0.2305 cfs.

POC 2

**Pond B**



+ Predeveloped    x Mitigated

Predeveloped Landuse Totals for POC #2

Total Pervious Area:     41.6  
 Total Impervious Area:    0

Mitigated Landuse Totals for POC #2

Total Pervious Area:     35.1  
 Total Impervious Area:    6.5

Flow Frequency Method:    Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	Flow(cfs)
2 year	1.714532
5 year	2.91405
10 year	3.86788
25 year	5.254873
50 year	6.421128
100 year	7.702601

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	Flow(cfs)
2 year	1.001352
5 year	1.576963
10 year	2.029747
25 year	2.687661
50 year	3.242958
100 year	3.856606

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	Predeveloped	Mitigated
1949	2.497	0.742
1950	2.673	1.438
1951	3.364	2.878
1952	1.118	0.636
1953	0.943	0.660
1954	1.366	1.060
1955	2.107	1.277
1956	1.943	1.492
1957	1.707	0.812
1958	1.574	1.013
1959	1.337	0.773

1960	2.686	2.178
1961	1.296	0.748
1962	0.879	0.579
1963	1.268	0.823
1964	1.750	0.790
1965	1.325	0.825
1966	1.052	0.696
1967	2.918	1.225
1968	1.613	0.740
1969	1.516	0.720
1970	1.218	0.735
1971	1.618	0.982
1972	2.636	2.005
1973	1.205	0.803
1974	1.592	1.152
1975	2.063	0.952
1976	1.500	1.096
1977	0.629	0.397
1978	1.220	0.794
1979	0.719	0.551
1980	4.682	1.627
1981	1.059	0.721
1982	2.736	1.466
1983	1.790	1.096
1984	1.095	0.633
1985	0.641	0.533
1986	2.723	1.707
1987	2.537	1.742
1988	1.073	0.688
1989	0.693	0.494
1990	7.919	2.388
1991	3.617	2.604
1992	1.423	0.906
1993	1.265	0.735
1994	0.543	0.451
1995	1.687	1.362
1996	4.462	2.832
1997	3.192	2.473
1998	1.238	0.590
1999	5.085	1.622
2000	1.207	0.651
2001	0.315	0.404
2002	1.702	1.187
2003	2.920	0.682
2004	2.744	1.994
2005	1.887	1.226
2006	1.855	1.063
2007	6.069	2.084
2008	6.165	2.812
2009	2.619	1.611

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	7.9192	2.8780
2	6.1651	2.8323
3	6.0694	2.8123
4	5.0847	2.6037

5	4.6816	2.4732
6	4.4616	2.3879
7	3.6168	2.1783
8	3.3640	2.0839
9	3.1916	2.0047
10	2.9204	1.9942
11	2.9183	1.7418
12	2.7445	1.7073
13	2.7358	1.6270
14	2.7228	1.6217
15	2.6860	1.6113
16	2.6728	1.4919
17	2.6362	1.4660
18	2.6192	1.4376
19	2.5365	1.3617
20	2.4973	1.2770
21	2.1070	1.2260
22	2.0632	1.2255
23	1.9430	1.1871
24	1.8868	1.1524
25	1.8550	1.0965
26	1.7905	1.0965
27	1.7501	1.0630
28	1.7072	1.0595
29	1.7023	1.0132
30	1.6873	0.9821
31	1.6181	0.9517
32	1.6126	0.9061
33	1.5921	0.8251
34	1.5736	0.8227
35	1.5160	0.8122
36	1.4997	0.8034
37	1.4228	0.7938
38	1.3660	0.7899
39	1.3368	0.7731
40	1.3250	0.7482
41	1.2958	0.7422
42	1.2685	0.7402
43	1.2645	0.7353
44	1.2378	0.7349
45	1.2198	0.7208
46	1.2179	0.7199
47	1.2072	0.6958
48	1.2048	0.6876
49	1.1183	0.6819
50	1.0949	0.6599
51	1.0731	0.6510
52	1.0590	0.6362
53	1.0516	0.6329
54	0.9433	0.5903
55	0.8791	0.5788
56	0.7195	0.5514
57	0.6928	0.5329
58	0.6411	0.4944
59	0.6294	0.4506
60	0.5430	0.4037
61	0.3148	0.3972

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.8573	16228	7578	46	Pass
0.9135	14132	7073	50	Pass
0.9697	12209	6648	54	Pass
1.0259	10534	6216	59	Pass
1.0821	9161	5619	61	Pass
1.1383	7967	5168	64	Pass
1.1945	6956	4706	67	Pass
1.2507	6151	4357	70	Pass
1.3069	5454	4034	73	Pass
1.3631	4860	3632	74	Pass
1.4193	4361	3243	74	Pass
1.4755	3918	2868	73	Pass
1.5317	3486	2556	73	Pass
1.5879	3093	2205	71	Pass
1.6441	2731	1831	67	Pass
1.7003	2417	1586	65	Pass
1.7565	2160	1295	59	Pass
1.8127	1933	1019	52	Pass
1.8689	1761	952	54	Pass
1.9251	1597	882	55	Pass
1.9813	1393	803	57	Pass
2.0375	1246	733	58	Pass
2.0937	1121	682	60	Pass
2.1499	1036	631	60	Pass
2.2061	942	560	59	Pass
2.2623	875	509	58	Pass
2.3185	789	443	56	Pass
2.3747	714	379	53	Pass
2.4309	633	318	50	Pass
2.4871	545	267	48	Pass
2.5433	465	234	50	Pass
2.5995	392	188	47	Pass
2.6557	351	160	45	Pass
2.7119	310	132	42	Pass
2.7681	265	100	37	Pass
2.8243	218	29	13	Pass
2.8805	184	0	0	Pass
2.9367	152	0	0	Pass
2.9929	126	0	0	Pass
3.0491	113	0	0	Pass
3.1053	93	0	0	Pass
3.1615	80	0	0	Pass
3.2177	67	0	0	Pass
3.2739	60	0	0	Pass
3.3301	49	0	0	Pass
3.3863	44	0	0	Pass
3.4425	41	0	0	Pass
3.4987	35	0	0	Pass
3.5549	31	0	0	Pass
3.6111	25	0	0	Pass
3.6673	20	0	0	Pass
3.7235	18	0	0	Pass
3.7797	12	0	0	Pass

3.8359	12	0	0	Pass
3.8921	11	0	0	Pass
3.9483	11	0	0	Pass
4.0045	10	0	0	Pass
4.0607	9	0	0	Pass
4.1169	9	0	0	Pass
4.1731	9	0	0	Pass
4.2293	9	0	0	Pass
4.2855	9	0	0	Pass
4.3417	9	0	0	Pass
4.3979	9	0	0	Pass
4.4541	9	0	0	Pass
4.5103	8	0	0	Pass
4.5665	8	0	0	Pass
4.6227	8	0	0	Pass
4.6789	7	0	0	Pass
4.7351	6	0	0	Pass
4.7913	6	0	0	Pass
4.8475	6	0	0	Pass
4.9037	6	0	0	Pass
4.9599	6	0	0	Pass
5.0161	6	0	0	Pass
5.0723	6	0	0	Pass
5.1285	5	0	0	Pass
5.1847	5	0	0	Pass
5.2409	5	0	0	Pass
5.2971	5	0	0	Pass
5.3533	5	0	0	Pass
5.4095	5	0	0	Pass
5.4657	5	0	0	Pass
5.5219	5	0	0	Pass
5.5781	4	0	0	Pass
5.6343	4	0	0	Pass
5.6905	4	0	0	Pass
5.7467	4	0	0	Pass
5.8029	4	0	0	Pass
5.8591	4	0	0	Pass
5.9153	4	0	0	Pass
5.9715	4	0	0	Pass
6.0277	4	0	0	Pass
6.0839	3	0	0	Pass
6.1401	3	0	0	Pass
6.1963	1	0	0	Pass
6.2525	1	0	0	Pass
6.3087	1	0	0	Pass
6.3649	1	0	0	Pass
6.4211	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #2

**Pond B**

On-line facility volume: 2.3108 acre-feet

On-line facility target flow: 1.6456 cfs.

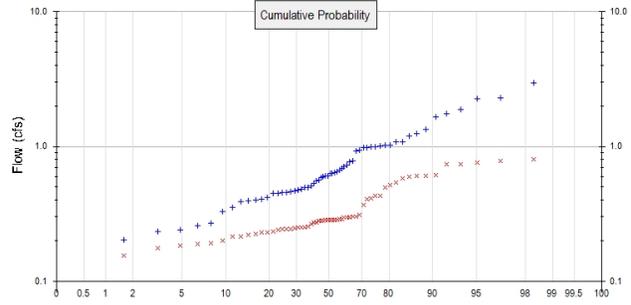
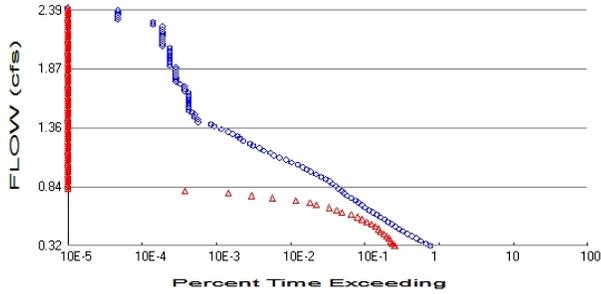
Adjusted for 15 min: 1.6456 cfs.

Off-line facility target flow: 0.9097 cfs.

Adjusted for 15 min: 0.9097 cfs.

POC 3

Pond I



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #3

Total Pervious Area: 15.5  
 Total Impervious Area: 0

Mitigated Landuse Totals for POC #3

Total Pervious Area: 12.6  
 Total Impervious Area: 2.9

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #3

Return Period	Flow(cfs)
2 year	0.638828
5 year	1.085764
10 year	1.441158
25 year	1.957946
50 year	2.392489
100 year	2.869961

Flow Frequency Return Periods for Mitigated. POC #3

Return Period	Flow(cfs)
2 year	0.303844
5 year	0.44685
10 year	0.558357
25 year	0.719873
50 year	0.856146
100 year	1.006936

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #3

Year	Predeveloped	Mitigated
1949	0.931	0.233
1950	0.996	0.311
1951	1.253	0.784
1952	0.417	0.213
1953	0.351	0.245
1954	0.509	0.283
1955	0.785	0.286
1956	0.724	0.405
1957	0.636	0.275
1958	0.586	0.287
1959	0.498	0.245

1960	1.001	0.583
1961	0.483	0.281
1962	0.328	0.184
1963	0.473	0.275
1964	0.652	0.251
1965	0.494	0.298
1966	0.392	0.247
1967	1.087	0.284
1968	0.601	0.251
1969	0.565	0.239
1970	0.454	0.244
1971	0.603	0.284
1972	0.982	0.520
1973	0.449	0.299
1974	0.593	0.290
1975	0.769	0.266
1976	0.559	0.280
1977	0.235	0.154
1978	0.454	0.287
1979	0.268	0.191
1980	1.744	0.607
1981	0.395	0.252
1982	1.019	0.433
1983	0.667	0.291
1984	0.408	0.221
1985	0.239	0.199
1986	1.014	0.432
1987	0.945	0.494
1988	0.400	0.224
1989	0.258	0.190
1990	2.951	0.616
1991	1.348	0.598
1992	0.530	0.297
1993	0.471	0.231
1994	0.202	0.175
1995	0.629	0.304
1996	1.662	0.737
1997	1.189	0.806
1998	0.461	0.215
1999	1.895	0.537
2000	0.450	0.253
2001	0.117	0.137
2002	0.634	0.370
2003	1.088	0.232
2004	1.023	0.603
2005	0.703	0.287
2006	0.691	0.301
2007	2.261	0.739
2008	2.297	0.763
2009	0.976	0.413

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #3

Rank	Predeveloped	Mitigated
1	2.9507	0.8064
2	2.2971	0.7842
3	2.2614	0.7628
4	1.8945	0.7387

5	1.7444	0.7367
6	1.6624	0.6165
7	1.3476	0.6071
8	1.2534	0.6030
9	1.1892	0.5980
10	1.0881	0.5832
11	1.0874	0.5367
12	1.0226	0.5199
13	1.0193	0.4942
14	1.0145	0.4329
15	1.0008	0.4323
16	0.9959	0.4135
17	0.9823	0.4048
18	0.9759	0.3701
19	0.9451	0.3105
20	0.9305	0.3037
21	0.7851	0.3015
22	0.7687	0.2995
23	0.7240	0.2978
24	0.7030	0.2969
25	0.6912	0.2906
26	0.6671	0.2902
27	0.6521	0.2871
28	0.6361	0.2870
29	0.6343	0.2870
30	0.6287	0.2856
31	0.6029	0.2842
32	0.6008	0.2835
33	0.5932	0.2829
34	0.5863	0.2810
35	0.5649	0.2804
36	0.5588	0.2749
37	0.5301	0.2748
38	0.5090	0.2663
39	0.4981	0.2534
40	0.4937	0.2525
41	0.4828	0.2508
42	0.4726	0.2505
43	0.4712	0.2472
44	0.4612	0.2455
45	0.4545	0.2451
46	0.4538	0.2436
47	0.4498	0.2388
48	0.4489	0.2329
49	0.4167	0.2317
50	0.4079	0.2314
51	0.3998	0.2242
52	0.3946	0.2210
53	0.3918	0.2152
54	0.3515	0.2132
55	0.3276	0.1991
56	0.2681	0.1913
57	0.2581	0.1901
58	0.2389	0.1838
59	0.2345	0.1750
60	0.2023	0.1540
61	0.1173	0.1365

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.3194	16268	5371	33	Pass
0.3404	14144	5024	35	Pass
0.3613	12213	4750	38	Pass
0.3822	10528	4496	42	Pass
0.4032	9163	4175	45	Pass
0.4241	7967	3867	48	Pass
0.4451	6951	3476	50	Pass
0.4660	6164	3260	52	Pass
0.4869	5467	2950	53	Pass
0.5079	4879	2620	53	Pass
0.5288	4383	2261	51	Pass
0.5498	3933	1978	50	Pass
0.5707	3495	1726	49	Pass
0.5916	3097	1392	44	Pass
0.6126	2736	1043	38	Pass
0.6335	2423	887	36	Pass
0.6545	2165	711	32	Pass
0.6754	1935	476	24	Pass
0.6963	1761	387	21	Pass
0.7173	1598	252	15	Pass
0.7382	1395	121	8	Pass
0.7592	1246	64	5	Pass
0.7801	1118	31	2	Pass
0.8010	1035	8	0	Pass
0.8220	946	0	0	Pass
0.8429	876	0	0	Pass
0.8639	791	0	0	Pass
0.8848	717	0	0	Pass
0.9057	633	0	0	Pass
0.9267	549	0	0	Pass
0.9476	466	0	0	Pass
0.9686	393	0	0	Pass
0.9895	351	0	0	Pass
1.0104	310	0	0	Pass
1.0314	265	0	0	Pass
1.0523	218	0	0	Pass
1.0733	184	0	0	Pass
1.0942	152	0	0	Pass
1.1151	126	0	0	Pass
1.1361	113	0	0	Pass
1.1570	93	0	0	Pass
1.1780	80	0	0	Pass
1.1989	67	0	0	Pass
1.2198	60	0	0	Pass
1.2408	49	0	0	Pass
1.2617	44	0	0	Pass
1.2827	41	0	0	Pass
1.3036	35	0	0	Pass
1.3245	31	0	0	Pass
1.3455	25	0	0	Pass
1.3664	20	0	0	Pass
1.3874	18	0	0	Pass
1.4083	12	0	0	Pass

1.4292	12	0	0	Pass
1.4502	11	0	0	Pass
1.4711	11	0	0	Pass
1.4921	10	0	0	Pass
1.5130	9	0	0	Pass
1.5339	9	0	0	Pass
1.5549	9	0	0	Pass
1.5758	9	0	0	Pass
1.5968	9	0	0	Pass
1.6177	9	0	0	Pass
1.6386	9	0	0	Pass
1.6596	9	0	0	Pass
1.6805	8	0	0	Pass
1.7015	8	0	0	Pass
1.7224	8	0	0	Pass
1.7433	7	0	0	Pass
1.7643	6	0	0	Pass
1.7852	6	0	0	Pass
1.8062	6	0	0	Pass
1.8271	6	0	0	Pass
1.8480	6	0	0	Pass
1.8690	6	0	0	Pass
1.8899	6	0	0	Pass
1.9109	5	0	0	Pass
1.9318	5	0	0	Pass
1.9527	5	0	0	Pass
1.9737	5	0	0	Pass
1.9946	5	0	0	Pass
2.0156	5	0	0	Pass
2.0365	5	0	0	Pass
2.0574	5	0	0	Pass
2.0784	4	0	0	Pass
2.0993	4	0	0	Pass
2.1203	4	0	0	Pass
2.1412	4	0	0	Pass
2.1621	4	0	0	Pass
2.1831	4	0	0	Pass
2.2040	4	0	0	Pass
2.2250	4	0	0	Pass
2.2459	4	0	0	Pass
2.2668	3	0	0	Pass
2.2878	3	0	0	Pass
2.3087	1	0	0	Pass
2.3297	1	0	0	Pass
2.3506	1	0	0	Pass
2.3715	1	0	0	Pass
2.3925	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #3

Pond I

On-line facility volume: 0.9915 acre-feet

On-line facility target flow: 0.7216 cfs.

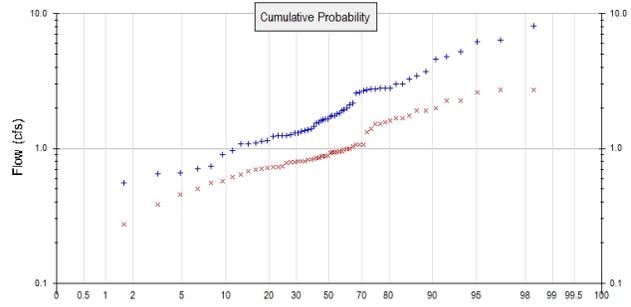
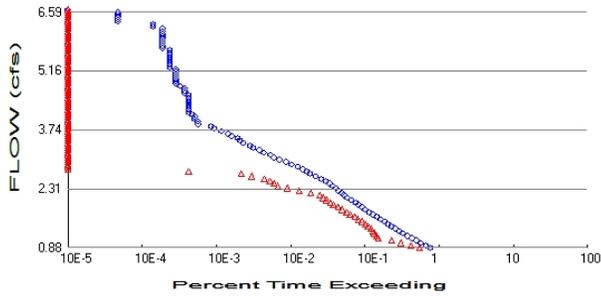
Adjusted for 15 min: 0.7216 cfs.

Off-line facility target flow: 0.3995 cfs.

Adjusted for 15 min: 0.3995 cfs.

POC 4

Pond H2



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #4

Total Pervious Area: 42.7  
 Total Impervious Area: 0

Mitigated Landuse Totals for POC #4

Total Pervious Area: 42.3  
 Total Impervious Area: 0.4

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #4

Return Period	Flow(cfs)
2 year	1.759868
5 year	2.991104
10 year	3.970156
25 year	5.393824
50 year	6.590918
100 year	7.906277

Flow Frequency Return Periods for Mitigated. POC #4

Return Period	Flow(cfs)
2 year	0.973542
5 year	1.492505
10 year	1.857056
25 year	2.335985
50 year	2.703875
100 year	3.079998

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #4

Year	Predeveloped	Mitigated
1949	2.563	0.839
1950	2.743	1.316
1951	3.453	2.736
1952	1.148	0.692
1953	0.968	0.640
1954	1.402	0.947
1955	2.163	1.072
1956	1.994	1.398
1957	1.752	0.831
1958	1.615	0.944
1959	1.372	0.852

1960	2.757	1.899
1961	1.330	0.820
1962	0.902	0.612
1963	1.302	0.869
1964	1.796	0.879
1965	1.360	0.882
1966	1.079	0.734
1967	2.995	1.035
1968	1.655	0.789
1969	1.556	0.801
1970	1.250	0.794
1971	1.661	0.874
1972	2.706	1.904
1973	1.237	0.803
1974	1.634	0.928
1975	2.118	0.954
1976	1.539	0.944
1977	0.646	0.211
1978	1.252	0.781
1979	0.739	0.553
1980	4.805	1.557
1981	1.087	0.729
1982	2.808	1.070
1983	1.838	0.979
1984	1.124	0.673
1985	0.658	0.458
1986	2.795	1.761
1987	2.604	1.670
1988	1.101	0.726
1989	0.711	0.503
1990	8.129	2.003
1991	3.712	2.276
1992	1.460	0.844
1993	1.298	0.804
1994	0.557	0.385
1995	1.732	1.067
1996	4.580	2.606
1997	3.276	2.259
1998	1.270	0.572
1999	5.219	1.525
2000	1.239	0.713
2001	0.323	0.273
2002	1.747	0.941
2003	2.998	0.707
2004	2.817	1.605
2005	1.937	0.988
2006	1.904	0.992
2007	6.230	1.679
2008	6.328	2.717
2009	2.688	1.527

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #4

Rank	Predeveloped	Mitigated
1	8.1286	2.7355
2	6.3281	2.7169
3	6.2299	2.6060
4	5.2192	2.2762

5	4.8054	2.2589
6	4.5796	2.0027
7	3.7125	1.9039
8	3.4529	1.8991
9	3.2760	1.7613
10	2.9976	1.6792
11	2.9955	1.6702
12	2.8171	1.6046
13	2.8081	1.5571
14	2.7947	1.5267
15	2.7570	1.5248
16	2.7435	1.3976
17	2.7059	1.3158
18	2.6885	1.0722
19	2.6036	1.0698
20	2.5634	1.0672
21	2.1628	1.0348
22	2.1177	0.9925
23	1.9944	0.9884
24	1.9367	0.9795
25	1.9041	0.9539
26	1.8378	0.9475
27	1.7964	0.9437
28	1.7523	0.9435
29	1.7473	0.9406
30	1.7319	0.9284
31	1.6609	0.8821
32	1.6552	0.8789
33	1.6342	0.8742
34	1.6152	0.8691
35	1.5561	0.8521
36	1.5394	0.8436
37	1.4604	0.8391
38	1.4021	0.8313
39	1.3722	0.8200
40	1.3600	0.8038
41	1.3301	0.8029
42	1.3020	0.8014
43	1.2980	0.7937
44	1.2705	0.7885
45	1.2520	0.7810
46	1.2501	0.7341
47	1.2392	0.7294
48	1.2366	0.7262
49	1.1478	0.7128
50	1.1238	0.7066
51	1.1014	0.6920
52	1.0870	0.6734
53	1.0794	0.6404
54	0.9683	0.6121
55	0.9024	0.5725
56	0.7385	0.5526
57	0.7111	0.5029
58	0.6580	0.4581
59	0.6460	0.3849
60	0.5573	0.2732
61	0.3232	0.2114

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.8799	16260	11631	71	Pass
0.9376	14140	8926	63	Pass
0.9953	12198	6521	53	Pass
1.0530	10536	4877	46	Pass
1.1107	9165	3238	35	Pass
1.1684	7967	3059	38	Pass
1.2261	6949	2879	41	Pass
1.2837	6151	2725	44	Pass
1.3414	5452	2567	47	Pass
1.3991	4860	2357	48	Pass
1.4568	4365	2169	49	Pass
1.5145	3918	1940	49	Pass
1.5722	3482	1731	49	Pass
1.6299	3093	1561	50	Pass
1.6875	2733	1351	49	Pass
1.7452	2417	1219	50	Pass
1.8029	2162	1061	49	Pass
1.8606	1933	929	48	Pass
1.9183	1761	800	45	Pass
1.9760	1599	731	45	Pass
2.0337	1395	648	46	Pass
2.0914	1246	590	47	Pass
2.1490	1118	523	46	Pass
2.2067	1036	396	38	Pass
2.2644	943	280	29	Pass
2.3221	875	192	21	Pass
2.3798	789	145	18	Pass
2.4375	713	128	17	Pass
2.4952	631	112	17	Pass
2.5528	548	94	17	Pass
2.6105	465	64	13	Pass
2.6682	391	46	11	Pass
2.7259	351	9	2	Pass
2.7836	309	0	0	Pass
2.8413	265	0	0	Pass
2.8990	218	0	0	Pass
2.9567	184	0	0	Pass
3.0143	152	0	0	Pass
3.0720	126	0	0	Pass
3.1297	113	0	0	Pass
3.1874	93	0	0	Pass
3.2451	80	0	0	Pass
3.3028	67	0	0	Pass
3.3605	60	0	0	Pass
3.4181	49	0	0	Pass
3.4758	44	0	0	Pass
3.5335	41	0	0	Pass
3.5912	34	0	0	Pass
3.6489	31	0	0	Pass
3.7066	25	0	0	Pass
3.7643	20	0	0	Pass
3.8220	18	0	0	Pass
3.8796	12	0	0	Pass

3.9373	12	0	0	Pass
3.9950	11	0	0	Pass
4.0527	11	0	0	Pass
4.1104	10	0	0	Pass
4.1681	9	0	0	Pass
4.2258	9	0	0	Pass
4.2834	9	0	0	Pass
4.3411	9	0	0	Pass
4.3988	9	0	0	Pass
4.4565	9	0	0	Pass
4.5142	9	0	0	Pass
4.5719	9	0	0	Pass
4.6296	8	0	0	Pass
4.6873	8	0	0	Pass
4.7449	8	0	0	Pass
4.8026	7	0	0	Pass
4.8603	6	0	0	Pass
4.9180	6	0	0	Pass
4.9757	6	0	0	Pass
5.0334	6	0	0	Pass
5.0911	6	0	0	Pass
5.1488	6	0	0	Pass
5.2064	6	0	0	Pass
5.2641	5	0	0	Pass
5.3218	5	0	0	Pass
5.3795	5	0	0	Pass
5.4372	5	0	0	Pass
5.4949	5	0	0	Pass
5.5526	5	0	0	Pass
5.6102	5	0	0	Pass
5.6679	5	0	0	Pass
5.7256	4	0	0	Pass
5.7833	4	0	0	Pass
5.8410	4	0	0	Pass
5.8987	4	0	0	Pass
5.9564	4	0	0	Pass
6.0141	4	0	0	Pass
6.0717	4	0	0	Pass
6.1294	4	0	0	Pass
6.1871	4	0	0	Pass
6.2448	3	0	0	Pass
6.3025	3	0	0	Pass
6.3602	1	0	0	Pass
6.4179	1	0	0	Pass
6.4755	1	0	0	Pass
6.5332	1	0	0	Pass
6.5909	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #4

**Pond H2**

On-line facility volume: 2.3155 acre-feet

On-line facility target flow: 1.268 cfs.

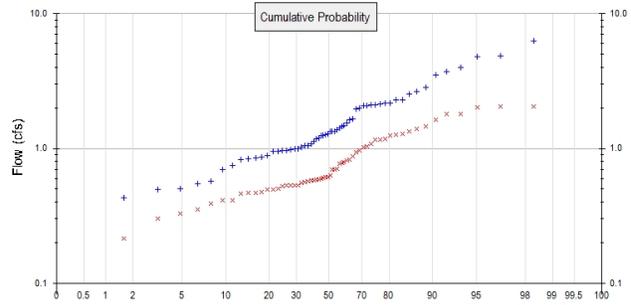
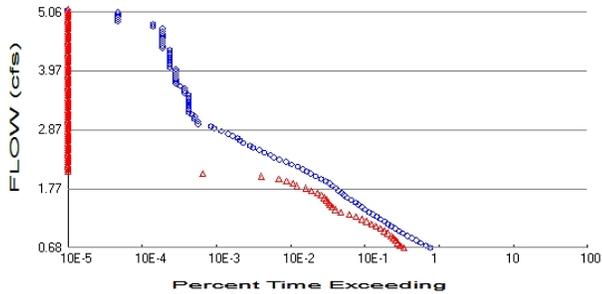
Adjusted for 15 min: 1.268 cfs.

Off-line facility target flow: 0.6949 cfs.

Adjusted for 15 min: 0.6949 cfs.

POC 5

Pond F



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #5

Total Pervious Area: 32.8  
 Total Impervious Area: 0

Mitigated Landuse Totals for POC #5

Total Pervious Area: 32.4  
 Total Impervious Area: 0.4

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #5

Return Period	Flow(cfs)
2 year	1.351843
5 year	2.297617
10 year	3.049675
25 year	4.143266
50 year	5.062813
100 year	6.073206

Flow Frequency Return Periods for Mitigated. POC #5

Return Period	Flow(cfs)
2 year	0.716722
5 year	1.131988
10 year	1.437463
25 year	1.854559
50 year	2.186329
100 year	2.535167

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #5

Year	Predeveloped	Mitigated
1949	1.969	0.553
1950	2.107	1.037
1951	2.652	2.055
1952	0.882	0.466
1953	0.744	0.470
1954	1.077	0.704
1955	1.661	0.937
1956	1.532	1.080
1957	1.346	0.592
1958	1.241	0.692
1959	1.054	0.570

1960	2.118	1.454
1961	1.022	0.559
1962	0.693	0.414
1963	1.000	0.599
1964	1.380	0.581
1965	1.045	0.604
1966	0.829	0.504
1967	2.301	0.872
1968	1.271	0.536
1969	1.195	0.535
1970	0.960	0.533
1971	1.276	0.610
1972	2.079	1.396
1973	0.950	0.585
1974	1.255	0.767
1975	1.627	0.627
1976	1.182	0.692
1977	0.496	0.174
1978	0.962	0.581
1979	0.567	0.390
1980	3.691	1.166
1981	0.835	0.528
1982	2.157	1.028
1983	1.412	0.779
1984	0.863	0.459
1985	0.505	0.327
1986	2.147	1.265
1987	2.000	1.244
1988	0.846	0.493
1989	0.546	0.353
1990	6.244	1.641
1991	2.852	1.813
1992	1.122	0.617
1993	0.997	0.536
1994	0.428	0.303
1995	1.330	0.960
1996	3.518	2.010
1997	2.516	1.808
1998	0.976	0.415
1999	4.009	1.179
2000	0.952	0.477
2001	0.248	0.215
2002	1.342	0.813
2003	2.303	0.498
2004	2.164	1.275
2005	1.488	0.823
2006	1.463	0.791
2007	4.785	1.330
2008	4.861	2.038
2009	2.065	1.168

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #5

Rank	Predeveloped	Mitigated
1	6.2440	2.0549
2	4.8610	2.0383
3	4.7855	2.0102
4	4.0091	1.8131

5	3.6913	1.8076
6	3.5178	1.6412
7	2.8517	1.4543
8	2.6524	1.3959
9	2.5165	1.3304
10	2.3026	1.2752
11	2.3010	1.2653
12	2.1639	1.2441
13	2.1570	1.1786
14	2.1468	1.1675
15	2.1178	1.1656
16	2.1074	1.0804
17	2.0786	1.0366
18	2.0652	1.0280
19	2.0000	0.9604
20	1.9691	0.9372
21	1.6613	0.8723
22	1.6267	0.8233
23	1.5320	0.8133
24	1.4877	0.7912
25	1.4626	0.7791
26	1.4117	0.7672
27	1.3799	0.7045
28	1.3461	0.6924
29	1.3422	0.6923
30	1.3304	0.6272
31	1.2758	0.6170
32	1.2715	0.6104
33	1.2553	0.6041
34	1.2407	0.5986
35	1.1953	0.5917
36	1.1825	0.5847
37	1.1218	0.5811
38	1.0771	0.5810
39	1.0541	0.5699
40	1.0447	0.5593
41	1.0217	0.5531
42	1.0001	0.5358
43	0.9970	0.5357
44	0.9759	0.5348
45	0.9617	0.5331
46	0.9603	0.5278
47	0.9519	0.5037
48	0.9499	0.4976
49	0.8817	0.4935
50	0.8632	0.4774
51	0.8461	0.4702
52	0.8350	0.4658
53	0.8292	0.4593
54	0.7438	0.4149
55	0.6932	0.4136
56	0.5673	0.3900
57	0.5462	0.3533
58	0.5055	0.3274
59	0.4963	0.3026
60	0.4281	0.2148
61	0.2482	0.1736

## Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.6759	16270	7144	43	Pass
0.7202	14123	6406	45	Pass
0.7645	12209	5929	48	Pass
0.8089	10538	5544	52	Pass
0.8532	9163	5165	56	Pass
0.8975	7972	4821	60	Pass
0.9418	6964	4391	63	Pass
0.9861	6143	3914	63	Pass
1.0304	5454	3465	63	Pass
1.0747	4866	3029	62	Pass
1.1190	4359	2642	60	Pass
1.1634	3918	2259	57	Pass
1.2077	3489	1953	55	Pass
1.2520	3095	1624	52	Pass
1.2963	2731	1316	48	Pass
1.3406	2419	1013	41	Pass
1.3849	2162	849	39	Pass
1.4292	1931	777	40	Pass
1.4735	1761	722	40	Pass
1.5179	1600	692	43	Pass
1.5622	1392	657	47	Pass
1.6065	1246	610	48	Pass
1.6508	1122	550	49	Pass
1.6951	1035	489	47	Pass
1.7394	943	406	43	Pass
1.7837	876	342	39	Pass
1.8280	788	260	32	Pass
1.8723	713	228	31	Pass
1.9167	633	188	29	Pass
1.9610	548	148	27	Pass
2.0053	465	86	18	Pass
2.0496	392	14	3	Pass
2.0939	351	0	0	Pass
2.1382	309	0	0	Pass
2.1825	265	0	0	Pass
2.2268	218	0	0	Pass
2.2712	184	0	0	Pass
2.3155	152	0	0	Pass
2.3598	126	0	0	Pass
2.4041	113	0	0	Pass
2.4484	94	0	0	Pass
2.4927	80	0	0	Pass
2.5370	67	0	0	Pass
2.5813	60	0	0	Pass
2.6257	49	0	0	Pass
2.6700	44	0	0	Pass
2.7143	41	0	0	Pass
2.7586	35	0	0	Pass
2.8029	31	0	0	Pass
2.8472	25	0	0	Pass
2.8915	20	0	0	Pass
2.9358	18	0	0	Pass
2.9801	12	0	0	Pass

3.0245	12	0	0	Pass
3.0688	11	0	0	Pass
3.1131	11	0	0	Pass
3.1574	10	0	0	Pass
3.2017	9	0	0	Pass
3.2460	9	0	0	Pass
3.2903	9	0	0	Pass
3.3346	9	0	0	Pass
3.3790	9	0	0	Pass
3.4233	9	0	0	Pass
3.4676	9	0	0	Pass
3.5119	9	0	0	Pass
3.5562	8	0	0	Pass
3.6005	8	0	0	Pass
3.6448	8	0	0	Pass
3.6891	7	0	0	Pass
3.7335	6	0	0	Pass
3.7778	6	0	0	Pass
3.8221	6	0	0	Pass
3.8664	6	0	0	Pass
3.9107	6	0	0	Pass
3.9550	6	0	0	Pass
3.9993	6	0	0	Pass
4.0436	5	0	0	Pass
4.0879	5	0	0	Pass
4.1323	5	0	0	Pass
4.1766	5	0	0	Pass
4.2209	5	0	0	Pass
4.2652	5	0	0	Pass
4.3095	5	0	0	Pass
4.3538	5	0	0	Pass
4.3981	4	0	0	Pass
4.4424	4	0	0	Pass
4.4868	4	0	0	Pass
4.5311	4	0	0	Pass
4.5754	4	0	0	Pass
4.6197	4	0	0	Pass
4.6640	4	0	0	Pass
4.7083	4	0	0	Pass
4.7526	4	0	0	Pass
4.7969	3	0	0	Pass
4.8413	3	0	0	Pass
4.8856	1	0	0	Pass
4.9299	1	0	0	Pass
4.9742	1	0	0	Pass
5.0185	1	0	0	Pass
5.0628	1	0	0	Pass

## Water Quality

Water Quality BMP Flow and Volume for POC #5

**Pond F**

On-line facility volume: 1.7949 acre-feet

On-line facility target flow: 1.0044 cfs.

Adjusted for 15 min: 1.0044 cfs.

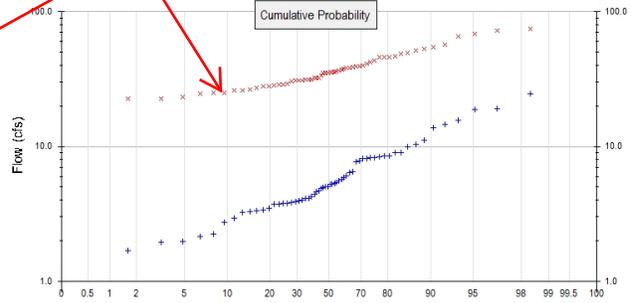
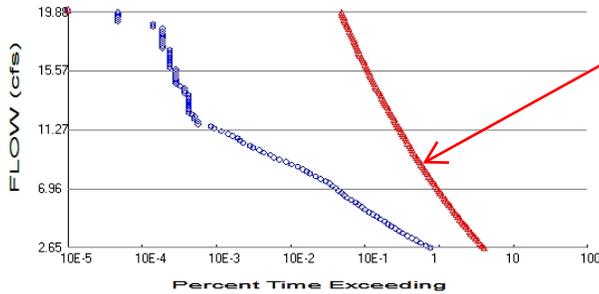
Off-line facility target flow: 0.5494 cfs.

Adjusted for 15 min: 0.5494 cfs.

POC 6

Pit 1 / Pit 2

Developed inflow curves



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #6

Total Pervious Area: 128.8  
Total Impervious Area: 0

Mitigated Landuse Totals for POC #6

Total Pervious Area: 60.3  
Total Impervious Area: 68.5

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #6

Return Period	Flow(cfs)
2 year	5.308454
5 year	9.022349
10 year	11.975556
25 year	16.269902
50 year	19.880813
100 year	23.848456

Flow Frequency Return Periods for Mitigated. POC #6

Return Period	Flow(cfs)
2 year	35.19141
5 year	45.618204
10 year	52.845213
25 year	62.367709
50 year	69.75688
100 year	77.407502

These are the Pit 1 / Pit 2 inflows.  
The Pit 1 / Pit 2 outflows are limited to 1.11 cfs max per pump and up to 2 pumps may be used to drain Pit 1.

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #6

Year	Predeveloped	Mitigated
1949	7.732	49.484
1950	8.275	46.003
1951	10.415	30.622
1952	3.462	22.518
1953	2.921	25.011
1954	4.229	29.264
1955	6.524	32.087
1956	6.016	30.824
1957	5.286	37.656
1958	4.872	28.343
1959	4.139	27.133

1960	8.316	32.178
1961	4.012	31.041
1962	2.722	24.959
1963	3.927	31.367
1964	5.419	27.880
1965	4.102	38.060
1966	3.256	24.509
1967	9.036	42.465
1968	4.993	48.780
1969	4.694	34.891
1970	3.771	33.541
1971	5.010	39.328
1972	8.162	43.400
1973	3.730	22.229
1974	4.929	37.173
1975	6.388	38.180
1976	4.643	28.979
1977	1.949	28.616
1978	3.777	35.078
1979	2.228	46.739
1980	14.495	51.824
1981	3.279	36.390
1982	8.470	52.884
1983	5.544	39.563
1984	3.390	26.057
1985	1.985	35.232
1986	8.430	31.203
1987	7.853	45.789
1988	3.322	26.214
1989	2.145	35.603
1990	24.519	74.385
1991	11.198	56.649
1992	4.405	26.329
1993	3.915	23.154
1994	1.681	22.753
1995	5.224	31.549
1996	13.814	38.798
1997	9.882	35.652
1998	3.832	32.176
1999	15.743	71.961
2000	3.738	35.393
2001	0.975	36.369
2002	5.270	46.212
2003	9.042	39.819
2004	8.497	67.957
2005	5.842	30.906
2006	5.743	28.171
2007	18.792	65.951
2008	19.088	54.822
2009	8.109	41.290

### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #6

Rank	Predeveloped	Mitigated
1	24.5192	74.3850
2	19.0882	71.9607
3	18.7918	67.9566
4	15.7431	65.9506

5	14.4951	56.6485
6	13.8138	54.8222
7	11.1982	52.8843
8	10.4154	51.8235
9	9.8817	49.4836
10	9.0419	48.7799
11	9.0356	46.7386
12	8.4973	46.2118
13	8.4703	46.0028
14	8.4301	45.7893
15	8.3162	43.4004
16	8.2754	42.4652
17	8.1622	41.2903
18	8.1095	39.8186
19	7.8534	39.5628
20	7.7322	39.3284
21	6.5237	38.7977
22	6.3879	38.1803
23	6.0159	38.0595
24	5.8418	37.6560
25	5.7434	37.1733
26	5.5436	36.3895
27	5.4185	36.3686
28	5.2857	35.6524
29	5.2705	35.6032
30	5.2241	35.3933
31	5.0100	35.2318
32	4.9928	35.0779
33	4.9295	34.8911
34	4.8720	33.5414
35	4.6937	32.1777
36	4.6433	32.1764
37	4.4052	32.0871
38	4.2294	31.5490
39	4.1391	31.3672
40	4.1023	31.2034
41	4.0120	31.0406
42	3.9274	30.9059
43	3.9151	30.8238
44	3.8323	30.6223
45	3.7765	29.2639
46	3.7708	28.9793
47	3.7378	28.6164
48	3.7301	28.3425
49	3.4623	28.1713
50	3.3898	27.8797
51	3.3223	27.1331
52	3.2787	26.3286
53	3.2560	26.2141
54	2.9207	26.0570
55	2.7220	25.0110
56	2.2276	24.9589
57	2.1449	24.5091
58	1.9849	23.1538
59	1.9487	22.7527
60	1.6811	22.5177
61	0.9747	22.2294

## Water Quality

Water Quality BMP Flow and Volume for POC #6

On-line facility volume: 11.468 acre-feet

On-line facility target flow: 12.955 cfs.

Adjusted for 15 min: 12.955 cfs.

Off-line facility target flow: 7.2367 cfs.

Adjusted for 15 min: 7.2367 cfs.

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