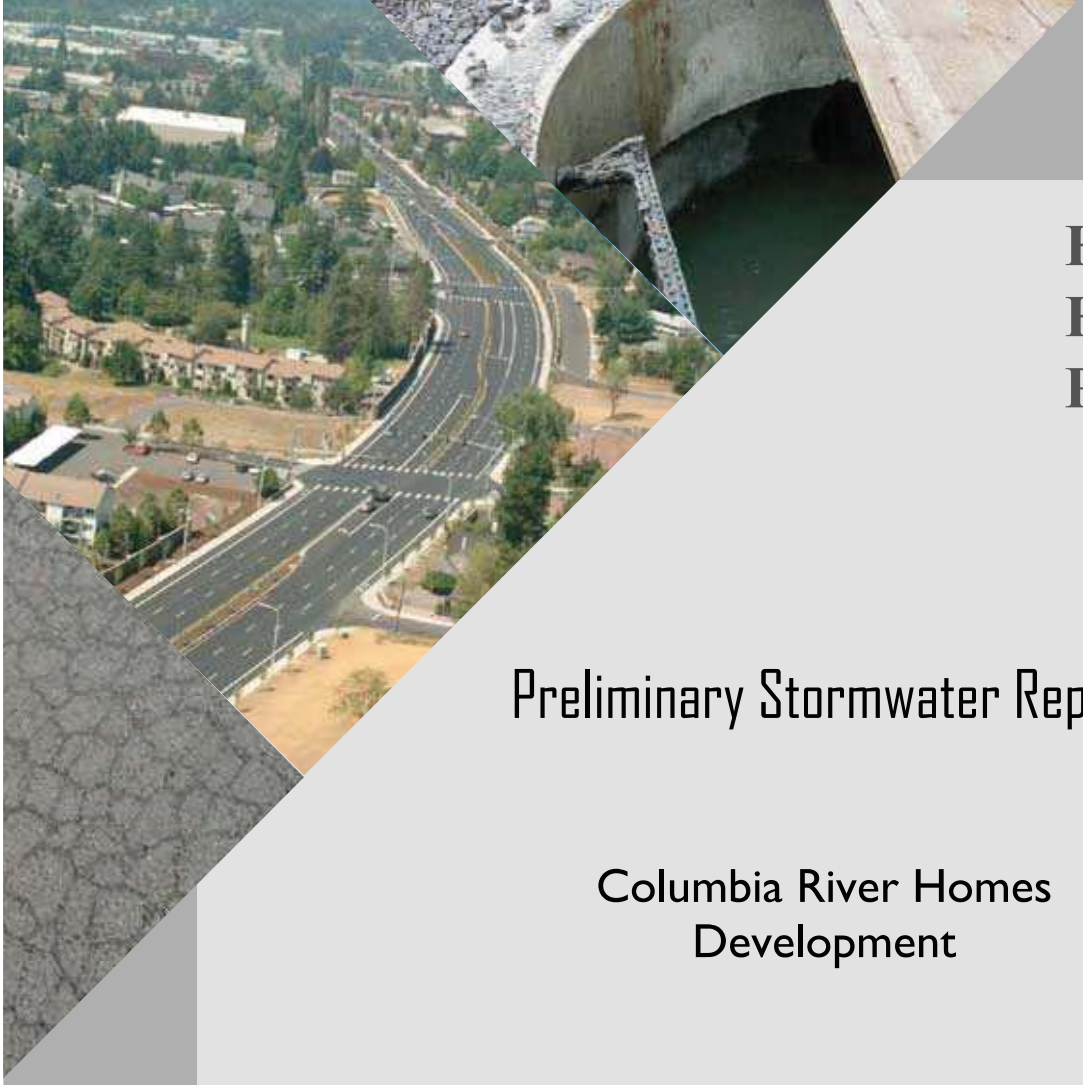

Harper
Houf Peterson
Righellis Inc.

Preliminary Stormwater Report

Columbia River Homes Development

May 10, 2019

Prepared For:

Reiter Design Architect Incorporated
7965 SW Cirrus Drive
Beaverton, OR 97008

SRD-33

Prepared By:

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Bruce Haunreiter, P.E.

HHPR

ENGINEERS ◆ PLANNERS
LANDSCAPE ARCHITECTS ◆ SURVEYORS

INTRODUCTION

This preliminary stormwater report for the Columbia River Homes Development site is submitted concurrently with the Site Plan Review set that contains both the stormwater plan and the grading plan sheets. The layout of this report conforms to the standardized format as described in the City of Camas Stormwater Design Standards Manual.

PROJECT SUMMARY

The site is located on Tax lot 83128000 at 3210 SW 6th Avenue, Camas, Washington 98607. The project seeks to short plat the existing parcel into five lots with single family townhomes and associated driveways. Stormwater management facilities will be installed to manage runoff from the new impervious surface of 0.56 acres. The roof drains from the townhomes will discharge to dispersion trenches, overflowing into the grassy area in the southern portion of the parcel. The stormwater runoff from the access road and driveways will be collected in inlets, treated and detained in bioretention swales, and overflow to the proposed dispersion trenches south of the townhomes.

Table of Contents

Map Submittals

1. Vicinity Map. See Appendix 1, Figure 1 for Site Location Map.
2. Soils Map. See Appendix 1, Figure 2 for the Clark County Soils Survey Map

Section A – Project Overview

1. The site is located at 3210 SW 6th Avenue, Camas, Washington 98607. An existing 1,500 square foot house and detached garage are present on the site and are accessed by a gravel driveway. The existing house and garage will be demolished. The proposed construction will impact approximately 0.54 acres of tax parcel 83128000, as well as approximately 0.22 acres within the right-of-way south of SW 6th Avenue. (Approximately 0.76 acres of total disturbance).

2. The project slopes toward the southeast, with elevations ranging from 86 feet along the northern property line to 58 feet at the southeast property corner. The site and the surrounding areas are mapped as Areas of Potential Instability for landslide hazards (Clark County GIS 2019). A Geotechnical investigation was conducted by Terra Dolce Consultants which concluded that the site was geotechnically sound for the proposed project. (See Section C – Soils Evaluation and Appendix 4 - Geotechnical Report.)

   Site vegetation is characteristic of a residential lawn with various native and non-native tree species planted, mostly along the margin of the parcel. The lawn is a combination of non-native lawn grasses and weedy forbs. The northeast corner of the parcel has a thicket of teasel, western white clematis, and Himalayan blackberry. Trees on the property are typically small Douglas fir, bigleaf maple, arborvitae and various ornamental cypress species planted around the margins of the parcel. The notable exceptions (native species) are a western red cedar southeast of the house, two Douglas fir and one bigleaf maple along the southern boundary, and an Oregon white oak in the southwest corner of the parcel.

   The site overlays the countywide, federally designated Troutdale Sole Source Aquifer, which is designated as a Critical Aquifer Recharge Area (CARA) in accordance with CMC 16.55. The closest mapped municipal wellhead protection area is 2.5 miles east of the parcel (Clark County GIS 2019). The project will not extend into any other critical areas. (See Appendix 5 – Critical Area Report).

3. The existing site stormwater flows overland from the north to the south portion of the parcel. Runoff from the gravel access road sheet flows to the south. Roof drains for the existing house and detached garage discharge to splash blocks, which disperse roof runoff to the south grassy lawn area. The shallow bedrock present on the site prevents stormwater infiltration.

4. The parameters that influence the storm drainage design for the project are the poor infiltration rates and the shallow bedrock.

5. Runoff from the gravel access road within the right-of-way north of the site sheet flows to the south onto the site. The existing site runoff flows overland through the thick grassy area that slopes to the south. Any drainage offsite will flow through the densely vegetated slope to the gravel drainage channel on the north side of the Burlington Northern Railway tracks. Culverts under the railway tracks convey runoff to the south side of the tracks to drainage ways which outfall to the Camas Slough. (See attached Figure 4 Offsite Drainage Cross-section, Appendix 1).

6. No wetlands or hydric soils are mapped on or adjacent to the site (Clark County GIS 2019, USDA NRCS 2019). There are no streams or ponds on the site. The closest waterbody, the west end of Camas Slough, is 300 feet south. The closest mapped wetlands and hydric soils are along Camas Slough. No evidence of wetland indicators (hydrophytic vegetation, hydric soil, or wetland hydrology) was observed on site. Storm drainage runoff will be treated and dispersed on site and will not affect these water bodies. The project shall have no disturbance to adjacent properties during construction.

7. The proposed project consists of approximately 0.29 acres of asphalt driveway, partially located within the right-of-way, which will be conveyed via sheetflow and catchbasins to bioretention swales on each of the five lots. The 0.27 acres of roof drains from the townhomes will discharge to dispersion trenches located on each of the five lots, overflowing into the grassy area in the southern portion of the parcel.

Section B – Minimum Requirements

A. The land-disturbing activity for the project consists of constructing approximately 0.29 acres of pollution generating hard surface (0.18 acres of asphalt roadway and driveways within the right-of-way and 0.11 acres of driveways on the parcel), and 0.27 acres of building area for the townhome construction. Per Figure 1.3 of the City of Camas Stormwater Design Standards Manual, all minimum requirements apply to the new and replaced impervious surfaces of this project (See Figure 4, Appendix 1).

- *The project results in 2,000 square feet or more of new plus replaced hard surface area.*
- *The project adds 5,000 square feet or more of new hard surfaces.*
- *This is not a road related project.*
- *The value of the proposed improvements exceed 50% of the assessed value of the existing site improvements.*

TABLE 1 – Impervious Surface Summary (Disturbed area only)

Post-Developed

Existing Impervious (acre)	New Impervious Surface (acre)	Replaced Impervious Surface (acre)	Native Vegetation converted to Lawn or Landscape (acre)	Total Land-Disturbed Area (acre)	Total Site Area (acre)
0.05	0.51	0.05	0	0.76	0.78

B. The minimum requirements for the subject project are as follows:

Minimum Requirement #1 - Preparation of Stormwater Site Plans – *Stormwater site plans are included with this submittal.*

Minimum Requirement #2 - Construction Stormwater Pollution Prevention (SWPPP) – *A SWPPP is will be prepared with the Engineering Submittal.*

Minimum Requirement #3 - Source Control of Pollution – *The development activities do not include any of the activities listed in section 2.2 of Volume IV of the Stormwater Management Manual for Western Washington (SWMMWW).*

Minimum Requirement #4 - Preservation of Natural Drainage Systems and Outfalls – *The existing site runoff flows overland to the south. All natural drainage systems and outfalls will be maintained as the proposed project will manage stormwater through dispersion trenches on-site.*

Minimum Requirement #5 - On-Site Stormwater Management – *The intent of this project is to treat the runoff from the new pollution-generating impervious surface on-site through the use of bioretention swales, which will overflow to dispersion trenches south of the proposed townhomes. The bioretention swales will be sized to treat at least 91% of the pollution generating runoff through the treatment soil. The swales were also designed to provide flow control, per the Stormwater Manual runoff requirements. See Appendix 3, Stormwater Calculations for WWHM2012 printouts. As designed, all systems have shown a "Pass" in WWHM2012.*

The roof drains from the townhomes will discharge directly to the proposed dispersion trenches. Per the requirement of 10 linear feet of trench for every 700 square feet of roof area, the dispersion trenches will be sized accordingly. (See Stormwater Plans – Appendix 2). A vegetative flow path of 25 feet will be maintained downslope of the dispersion trenches.

BMP T5.13 Post Construction Soil Quality and Depth will be completed on all disturbed areas.

Minimum Requirement #6 - Runoff Treatment – *The pollution generating surfaces will be treated with basic treatment via bioretention facilities. See the Stormwater Calculations, Appendix 3.*

Minimum Requirement #7 - Flow Control – *Flow control will be provided through the use of bioretention facilities and dispersion trenches. Predeveloped and mitigated scenarios were modeled in WWHM2012. See the Stormwater Calculations, Appendix 3.*

Minimum Requirement #8 - Wetlands Protection – *No wetlands are located within the project vicinity.*

Minimum Requirement #9 – Basin/Watershed Planning – *N/A.*

Minimum Requirement #10 - Operation and Maintenance – *An Operations and Maintenance Manual will be included in the final stormwater report.*

The project will provide stormwater management for all of the new and replaced impervious surface area.

Section C – Soils Evaluation

1. Clark County GIS identifies the soil as Olympic clay loam, 8 to 20% (OlD). According to the Soil Survey of Clark County, Washington, OlD consists of well-drained, steep soils underlain by basalt bedrock. The available water capacity is high, and surface runoff is medium. A Geotechnical investigation was completed by Terra Dolce Consultants, Inc. in October of 2018. Per the geotechnical evaluation, the property is underlain with volcanic rock which is not suitable for infiltration of surface water. The completed project will consist of imported soil to create a flat, buildable surface for the driveways and bioretention swale areas.

2. Groundwater was not encountered during the geotechnical evaluation.

3. Due to the presence of bedrock, Soil Group C was used for the pre-developed conditions in the WWHM2012 model.

4. The Geotechnical Engineer conducted a site investigation on August 28, 2018. Borings were drilled with a solid-stem auger drill rig to 5 feet below ground surface. The shallow boring depths were due to the shallow bedrock. Up to 4 inches of silty topsoil, and 1 to 2 feet of silt, was encountered across the site. Hard to very hard volcanic bedrock was encountered directly under the silt. Per the geotechnical report, the volcanic rock is unable to percolate surface water.

5. See attached Geotechnical Report, prepared October 8, 2018 by Terra Dolce Consultants, Inc. for the Proposed Camas Riverfront Townhomes.

(Appendix 1 – Clark County GIS soils map and Appendix 4 - Geotechnical Report)

Section D – Source Control

The development activities do not include any of the activities listed in section 2.2 of Volume IV of the Stormwater Management Manual for Western Washington (SWMMWW).

Section E – On-Site Stormwater Management BMPs

1. See the Project Plans, Appendix 2 for the stormwater plan that shows the BMPs utilized for this site.

2. Per the Geotechnical Report (Appendix 4), the site topography and environmental site constraints were analyzed in selecting each BMP. The shallow bedrock throughout the site prevents infiltration of surface water. Due to the poor infiltration rates, Soil Group C was used for the pre-developed conditions in the WWHM2012 model. The proposed bioretention swales will be constructed within the areas of imported fill, and have been modeled assuming a conservative infiltration rate of 0.5 inches/hour. (Appendix 1 – Clark County GIS soils map, and Appendix 4 - Geotechnical Report.)

3. The proposed on-site stormwater permanent BMPs are bioretention facilities and downspout dispersion trenches. These BMPs were chosen because of the layout of the site, the small amount of increased impervious area, the shallow bedrock and limited available construction space. BMP T5.13 Post Construction Soil Quality and Depth will be completed on all disturbed areas.

4. The bioretention facilities were designed per the Stormwater Manual utilizing a continuous runoff model. The facilities have been designed to treat at least 91% of the pollution generating runoff through the treatment soil.

5. The LID measures planned for the project include bioretention facilities and downspout dispersion trenches. See Appendix 2 for the project plans that show the size and location of the facilities.

6. The following assumptions were made in design of the stormwater facilities:

    a. The rainfall data in the WWHM2012 program accurately reflects the actual total precipitation for the design event.
    b. The topography of the site is accurately reflected on the topographic survey.
    c. The contractor will provide erosion control as necessary during construction to ensure that the bioretention facilities stay free of silt.
    d. The bioretention facilities and the downspout dispersion trenches will be adequately maintained.

7. The specific BMPs were chosen because of the site suitability. The bioretention swales will be constructed in the available space between the access road and the townhouses, which will consist of imported soil to create a flat, buildable surface for the driveways and swales. The grassy area south of the townhouses is available for dispersion of the stormwater. A flow path of 25 feet will be maintained between the trenches and the downstream property line.

Section F – Runoff Treatment Analysis and Design

1. Per the DOE manual, the level of treatment required for the subject project is basic treatment.
2. Bioretention facilities were chosen because of the relatively small footprint and the available space between the access road and the townhomes. All proposed pollution generating surfaces will be treated in the new bioretention swales. The swales will have a bottom width of 2 feet, lengths of 8 to 11 feet, with 3 to 1 side slopes.
3. Refer to Appendix 4 for the Geotechnical Report. Refer to Appendix 3 for all stormwater calculations.
4. Bioretention facilities were chosen because of the relatively small footprint and the topography of the site. All pollution generating surfaces will be treated by the bioretention swales. The swales will have a bottom width of 2 feet, lengths of 8 to 11 feet, with 3 to 1 side slopes. The soil layer consists of 18” BSM (SMMWW 12 in/hr) and 18” of gravel.
5. The proposed BMP, bioretention facilities, were designed per the Stormwater Manual. They are designed to infiltrate at least 91% of the runoff through the treatment soil and are considered enhanced treatment.
6. Table 2 provides a list of the amount of pollution-generating pervious surfaces and pollution-generating impervious surfaces.

TABLE 2 – Pollution Generating Surface Summary

Post-Developed

Pollution Generating Impervious Surface (acre)	Pollution Generating Pervious Surface (acre)
0.29	0

The driveways and access road are considered pollution-generating impervious surfaces.

Section G – Flow Control Analysis and Design

1. Flow control was achieved via the bioretention facilities and the dispersion trenches. Refer to the WWHM2012 report for the pre-developed versus mitigated results. The predeveloped conditions were modeled in WWHM2012 as C/IMP DISP/STEEP (dispersal of impervious area runoff on C soil with steep slope) which appears to best represent the steep predeveloped site which sets on a shallow soil layer atop impervious bedrock.

   The mitigated site will consist of imported soil to create a flat, buildable surface for the driveways and bioretention swale areas. For purposes of the WWHM2012 model, the imported soil is assumed to have a measured infiltration rate of 0.5 in/hr with a safety factor of 4 (design rate of 0.125 in/hr). The bioretention swales are sized to provide both water quality and sufficient detention for the post-developed runoff.

   The dispersion trenches have been modeled in WWHM as five separate shallow ponds, with slight surface infiltration (0.5 in/hr) at 35 feet long (length of dispersion) x 25 feet wide (width of dispersed area) x 0.10 feet deep. The mitigated basin does not include the area of the dispersion trench, as this is accounted for in the WWHM2012 model. See Appendix 3 for all calculations.

2. See Appendix 4 for the project Geotechnical Report.

3. See Appendix 3 for all stormwater calculations.

4. Not applicable. The site is not considered historic prairie.

5. See Appendix 3 for WWHM2012 modeling results.

6. See Appendix 3 for all stormwater calculations.

7. See attached Basin Map in Appendix 3.

Section H – Wetlands Protection

1. The storm drainage runoff does not discharge to a wetland directly or indirectly, therefore Minimum Requirement #8 is not applicable to this project.

REFERENCES

Clark County. 2019. Clark County GIS MapsOnline. URL http://maps.clark.wa.gov/imfmol/imf.jsp?site=pub_mapsonline. Accessed March through April 2019.

Terra Dolce Consultants, Inc. 2018. Geotechnical Engineering Report. Proposed Camas Riverfront Townhomes. Camas, Washington. Prepared for Terrie Cox Revocable Living Trust, Vancouver, Washington. October 8, 2018.

Washington State Department of Ecology - Water Quality Program. December 2014. Stormwater Management Manual for Western Washington. Publication Number 14-10-055.

APPENDIX 1
MAPS AND FIGURES

Figure 1: Vicinity Map

Legend

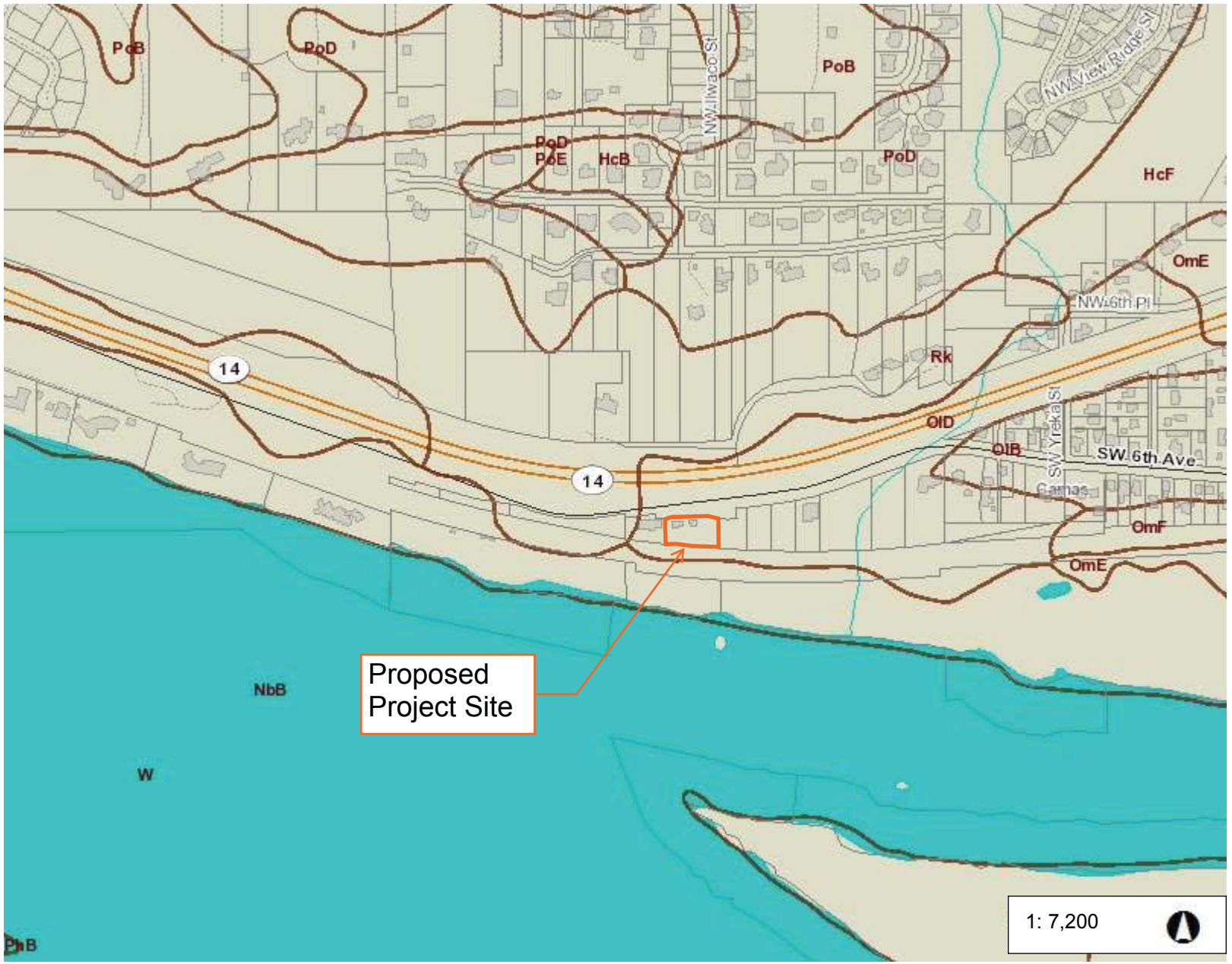
- Building Footprints
- Taxlots
- Cities Boundaries
- Urban Growth Boundaries

Notes:

2,000.0 0 1,000.00 2,000.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

Figure 2: Soils Map



Legend

- Building Footprints
- Taxlots
- Soil Type
- All Roads
  - Interstate
  - State Route
  - Arterial
  - Forest Arterial
  - Minor Collector
  - Forest Collector
  - Private or Other
- Cities Boundaries
- Urban Growth Boundaries

OlD - Olympic clay loam, 8 to 20% slopes

Notes:

1,200.0 0 600.00 1,200.0 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Clark County, WA. GIS - http://gis.clark.wa.gov

Figure 3: Redevelopment Flow Chart

Figure 1.3: Redevelopment Minimum Requirements Flow Chart

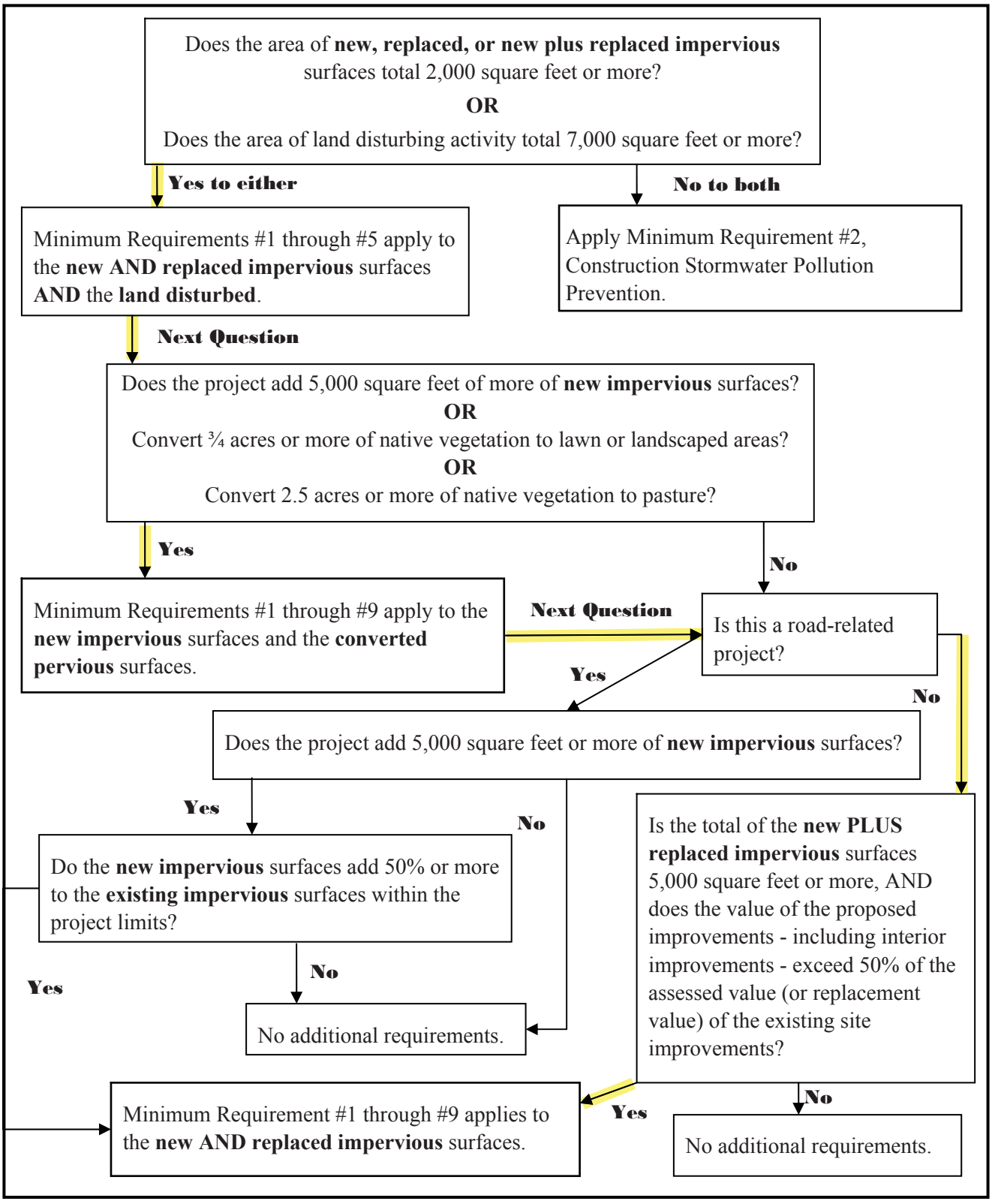
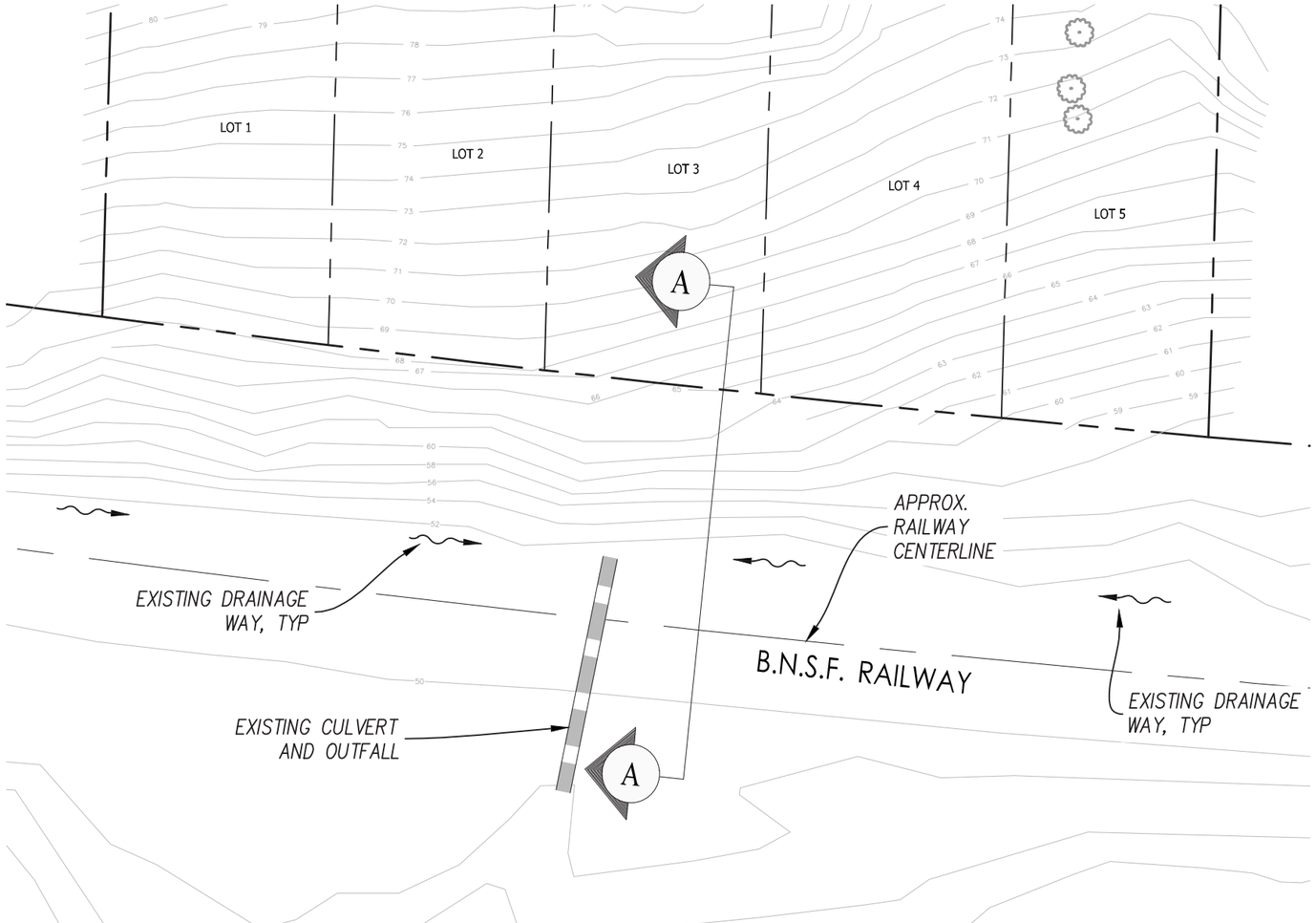
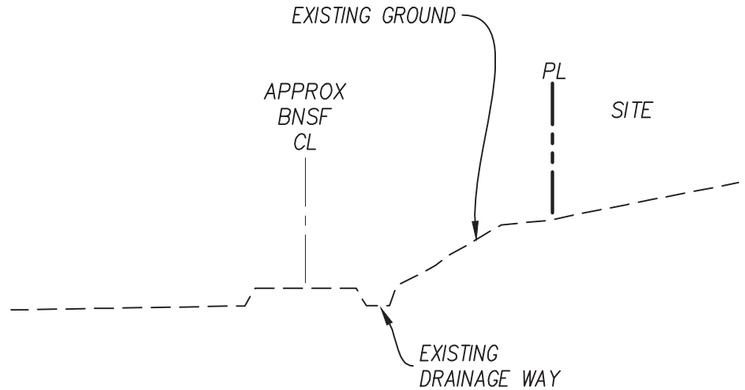


Figure 4: Offsite Drainage Cross-section





SECTION A-A

SCALE: 1" = 30'

0 15 30 60

SCALE: 1" = 30'

N

DESIGNED:	
DRAWN:	
CHECKED:	
DATE:	05/09/19

Harper Houf Peterson Righellis Inc.
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EXISTING RAILWAY DRAINAGE EXHIBIT
COLUMBIA RIVER HOMES DEVELOPMENT
3210 SW 6TH AVENUE CAMAS, WASHINGTON

SHEET NO. 1 OF 1

JOB NO. SRD-33

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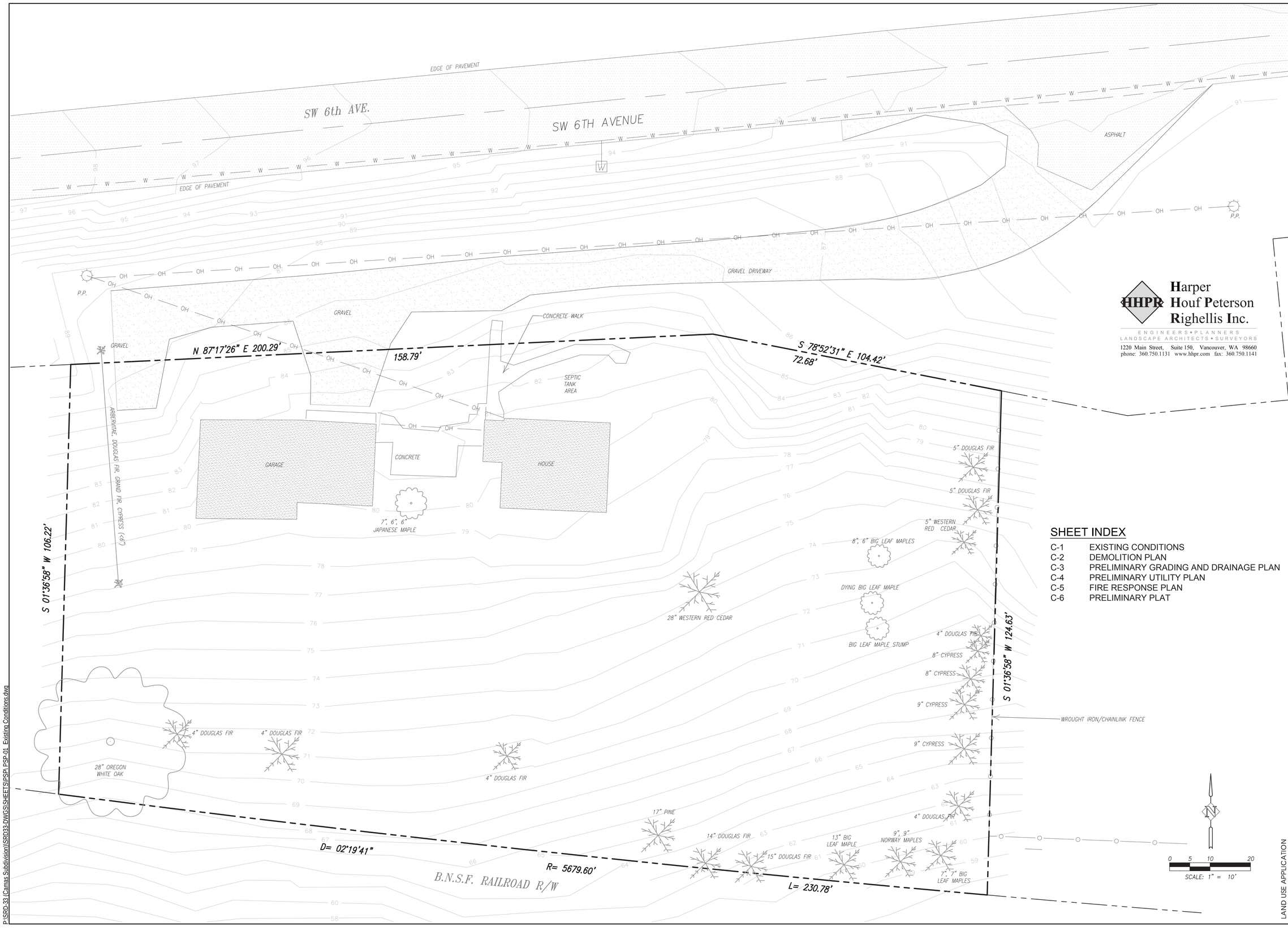
APPENDIX 2
PLAN REVIEW SET



SHEET INDEX

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7965 SW CIRRUS DRIVE BEAVERTON, OREGON 97008 (503) 574-3036

COLUMBIA RIVER HOMES DEVELOPMENT

3210 SW 6TH AVENUE CAMAS, WASHINGTON

OWNER:
TERRIE COX REVOCABLE LIVING TRUST
16408 SE MILL PLAIN BLVD. VANCOUVER, WASHINGTON 98684

EXISTING CONDITIONS PLAN

date: MAY 10, 2019
revisions:
scale: 1" = 10'
drawn:
HHPR job no: SRD-33

LAND USE APPLICATION

SHEET NO. C-1 OF 6

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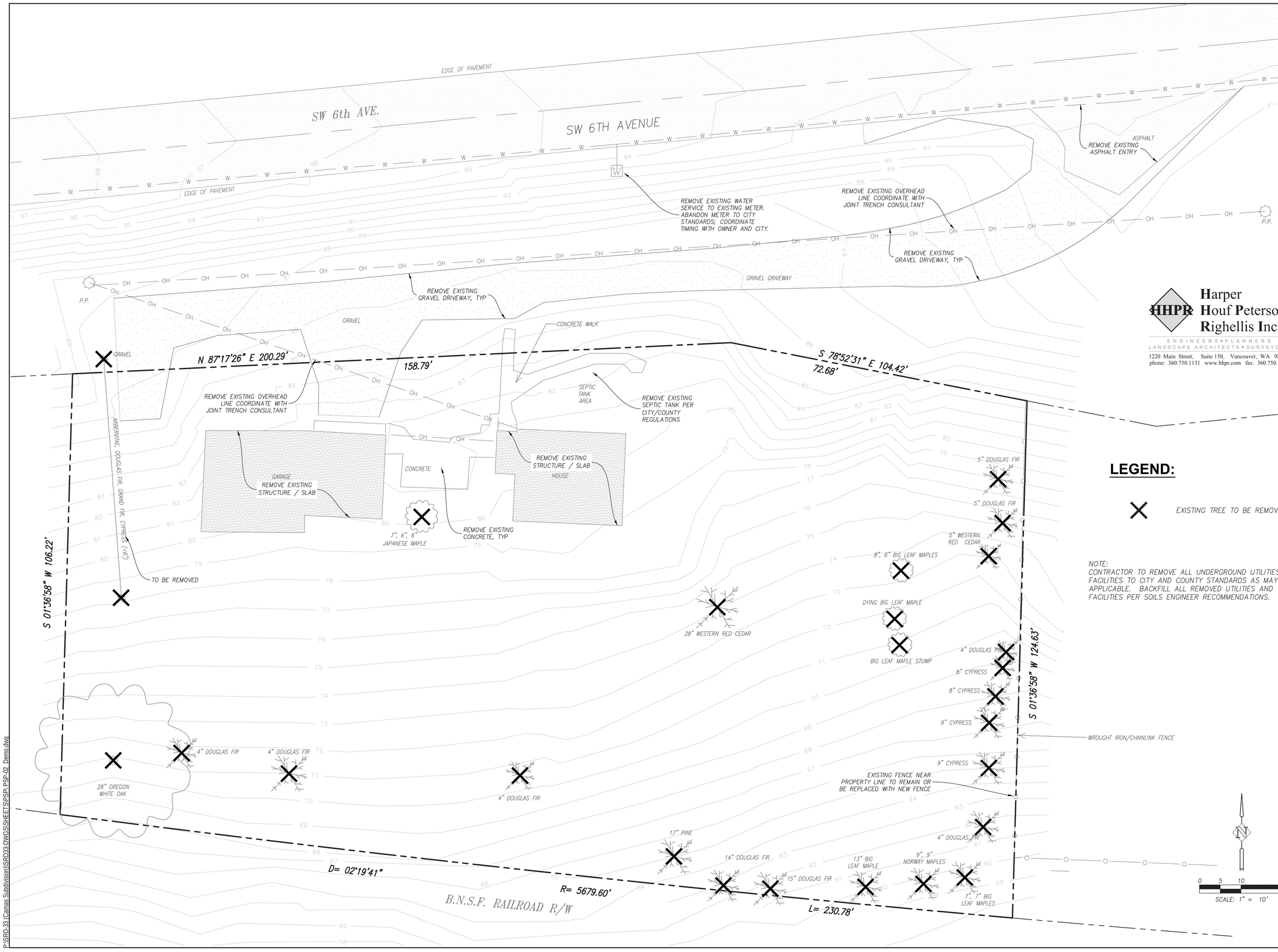

LEGEND:

X — EXISTING TREE TO BE REMOVED

NOTE:
CONTRACTOR TO REMOVE ALL UNDERGROUND UTILITIES AND FACILITIES TO CITY AND COUNTY STANDARDS AS MAY BE APPLICABLE. BACKFILL ALL REMOVED UTILITIES AND FACILITIES PER SOILS ENGINEER RECOMMENDATIONS.

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3210 SW 6TH AVENUE CAMAS, WASHINGTON

OWNER:
TERRIE COX REVOCABLE LIVING TRUST
16408 SE MILL PLAIN BLVD. VANCOUVER, WASHINGTON 98634

DEMOLITION PLAN

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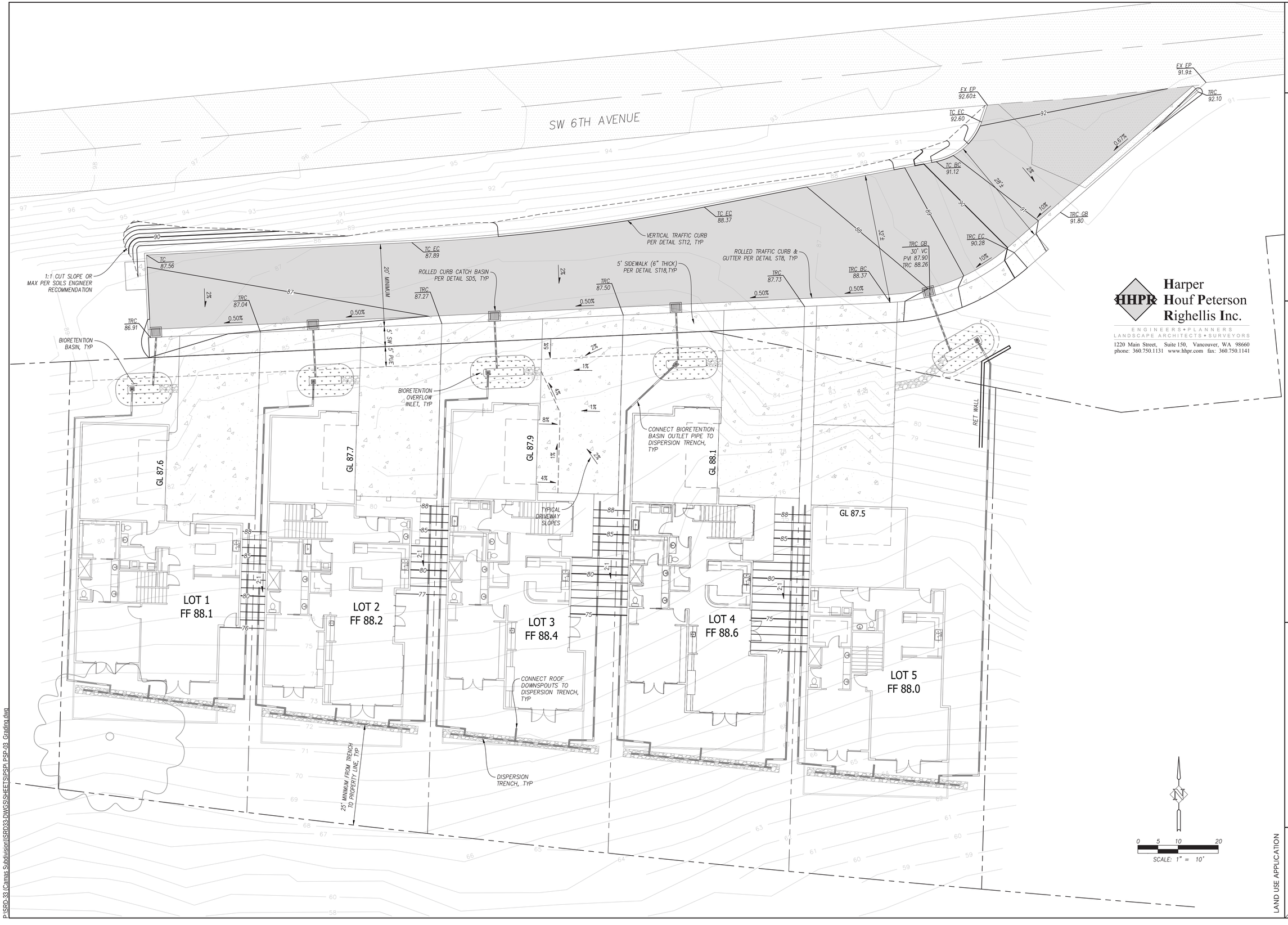

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OWNER:
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PRELIMINARY GRADING AND DRAINAGE PLAN

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LAND USE APPLICATION

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SW 6TH AVENUE

OFF-SITE SEWER CONNECTION SEE BELOW RIGHT

PROPOSED STREET LIGHT, TYP

PROPOSED FIRE HYDRANT, TYP

WATER SERVICE & METER PER DETAIL W2, TYP

ROLLED CURB CATCH BASIN PER DETAIL SD5, TYP

STEP TANK/SYSTEM PER DETAIL S5B, TYP

BIORETENTION BASIN, TYP

BIORETENTION OVERFLOW INLET, TYP

CONNECT BIORETENTION BASIN OUTLET PIPE TO DISPERSION TRENCH, TYP

CONNECT ROOF DOWNSPOUTS TO DISPERSION TRENCH, TYP

DISPERSION TRENCH, TYP

25' MINIMUM FROM TRENCH TO PROPERTY LINE, TYP

10' MIN

20' MIN

5' SW, 5' PUE

LOT 1

LOT 2

LOT 3

LOT 4

LOT 5

0 5 10 20

SCALE: 1" = 10'

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SEE ABOVE

OLD EVERGREEN HWY

CONNECT TO AND EXTEND EXISTING 3" SEWER FORCE MAIN

0 15 30 60

SCALE: 1" = 30'

OFF-SITE SEWER CONNECTION

LAND USE APPLICATION

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COLUMBIA RIVER HOMES DEVELOPMENT
3210 SW 6TH AVENUE CAMAS, WASHINGTON

OWNER:
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PRELIMINARY UTILITY PLAN

revisions:

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HHPR job no: SRD.33

SHEET NO.
C-4
OF
6

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SW 6TH AVENUE

PROPOSED FIRE HYDRANT

VERTICAL TRAFFIC CURB
PER DETAIL ST12, TYP
PAINT OR SIGN FOR NO PARKING

ROLLED TRAFFIC CURB &
GUTTER PER DETAIL ST8, TYP
PAINT OR SIGN FOR NO PARKING

5' SIDEWALK (6" THICK)
PER DETAIL ST18,TYP

20' MINIMUM

5' SW

5' PUE

32'±

28'±

PROPOSED FIRE HYDRANT

STRIPE FOR
NO PARKING

EVAE

LOT 1

LOT 2

LOT 3

LOT 4

LOT 5

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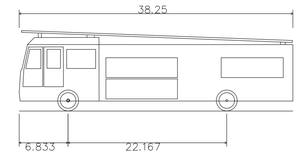
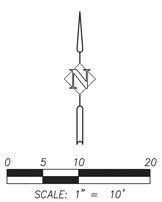


E-ONE Combination Unit	
Overall Length	38.250ft
Overall Width	8.333ft
Overall Body Height	11.250ft
Min Body Ground Clearance	1.393ft
Track Width	8.333ft
Lock-to-lock time	6.00s
Max Wheel Angle	45.00°



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16408 SE MILL PLAIN BLVD. VANCOUVER, WASHINGTON 98634

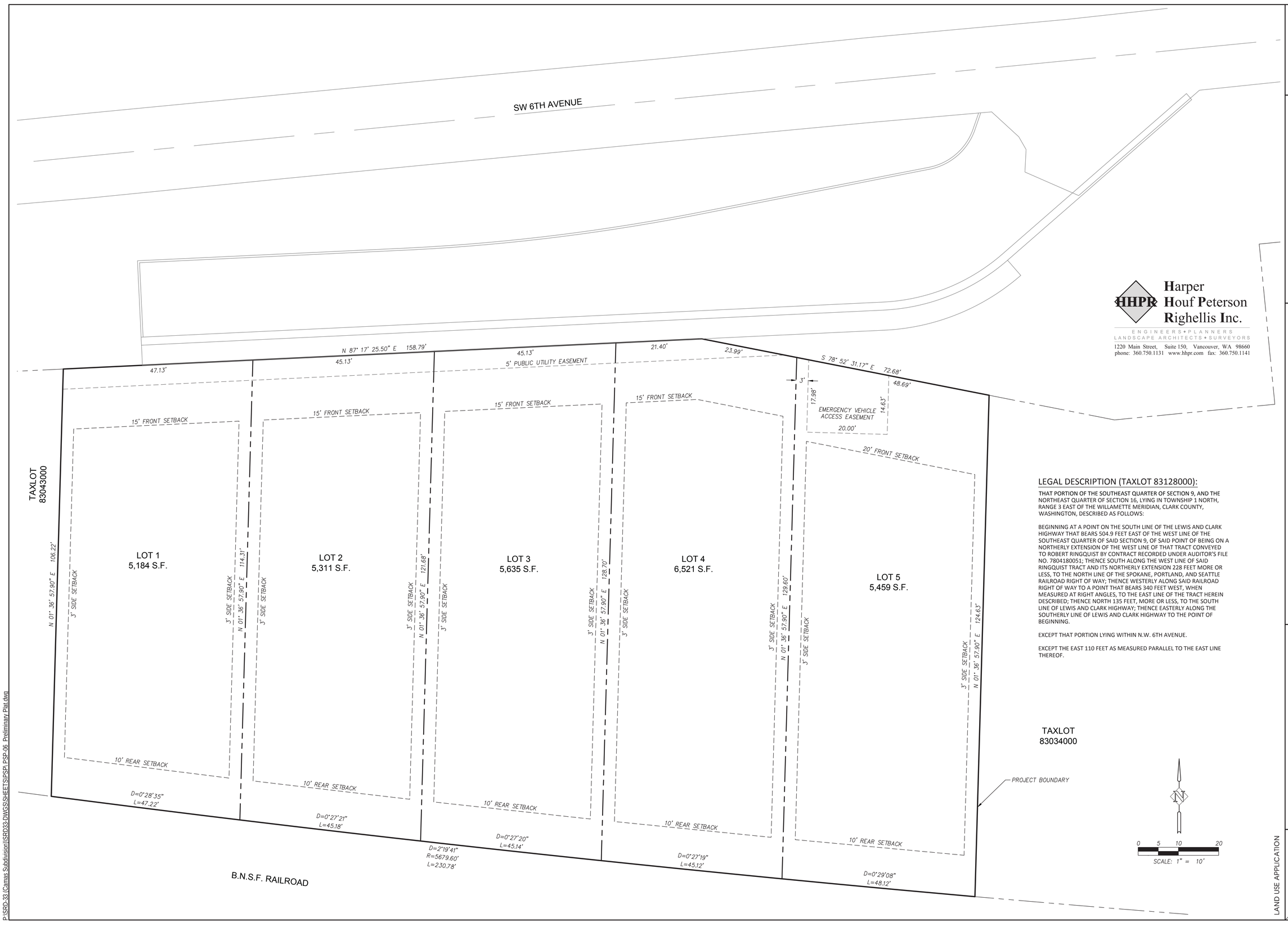
FIRE RESPONSE PLAN

revisions:

date: MAY 10, 2019
scale: 1" = 10'
drawn:
HHPR job no: SRD-33

SHEET NO.
C-5
OF
6

P:\SRD-33 (Camas Subdivision)\SRD33-DWGS\SHEETS\PSP\ PSP-05 Fire.dwg



Harper Houf Peterson Righellis Inc.
ENGINEERS • PLANNERS
LANDSCAPE ARCHITECTS • SURVEYORS
1220 Main Street, Suite 150, Vancouver, WA 98660
phone: 360.750.1131 www.hhpr.com fax: 360.750.1141

LEGAL DESCRIPTION (TAXLOT 83128000):

THAT PORTION OF THE SOUTHEAST QUARTER OF SECTION 9, AND THE NORTHEAST QUARTER OF SECTION 16, LYING IN TOWNSHIP 1 NORTH, RANGE 3 EAST OF THE WILLAMETTE MERIDIAN, CLARK COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE SOUTH LINE OF THE LEWIS AND CLARK HIGHWAY THAT BEARS 504.9 FEET EAST OF THE WEST LINE OF THE SOUTHEAST QUARTER OF SAID SECTION 9, OF SAID POINT OF BEING ON A NORTHERLY EXTENSION OF THE WEST LINE OF THAT TRACT CONVEYED TO ROBERT RINGQUIST BY CONTRACT RECORDED UNDER AUDITOR'S FILE NO. 7804180051; THENCE SOUTH ALONG THE WEST LINE OF SAID RINGQUIST TRACT AND ITS NORTHERLY EXTENSION 228 FEET MORE OR LESS, TO THE NORTH LINE OF THE SPOKANE, PORTLAND, AND SEATTLE RAILROAD RIGHT OF WAY; THENCE WESTERLY ALONG SAID RAILROAD RIGHT OF WAY TO A POINT THAT BEARS 340 FEET WEST, WHEN MEASURED AT RIGHT ANGLES, TO THE EAST LINE OF THE TRACT HEREIN DESCRIBED; THENCE NORTH 135 FEET, MORE OR LESS, TO THE SOUTH LINE OF LEWIS AND CLARK HIGHWAY; THENCE EASTERLY ALONG THE SOUTHERLY LINE OF LEWIS AND CLARK HIGHWAY TO THE POINT OF BEGINNING.

EXCEPT THAT PORTION LYING WITHIN N.W. 6TH AVENUE.

EXCEPT THE EAST 110 FEET AS MEASURED PARALLEL TO THE EAST LINE THEREOF.

RDA
REITER DESIGN ARCHITECT INCORPORATED
7965 SW CIRRUS DRIVE BEAVERTON, OREGON 97008 (503) 574-3036

COLUMBIA RIVER HOMES DEVELOPMENT
3210 SW 6TH AVENUE CAMAS, WASHINGTON

OWNER:
TERRIE COX REVOCABLE LIVING TRUST
16408 SE MILL PLAIN BLVD. VANCOUVER, WASHINGTON 98634

PRELIMINARY PLAT

date: MAY 10, 2019
revisions:
scale: 1" = 10'
drawn:
HHPR job no: SRD-33

LAND USE APPLICATION

SHEET NO.
C-6
OF
6

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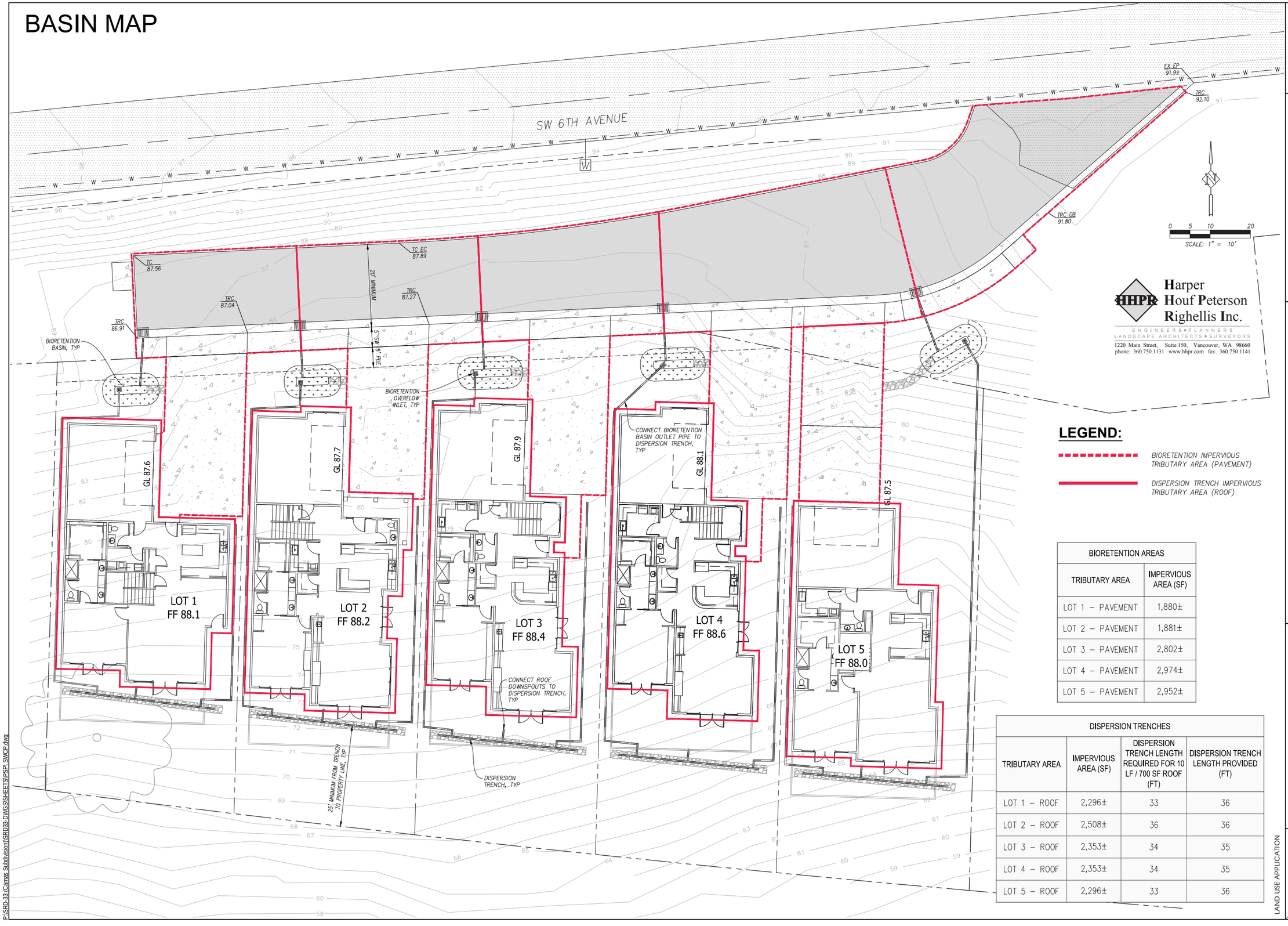
APPENDIX 3
STORMWATER CALCULATIONS

BASIN MAP



LEGEND:

- BIORETENTION IMPERVIOUS TRIBUTARY AREA (PAVEMENT)
- DISPERSION TRENCH IMPERVIOUS TRIBUTARY AREA (ROOF)

BIORETENTION AREAS	
TRIBUTARY AREA	IMPERVIOUS AREA (SF)
LOT 1 – PAVEMENT	1,880±
LOT 2 – PAVEMENT	1,881±
LOT 3 – PAVEMENT	2,802±
LOT 4 – PAVEMENT	2,974±
LOT 5 – PAVEMENT	2,952±

DISPERSION TRENCHES			
TRIBUTARY AREA	IMPERVIOUS AREA (SF)	DISPERSION TRENCH LENGTH REQUIRED FOR 10 LF / 700 SF ROOF (FT)	DISPERSION TRENCH LENGTH PROVIDED (FT)
LOT 1 – ROOF	2,296±	33	36
LOT 2 – ROOF	2,508±	36	36
LOT 3 – ROOF	2,353±	34	35
LOT 4 – ROOF	2,353±	34	35
LOT 5 – ROOF	2,296±	33	36

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RDA
REITER DESIGN ARCHITECT INCORPORATED
7965 SW CIRRUS DRIVE BEAVERTON, OREGON 97008 (503) 574-3056

COLUMBIA RIVER HOMES DEVELOPMENT
3210 SW 6TH AVENUE CAMAS, WASHINGTON

OWNER:
TERRIE COX REVOCABLE LIVING TRUST
16408 SE MILL PLAIN BLVD. VANCOUVER, WASHINGTON 98634

PRELIMINARY STORMWATER CONTROL PLAN

revisions:
date: MAY 10, 2019
scale: 1" = 10'
drawn:
HHPR job no: SRD-33

LAND USE APPLICATION

SHEET NO. 1 OF 1

P:\SRD-33 (Camas Subdivision)\SRD33-DWGS\SHEETS\PSPI SWCP.dwn

WATER QUANTITY

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	SRD-33 Basin 1 - bio
Site Name:	Columbia River Homes
Site Address:	
City:	
Report Date:	5/10/2019
Gage:	Troutdale
Data Start:	1948/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.370
Version Date:	2017/04/14
Version:	4.2.13

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C IMP DISP STEE	0.143
Pervious Total	0.143
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.143

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

driveway

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.043
Impervious Total	0.043
Basin Total	0.043

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 1	Surface retention 1	

roof

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	0.053
Impervious Total	0.053
Basin Total	0.053

Element Flows To:

Surface	Interflow	Groundwater
Dispersion Trench 1	Dispersion Trench 1	

Basin 1

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C, Lawn, Mod	0.026
Pervious Total	0.026
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.026

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Dispersion Trench 1

Bottom Length: 36.00 ft.
Bottom Width: 25.00 ft.
Depth: 1.1 ft.
Volume at riser head: 0.0023 acre-feet.
Infiltration On
Infiltration rate: 0.5
Infiltration safety factor: 0.25
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 10.163
Total Volume Through Riser (ac-ft.): 0.976
Total Volume Through Facility (ac-ft.): 11.139
Percent Infiltrated: 91.24
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Side slope 1: 0 To 1
Side slope 2: 0 To 1
Side slope 3: 0 To 1
Side slope 4: 0 To 1
Discharge Structure
Riser Height: 0.1 ft.
Riser Diameter: 432 in.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.020	0.000	0.000	0.000
0.0122	0.020	0.000	0.000	0.002
0.0244	0.020	0.000	0.000	0.002
0.0367	0.020	0.000	0.000	0.002
0.0489	0.020	0.001	0.000	0.002
0.0611	0.020	0.001	0.000	0.002
0.0733	0.020	0.001	0.000	0.002
0.0856	0.020	0.001	0.000	0.002
0.0978	0.020	0.002	0.000	0.002
0.1100	0.020	0.002	0.382	0.002
0.1222	0.020	0.002	1.266	0.002
0.1344	0.020	0.002	2.444	0.002
0.1467	0.020	0.003	3.854	0.002
0.1589	0.020	0.003	5.464	0.002
0.1711	0.020	0.003	7.250	0.002
0.1833	0.020	0.003	9.197	0.002
0.1956	0.020	0.004	11.29	0.002
0.2078	0.020	0.004	13.52	0.002
0.2200	0.020	0.004	15.89	0.002
0.2322	0.020	0.004	18.38	0.002
0.2444	0.020	0.005	20.98	0.002
0.2567	0.020	0.005	23.70	0.002
0.2689	0.020	0.005	26.53	0.002
0.2811	0.020	0.005	29.46	0.002
0.2933	0.020	0.006	32.49	0.002
0.3056	0.020	0.006	35.62	0.002

0.3178	0.020	0.006	38.84	0.002
0.3300	0.020	0.006	42.16	0.002
0.3422	0.020	0.007	45.56	0.002
0.3544	0.020	0.007	49.05	0.002
0.3667	0.020	0.007	52.63	0.002
0.3789	0.020	0.007	56.29	0.002
0.3911	0.020	0.008	60.03	0.002
0.4033	0.020	0.008	63.85	0.002
0.4156	0.020	0.008	67.74	0.002
0.4278	0.020	0.008	71.72	0.002
0.4400	0.020	0.009	75.76	0.002
0.4522	0.020	0.009	79.88	0.002
0.4644	0.020	0.009	84.08	0.002
0.4767	0.020	0.009	88.34	0.002
0.4889	0.020	0.010	92.67	0.002
0.5011	0.020	0.010	97.07	0.002
0.5133	0.020	0.010	101.5	0.002
0.5256	0.020	0.010	106.0	0.002
0.5378	0.020	0.011	110.6	0.002
0.5500	0.020	0.011	115.3	0.002
0.5622	0.020	0.011	120.0	0.002
0.5744	0.020	0.011	124.8	0.002
0.5867	0.020	0.012	129.7	0.002
0.5989	0.020	0.012	134.6	0.002
0.6111	0.020	0.012	139.6	0.002
0.6233	0.020	0.012	144.6	0.002
0.6356	0.020	0.013	149.7	0.002
0.6478	0.020	0.013	154.9	0.002
0.6600	0.020	0.013	160.1	0.002
0.6722	0.020	0.013	165.3	0.002
0.6844	0.020	0.014	170.7	0.002
0.6967	0.020	0.014	176.0	0.002
0.7089	0.020	0.014	181.5	0.002
0.7211	0.020	0.014	187.0	0.002
0.7333	0.020	0.015	192.5	0.002
0.7456	0.020	0.015	198.1	0.002
0.7578	0.020	0.015	203.8	0.002
0.7700	0.020	0.015	209.5	0.002
0.7822	0.020	0.016	215.2	0.002
0.7944	0.020	0.016	221.0	0.002
0.8067	0.020	0.016	226.9	0.002
0.8189	0.020	0.016	232.8	0.002
0.8311	0.020	0.017	238.7	0.002
0.8433	0.020	0.017	244.8	0.002
0.8556	0.020	0.017	250.8	0.002
0.8678	0.020	0.017	256.9	0.002
0.8800	0.020	0.018	263.1	0.002
0.8922	0.020	0.018	269.3	0.002
0.9044	0.020	0.018	275.5	0.002
0.9167	0.020	0.018	281.8	0.002
0.9289	0.020	0.019	288.2	0.002
0.9411	0.020	0.019	294.6	0.002
0.9533	0.020	0.019	301.0	0.002
0.9656	0.020	0.019	307.5	0.002
0.9778	0.020	0.020	314.0	0.002
0.9900	0.020	0.020	320.6	0.002
1.0022	0.020	0.020	327.2	0.002
1.0144	0.020	0.021	333.9	0.002

1.0267	0.020	0.021	340.6	0.002
1.0389	0.020	0.021	347.4	0.002
1.0511	0.020	0.021	354.2	0.002
1.0633	0.020	0.022	361.0	0.002
1.0756	0.020	0.022	367.9	0.002
1.0878	0.020	0.022	374.8	0.002
1.1000	0.020	0.022	381.8	0.002

Bioretention 1

Bottom Length:	8.00 ft.
Bottom Width:	2.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW 12 in/hr
Material thickness of second layer:	1.5
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	0.25
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	8.872
Total Volume Through Riser (ac-ft.):	0.401
Total Volume Through Facility (ac-ft.):	9.273
Percent Infiltrated:	95.68
Total Precip Applied to Facility:	0.612
Total Evap From Facility:	0.352

Underdrain not used

Discharge Structure

Riser Height:	1 ft.	
Riser Diameter:	18 in.	
Orifice 1 Diameter:	0.25 in.	Elevation:0 ft.

Element Flows To:

Outlet 1 Outlet 2

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0119	0.0000	0.0000	0.0000
0.0549	0.0117	0.0000	0.0000	0.0000
0.1099	0.0114	0.0000	0.0000	0.0000
0.1648	0.0110	0.0000	0.0000	0.0000
0.2198	0.0107	0.0001	0.0000	0.0000
0.2747	0.0104	0.0001	0.0000	0.0000
0.3297	0.0101	0.0001	0.0000	0.0000
0.3846	0.0097	0.0001	0.0000	0.0000
0.4396	0.0094	0.0001	0.0000	0.0001
0.4945	0.0091	0.0002	0.0000	0.0001
0.5495	0.0088	0.0002	0.0000	0.0002
0.6044	0.0085	0.0002	0.0000	0.0002
0.6593	0.0082	0.0003	0.0000	0.0002
0.7143	0.0079	0.0003	0.0000	0.0002
0.7692	0.0077	0.0004	0.0000	0.0002
0.8242	0.0074	0.0004	0.0000	0.0003
0.8791	0.0071	0.0005	0.0000	0.0003
0.9341	0.0068	0.0005	0.0000	0.0003
0.9890	0.0066	0.0006	0.0000	0.0003
1.0440	0.0063	0.0007	0.0000	0.0003
1.0989	0.0061	0.0007	0.0000	0.0004
1.1538	0.0058	0.0008	0.0000	0.0004
1.2088	0.0056	0.0009	0.0000	0.0004
1.2637	0.0053	0.0010	0.0000	0.0004
1.3187	0.0051	0.0011	0.0000	0.0005
1.3736	0.0049	0.0012	0.0000	0.0005

1.4286	0.0047	0.0013	0.0000	0.0005
1.4835	0.0044	0.0014	0.0000	0.0005
1.5385	0.0042	0.0015	0.0000	0.0006
1.5934	0.0040	0.0016	0.0000	0.0006
1.6484	0.0038	0.0017	0.0000	0.0006
1.7033	0.0036	0.0018	0.0000	0.0006
1.7582	0.0034	0.0019	0.0000	0.0007
1.8132	0.0032	0.0020	0.0000	0.0007
1.8681	0.0031	0.0022	0.0000	0.0007
1.9231	0.0029	0.0023	0.0000	0.0008
1.9780	0.0027	0.0024	0.0000	0.0008
2.0330	0.0025	0.0026	0.0000	0.0008
2.0879	0.0024	0.0027	0.0000	0.0009
2.1429	0.0022	0.0029	0.0000	0.0009
2.1978	0.0021	0.0031	0.0000	0.0009
2.2527	0.0019	0.0032	0.0000	0.0010
2.3077	0.0018	0.0034	0.0000	0.0010
2.3626	0.0016	0.0036	0.0000	0.0010
2.4176	0.0015	0.0038	0.0000	0.0011
2.4725	0.0014	0.0040	0.0000	0.0011
2.5275	0.0013	0.0042	0.0000	0.0012
2.5824	0.0011	0.0044	0.0000	0.0012
2.6374	0.0010	0.0046	0.0000	0.0012
2.6923	0.0009	0.0048	0.0000	0.0013
2.7473	0.0008	0.0051	0.0000	0.0013
2.8022	0.0007	0.0053	0.0000	0.0014
2.8571	0.0006	0.0056	0.0000	0.0014
2.9121	0.0005	0.0058	0.0000	0.0014
2.9670	0.0004	0.0061	0.0000	0.0015
3.0000	0.0004	0.0062	0.0000	0.0015

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.011938	0.006242	0.0000	0.1541	0.0000
3.0549	0.012288	0.006908	0.0004	0.1541	0.0001
3.1099	0.012644	0.007593	0.0006	0.1642	0.0001
3.1648	0.013004	0.008297	0.0007	0.1746	0.0002
3.2198	0.013370	0.009022	0.0008	0.1855	0.0002
3.2747	0.013741	0.009767	0.0009	0.1967	0.0003
3.3297	0.014116	0.010532	0.0010	0.2039	0.0003
3.3846	0.014497	0.011318	0.0011	0.2073	0.0004
3.4396	0.014882	0.012125	0.0011	0.2106	0.0004
3.4945	0.015273	0.012954	0.0012	0.2140	0.0005
3.5495	0.015668	0.013804	0.0013	0.2174	0.0005
3.6044	0.016069	0.014675	0.0013	0.2207	0.0006
3.6593	0.016474	0.015570	0.0014	0.2241	0.0006
3.7143	0.016885	0.016486	0.0014	0.2275	0.0007
3.7692	0.017300	0.017425	0.0015	0.2308	0.0007
3.8242	0.017721	0.018387	0.0015	0.2342	0.0008
3.8791	0.018146	0.019373	0.0016	0.2376	0.0008
3.9341	0.018577	0.020382	0.0016	0.2409	0.0009
3.9890	0.019012	0.021414	0.0017	0.2443	0.0009
4.0440	0.019453	0.022471	0.1484	0.2477	0.0010
4.0989	0.019898	0.023552	0.4957	0.2510	0.0011
4.1538	0.020349	0.024658	0.9561	0.2544	0.0011
4.2088	0.020804	0.025788	1.4972	0.2578	0.0012
4.2637	0.021265	0.026944	2.0929	0.2611	0.0012
4.3187	0.021730	0.028125	2.7168	0.2645	0.0013

4.3736	0.022200	0.029332	3.3418	0.2679	0.0014
4.4286	0.022676	0.030565	3.9410	0.2712	0.0014
4.4835	0.023156	0.031824	4.4896	0.2746	0.0015
4.5385	0.023641	0.033110	4.9675	0.2779	0.0015
4.5934	0.024132	0.034422	5.3619	0.2813	0.0016
4.6484	0.024627	0.035762	5.6709	0.2847	0.0017
4.7033	0.025127	0.037129	5.9074	0.2880	0.0017
4.7582	0.025633	0.038523	6.1731	0.2914	0.0018
4.8132	0.026143	0.039946	6.3928	0.2948	0.0019
4.8681	0.026658	0.041396	6.6052	0.2981	0.0019
4.9231	0.027179	0.042875	6.8110	0.3015	0.0020
4.9780	0.027704	0.044383	7.0107	0.3049	0.0020
5.0000	0.027916	0.044994	7.2050	0.3062	0.0000

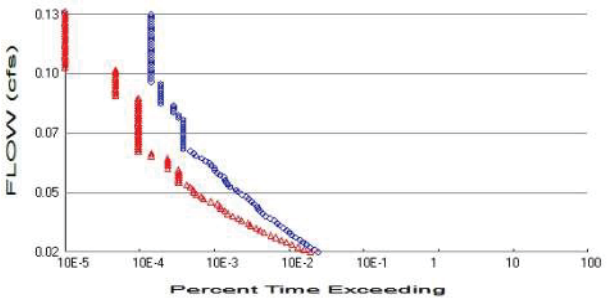
Surface retention 1

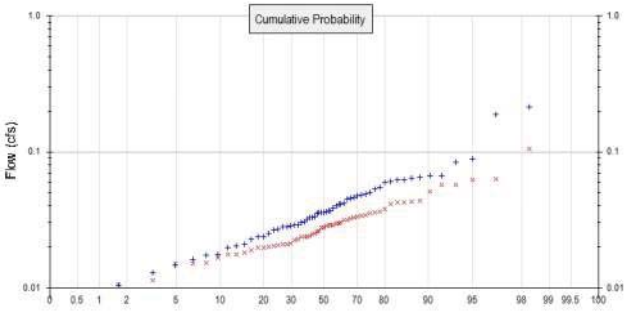
Element Flows To:

Outlet 1	Outlet 2
	Bioretention 1

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.143
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.026
Total Impervious Area: 0.096

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.03522
5 year	0.058557
10 year	0.077676
25 year	0.106359
50 year	0.131244
100 year	0.159342

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.026967
5 year	0.039833
10 year	0.049054
25 year	0.061454
50 year	0.071214
100 year	0.08141

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.033	0.024
1950	0.025	0.019
1951	0.036	0.018
1952	0.053	0.043
1953	0.036	0.025
1954	0.042	0.029
1955	0.029	0.020
1956	0.059	0.038
1957	0.026	0.024
1958	0.037	0.033

1959	0.017	0.011
1960	0.024	0.029
1961	0.031	0.028
1962	0.033	0.021
1963	0.038	0.021
1964	0.041	0.030
1965	0.035	0.026
1966	0.040	0.031
1967	0.027	0.025
1968	0.066	0.062
1969	0.036	0.051
1970	0.188	0.105
1971	0.021	0.015
1972	0.020	0.015
1973	0.032	0.029
1974	0.049	0.034
1975	0.036	0.028
1976	0.065	0.043
1977	0.016	0.020
1978	0.062	0.030
1979	0.049	0.035
1980	0.028	0.024
1981	0.041	0.032
1982	0.050	0.036
1983	0.060	0.041
1984	0.045	0.018
1985	0.033	0.024
1986	0.018	0.033
1987	0.028	0.023
1988	0.020	0.020
1989	0.046	0.032
1990	0.028	0.018
1991	0.048	0.015
1992	0.029	0.017
1993	0.084	0.057
1994	0.023	0.020
1995	0.037	0.030
1996	0.088	0.057
1997	0.066	0.044
1998	0.055	0.042
1999	0.024	0.021
2000	0.010	0.008
2001	0.013	0.011
2002	0.062	0.021
2003	0.046	0.023
2004	0.010	0.036
2005	0.015	0.034
2006	0.064	0.029
2007	0.030	0.026
2008	0.214	0.063

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.2141	0.1050
2	0.1876	0.0632
3	0.0881	0.0624
4	0.0841	0.0574

5	0.0663	0.0570
6	0.0663	0.0509
7	0.0651	0.0437
8	0.0635	0.0428
9	0.0622	0.0426
10	0.0621	0.0422
11	0.0602	0.0414
12	0.0595	0.0379
13	0.0549	0.0360
14	0.0533	0.0359
15	0.0500	0.0354
16	0.0489	0.0341
17	0.0485	0.0339
18	0.0477	0.0333
19	0.0463	0.0329
20	0.0458	0.0323
21	0.0447	0.0315
22	0.0419	0.0314
23	0.0412	0.0300
24	0.0410	0.0296
25	0.0403	0.0296
26	0.0383	0.0291
27	0.0367	0.0290
28	0.0365	0.0288
29	0.0365	0.0286
30	0.0359	0.0277
31	0.0359	0.0276
32	0.0359	0.0260
33	0.0354	0.0257
34	0.0331	0.0251
35	0.0331	0.0248
36	0.0327	0.0239
37	0.0321	0.0238
38	0.0307	0.0238
39	0.0303	0.0237
40	0.0290	0.0228
41	0.0288	0.0226
42	0.0283	0.0211
43	0.0283	0.0210
44	0.0280	0.0208
45	0.0271	0.0206
46	0.0264	0.0203
47	0.0253	0.0200
48	0.0239	0.0199
49	0.0238	0.0197
50	0.0227	0.0188
51	0.0208	0.0181
52	0.0203	0.0177
53	0.0196	0.0175
54	0.0177	0.0167
55	0.0174	0.0153
56	0.0161	0.0151
57	0.0146	0.0150
58	0.0128	0.0114
59	0.0104	0.0106
60	0.0096	0.0078

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0176	516	407	78	Pass
0.0188	460	333	72	Pass
0.0199	403	276	68	Pass
0.0211	358	232	64	Pass
0.0222	321	195	60	Pass
0.0233	293	165	56	Pass
0.0245	255	141	55	Pass
0.0256	227	120	52	Pass
0.0268	212	97	45	Pass
0.0279	195	86	44	Pass
0.0291	177	76	42	Pass
0.0302	159	64	40	Pass
0.0314	146	60	41	Pass
0.0325	132	49	37	Pass
0.0337	117	44	37	Pass
0.0348	102	37	36	Pass
0.0360	93	32	34	Pass
0.0371	85	29	34	Pass
0.0383	81	26	32	Pass
0.0394	78	25	32	Pass
0.0406	72	23	31	Pass
0.0417	66	19	28	Pass
0.0429	61	15	24	Pass
0.0440	56	14	25	Pass
0.0452	49	12	24	Pass
0.0463	43	11	25	Pass
0.0475	41	11	26	Pass
0.0486	34	10	29	Pass
0.0497	32	9	28	Pass
0.0509	30	7	23	Pass
0.0520	29	7	24	Pass
0.0532	28	7	25	Pass
0.0543	25	7	28	Pass
0.0555	23	7	30	Pass
0.0566	21	7	33	Pass
0.0578	21	5	23	Pass
0.0589	19	5	26	Pass
0.0601	18	5	27	Pass
0.0612	16	5	31	Pass
0.0624	14	5	35	Pass
0.0635	12	3	25	Pass
0.0647	11	3	27	Pass
0.0658	10	2	20	Pass
0.0670	8	2	25	Pass
0.0681	8	2	25	Pass
0.0693	8	2	25	Pass
0.0704	8	2	25	Pass
0.0716	8	2	25	Pass
0.0727	8	2	25	Pass
0.0739	8	2	25	Pass
0.0750	8	2	25	Pass
0.0761	8	2	25	Pass
0.0773	8	2	25	Pass

0.0784	8	2	25	Pass
0.0796	8	2	25	Pass
0.0807	8	2	25	Pass
0.0819	7	2	28	Pass
0.0830	7	2	28	Pass
0.0842	6	2	33	Pass
0.0853	6	2	33	Pass
0.0865	6	2	33	Pass
0.0876	6	2	33	Pass
0.0888	4	2	50	Pass
0.0899	4	2	50	Pass
0.0911	4	2	50	Pass
0.0922	4	1	25	Pass
0.0934	4	1	25	Pass
0.0945	4	1	25	Pass
0.0957	4	1	25	Pass
0.0968	4	1	25	Pass
0.0980	4	1	25	Pass
0.0991	3	1	33	Pass
0.1003	3	1	33	Pass
0.1014	3	1	33	Pass
0.1025	3	1	33	Pass
0.1037	3	1	33	Pass
0.1048	3	1	33	Pass
0.1060	3	0	0	Pass
0.1071	3	0	0	Pass
0.1083	3	0	0	Pass
0.1094	3	0	0	Pass
0.1106	3	0	0	Pass
0.1117	3	0	0	Pass
0.1129	3	0	0	Pass
0.1140	3	0	0	Pass
0.1152	3	0	0	Pass
0.1163	3	0	0	Pass
0.1175	3	0	0	Pass
0.1186	3	0	0	Pass
0.1198	3	0	0	Pass
0.1209	3	0	0	Pass
0.1221	3	0	0	Pass
0.1232	3	0	0	Pass
0.1244	3	0	0	Pass
0.1255	3	0	0	Pass
0.1267	3	0	0	Pass
0.1278	3	0	0	Pass
0.1289	3	0	0	Pass
0.1301	3	0	0	Pass
0.1312	3	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Dispersion Trench 1 POC	☐	10.14			☐	91.17			
retention 1 POC	☐	8.44			☐	95.68			
Total Volume Infiltrated		18.58	0.00	0.00		93.22	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

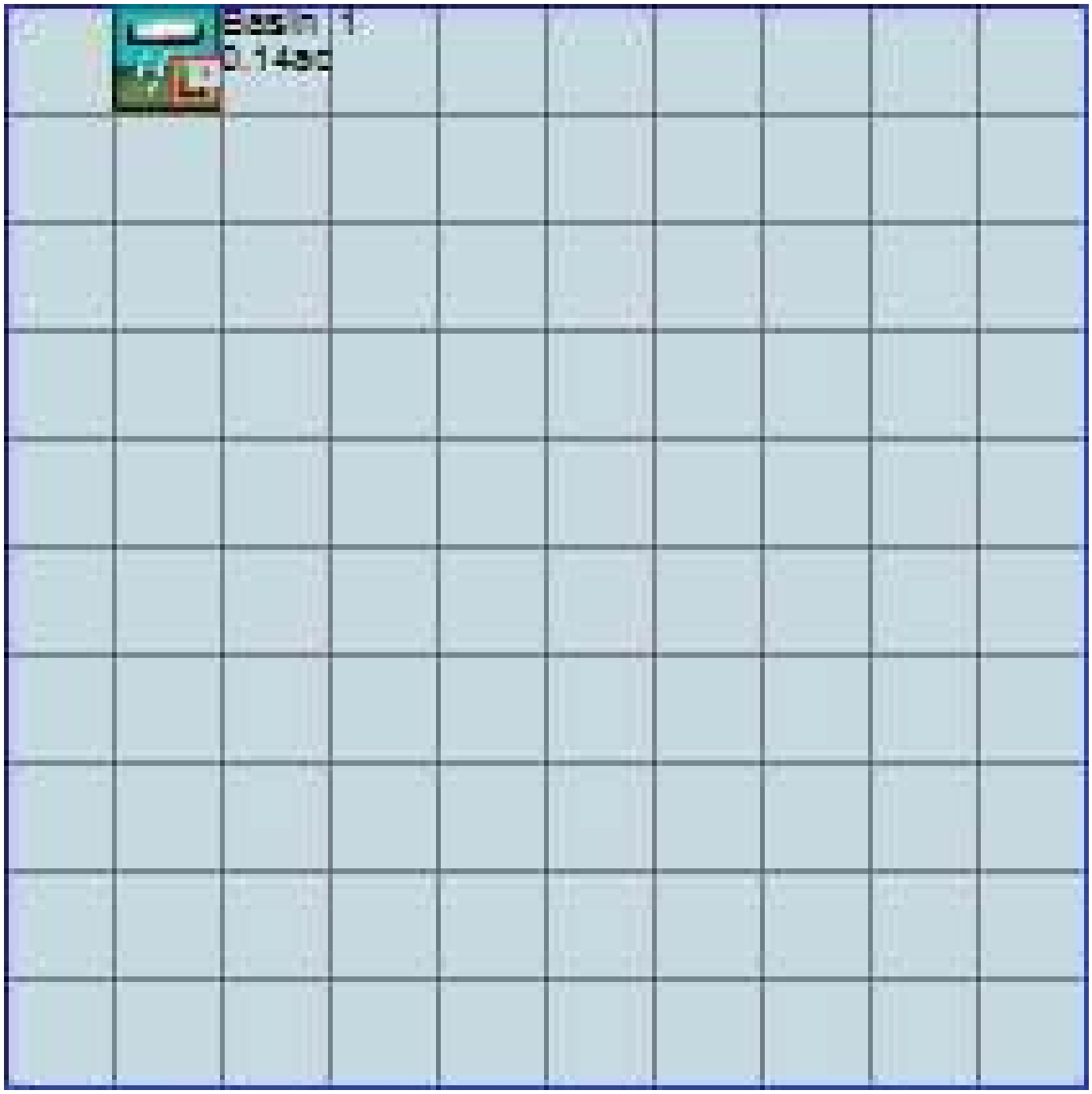
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 1 - bio.wdm
MESSU       25   PreSRD-33 Basin 1 - bio.MES
            27   PreSRD-33 Basin 1 - bio.L61
            28   PreSRD-33 Basin 1 - bio.L62
            30   POCSRD-33 Basin 1 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      30
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #          K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   30      C/IMP DISP /STEE       1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   30         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   30         0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   30              0       4.5      0.03       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   30             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   30          0.1      0.15      0.25         6       0.3      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   30             0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                  in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  30                       0.143     COPY   501     12
PERLND  30                       0.143     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.8             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 1 - bio.wdm
MESSU       25   MitSRD-33 Basin 1 - bio.MES
            27   MitSRD-33 Basin 1 - bio.L61
            28   MitSRD-33 Basin 1 - bio.L62
            30   POCSRD-33 Basin 1 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      IMPLND        1
      IMPLND        4
      PERLND       17
      RCHRES        1
      GENER         3
      RCHRES        2
      RCHRES        3
      COPY          1
      COPY        501
      COPY        601
      DISPLY        1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Dispersion Trench  1        MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  601          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    3         24
  END OPCODE
  PARM
    #    #          K ***
    3              0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   17     C, Lawn, Mod             1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
```

```
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   17         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   17         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   17         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -   # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   17              0       4.5      0.03       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -   # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   17              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -   #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   17           0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -   # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
   17              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -   #                     User  t-series Engl Metr ***
                                      in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP  VRS  VNN RTLI     ***
```

```
    1          0    0    0    0    0
    4          0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >       IWATER input info: Part 2          ***
    # -  # ***  LSUR      SLSUR      NSUR      RETSC
    1             400       0.01       0.1        0.1
    4             400       0.01       0.1        0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >       IWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN
    1              0          0
    4              0          0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS       SURS
    1              0          0
    4              0          0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK    ***
<Name>   #                 <-factor->     <Name>   #   Tbl#    ***
driveway***
IMPLND   1                     0.043      RCHRES   2      5
roof***
IMPLND   4                     0.053      RCHRES   1      5
Basin  1***
PERLND  17                     0.026      COPY   501     12
PERLND  17                     0.026      COPY   601     12
PERLND  17                     0.026      COPY   501     13
PERLND  17                     0.026      COPY   601     13

******Routing******
IMPLND   1                     0.043      COPY     1     15
IMPLND   4                     0.053      COPY     1     15
RCHRES   2                         1      RCHRES   3      8
RCHRES   1                         1      COPY   501     17
RCHRES   3                         1      COPY   501     17
RCHRES   2                         1      COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    3 OUTPUT TIMSER      .0011111     RCHRES   2     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                        in  out                             ***
    1     Dispersion Trenc-007    2    1    1    1   28    0    1
    2     Surface retentio-010    3    1    1    1   28    0    1
    3     Bioretention  1         2    1    1    1   28    0    1
  END GEN-INFO
```

```
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -   # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -   # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -   #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2       0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -   #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -   # ***   VOL    Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><---->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol3   RCHRES   3 VOL              4
  UVQUAN v2m3   GLOBAL     WORKSP  2        3
  UVQUAN vpo3   GLOBAL     WORKSP  3        3
  UVQUAN v2d3   GENER    3 K       1        3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <--->    <----><-><-><-> <---> <--->
  UVNAME  v2m3    1 WORKSP  2         1.0 QUAN
  UVNAME  vpo3    1 WORKSP  3         1.0 QUAN
  UVNAME  v2d3    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   3                               v2m3            =  251.
*** Compute remaining available pore space
  GENER   3                               vpo3            =  v2m3
  GENER   3                               vpo3           -=  vol3
```

```
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo3 < 0.0) THEN
  GENER   3                                   vpo3            =  0.0
END IF
*** Infiltration volume
  GENER   3                                   v2d3            =  vpo3
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   90    5
     Depth       Area     Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)    (acres) (acre-ft)    (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.020661  0.000000  0.000000  0.000000
  0.012222  0.020661  0.000253  0.000000  0.002604
  0.024444  0.020661  0.000505  0.000000  0.002604
  0.036667  0.020661  0.000758  0.000000  0.002604
  0.048889  0.020661  0.001010  0.000000  0.002604
  0.061111  0.020661  0.001263  0.000000  0.002604
  0.073333  0.020661  0.001515  0.000000  0.002604
  0.085556  0.020661  0.001768  0.000000  0.002604
  0.097778  0.020661  0.002020  0.000000  0.002604
  0.110000  0.020661  0.002273  0.382386  0.002604
  0.122222  0.020661  0.002525  1.266698  0.002604
  0.134444  0.020661  0.002778  2.444334  0.002604
  0.146667  0.020661  0.003030  3.854625  0.002604
  0.158889  0.020661  0.003283  5.464020  0.002604
  0.171111  0.020661  0.003535  7.250348  0.002604
  0.183333  0.020661  0.003788  9.197530  0.002604
  0.195556  0.020661  0.004040  11.29321  0.002604
  0.207778  0.020661  0.004293  13.52752  0.002604
  0.220000  0.020661  0.004545  15.89230  0.002604
  0.232222  0.020661  0.004798  18.38072  0.002604
  0.244444  0.020661  0.005051  20.98688  0.002604
  0.256667  0.020661  0.005303  23.70569  0.002604
  0.268889  0.020661  0.005556  26.53263  0.002604
  0.281111  0.020661  0.005808  29.46372  0.002604
  0.293333  0.020661  0.006061  32.49535  0.002604
  0.305556  0.020661  0.006313  35.62429  0.002604
  0.317778  0.020661  0.006566  38.84760  0.002604
  0.330000  0.020661  0.006818  42.16256  0.002604
  0.342222  0.020661  0.007071  45.56672  0.002604
  0.354444  0.020661  0.007323  49.05778  0.002604
  0.366667  0.020661  0.007576  52.63362  0.002604
  0.378889  0.020661  0.007828  56.29226  0.002604
  0.391111  0.020661  0.008081  60.03187  0.002604
  0.403333  0.020661  0.008333  63.85073  0.002604
  0.415556  0.020661  0.008586  67.74720  0.002604
  0.427778  0.020661  0.008838  71.71978  0.002604
  0.440000  0.020661  0.009091  75.76701  0.002604
  0.452222  0.020661  0.009343  79.88755  0.002604
  0.464444  0.020661  0.009596  84.08010  0.002604
  0.476667  0.020661  0.009848  88.34344  0.002604
  0.488889  0.020661  0.010101  92.67641  0.002604
  0.501111  0.020661  0.010354  97.07791  0.002604
  0.513333  0.020661  0.010606  101.5469  0.002604
  0.525556  0.020661  0.010859  106.0823  0.002604
  0.537778  0.020661  0.011111  110.6832  0.002604
  0.550000  0.020661  0.011364  115.3486  0.002604
  0.562222  0.020661  0.011616  120.0778  0.002604
  0.574444  0.020661  0.011869  124.8698  0.002604
  0.586667  0.020661  0.012121  129.7238  0.002604
  0.598889  0.020661  0.012374  134.6390  0.002604
  0.611111  0.020661  0.012626  139.6146  0.002604
  0.623333  0.020661  0.012879  144.6500  0.002604
  0.635556  0.020661  0.013131  149.7445  0.002604
  0.647778  0.020661  0.013384  154.8973  0.002604
  0.660000  0.020661  0.013636  160.1077  0.002604
  0.672222  0.020661  0.013889  165.3753  0.002604
  0.684444  0.020661  0.014141  170.6992  0.002604
  0.696667  0.020661  0.014394  176.0791  0.002604
```

```
0.708889  0.020661  0.014646  181.5141  0.002604
0.721111  0.020661  0.014899  187.0039  0.002604
0.733333  0.020661  0.015152  192.5479  0.002604
0.745556  0.020661  0.015404  198.1455  0.002604
0.757778  0.020661  0.015657  203.7962  0.002604
0.770000  0.020661  0.015909  209.4995  0.002604
0.782222  0.020661  0.016162  215.2549  0.002604
0.794444  0.020661  0.016414  221.0620  0.002604
0.806667  0.020661  0.016667  226.9204  0.002604
0.818889  0.020661  0.016919  232.8295  0.002604
0.831111  0.020661  0.017172  238.7889  0.002604
0.843333  0.020661  0.017424  244.7982  0.002604
0.855556  0.020661  0.017677  250.8570  0.002604
0.867778  0.020661  0.017929  256.9648  0.002604
0.880000  0.020661  0.018182  263.1214  0.002604
0.892222  0.020661  0.018434  269.3262  0.002604
0.904444  0.020661  0.018687  275.5790  0.002604
0.916667  0.020661  0.018939  281.8793  0.002604
0.928889  0.020661  0.019192  288.2268  0.002604
0.941111  0.020661  0.019444  294.6212  0.002604
0.953333  0.020661  0.019697  301.0620  0.002604
0.965556  0.020661  0.019949  307.5490  0.002604
0.977778  0.020661  0.020202  314.0818  0.002604
0.990000  0.020661  0.020455  320.6602  0.002604
1.002222  0.020661  0.020707  327.2837  0.002604
1.014444  0.020661  0.020960  333.9521  0.002604
1.026667  0.020661  0.021212  340.6651  0.002604
1.038889  0.020661  0.021465  347.4224  0.002604
1.051111  0.020661  0.021717  354.2236  0.002604
1.063333  0.020661  0.021970  361.0686  0.002604
1.075556  0.020661  0.022222  367.9569  0.002604
1.087778  0.020661  0.022475  374.8884  0.002604
END FTABLE  1
FTABLE      3
 56    5
   Depth      Area      Volume   Outflow1   Outflow2  Velocity  Travel Time***
    (ft)    (acres)  (acre-ft)    (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.011938  0.000000  0.000000  0.000000
0.054945  0.011730  0.000010  0.000000  0.000000
0.109890  0.011387  0.000022  0.000000  0.000000
0.164835  0.011049  0.000037  0.000000  0.000001
0.219780  0.010717  0.000054  0.000000  0.000004
0.274725  0.010389  0.000073  0.000000  0.000011
0.329670  0.010066  0.000094  0.000000  0.000024
0.384615  0.009749  0.000118  0.000000  0.000046
0.439560  0.009436  0.000145  0.000000  0.000080
0.494505  0.009128  0.000175  0.000000  0.000129
0.549451  0.008825  0.000208  0.000000  0.000173
0.604396  0.008528  0.000244  0.000000  0.000189
0.659341  0.008235  0.000284  0.000000  0.000206
0.714286  0.007947  0.000327  0.000000  0.000223
0.769231  0.007664  0.000373  0.000000  0.000241
0.824176  0.007387  0.000423  0.000000  0.000260
0.879121  0.007114  0.000477  0.000000  0.000279
0.934066  0.006846  0.000535  0.000000  0.000299
0.989011  0.006583  0.000596  0.000000  0.000320
1.043956  0.006325  0.000662  0.000000  0.000341
1.098901  0.006073  0.000732  0.000000  0.000363
1.153846  0.005825  0.000807  0.000000  0.000385
1.208791  0.005582  0.000886  0.000000  0.000408
1.263736  0.005344  0.000970  0.000000  0.000432
1.318681  0.005111  0.001058  0.000000  0.000456
1.373626  0.004883  0.001152  0.000000  0.000481
1.428571  0.004660  0.001250  0.000000  0.000507
1.483516  0.004442  0.001354  0.000000  0.000533
1.538462  0.004230  0.001453  0.000000  0.000560
1.593407  0.004022  0.001557  0.000000  0.000587
1.648352  0.003819  0.001665  0.000000  0.000615
1.703297  0.003621  0.001779  0.000000  0.000644
1.758242  0.003428  0.001899  0.000000  0.000674
```

```
  1.813187  0.003240  0.002023  0.000000  0.000704
  1.868132  0.003057  0.002153  0.000000  0.000734
  1.923077  0.002879  0.002289  0.000000  0.000765
  1.978022  0.002706  0.002430  0.000000  0.000797
  2.032967  0.002538  0.002577  0.000000  0.000830
  2.087912  0.002375  0.002730  0.000000  0.000863
  2.142857  0.002217  0.002890  0.000000  0.000897
  2.197802  0.002064  0.003055  0.000000  0.000931
  2.252747  0.001916  0.003226  0.000000  0.000966
  2.307692  0.001773  0.003404  0.000000  0.001002
  2.362637  0.001635  0.003589  0.000000  0.001038
  2.417582  0.001502  0.003780  0.000000  0.001075
  2.472527  0.001374  0.003978  0.000000  0.001112
  2.527473  0.001251  0.004183  0.000000  0.001151
  2.582418  0.001132  0.004394  0.000000  0.001189
  2.637363  0.001019  0.004613  0.000000  0.001229
  2.692308  0.000911  0.004839  0.000000  0.001269
  2.747253  0.000808  0.005072  0.000000  0.001309
  2.802198  0.000710  0.005313  0.000000  0.001351
  2.857143  0.000617  0.005561  0.000000  0.001393
  2.912088  0.000529  0.005817  0.000000  0.001435
  2.967033  0.000445  0.006080  0.000000  0.001478
  3.000000  0.000367  0.013108  0.000000  0.001505
  END FTABLE  3
  FTABLE      2
   38    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)    (acres) (acre-ft)    (cfs)     (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.000367  0.000000  0.000000  0.000000  0.000044
  0.054945  0.012288  0.000666  0.000398  0.154134  0.000044
  0.109890  0.012644  0.001350  0.000562  0.164198  0.000089
  0.164835  0.013004  0.002055  0.000689  0.174645  0.000134
  0.219780  0.013370  0.002780  0.000795  0.185481  0.000181
  0.274725  0.013741  0.003524  0.000889  0.196712  0.000227
  0.329670  0.014116  0.004290  0.000974  0.203917  0.000275
  0.384615  0.014497  0.005076  0.001052  0.207282  0.000323
  0.439560  0.014882  0.005883  0.001124  0.210647  0.000371
  0.494505  0.015273  0.006711  0.001193  0.214012  0.000420
  0.549451  0.015668  0.007561  0.001257  0.217377  0.000470
  0.604396  0.016069  0.008433  0.001319  0.220742  0.000521
  0.659341  0.016474  0.009327  0.001377  0.224107  0.000572
  0.714286  0.016885  0.010244  0.001433  0.227472  0.000624
  0.769231  0.017300  0.011183  0.001488  0.230837  0.000676
  0.824176  0.017721  0.012145  0.001540  0.234202  0.000729
  0.879121  0.018146  0.013131  0.001590  0.237567  0.000783
  0.934066  0.018577  0.014139  0.001639  0.240932  0.000837
  0.989011  0.019012  0.015172  0.001687  0.244297  0.000892
  1.043956  0.019453  0.016229  0.148355  0.247662  0.000947
  1.098901  0.019898  0.017310  0.495727  0.251027  0.001003
  1.153846  0.020349  0.018416  0.956065  0.254391  0.001060
  1.208791  0.020804  0.019546  1.497247  0.257756  0.001118
  1.263736  0.021265  0.020702  2.092933  0.261121  0.001176
  1.318681  0.021730  0.021883  2.716801  0.264486  0.001234
  1.373626  0.022200  0.023090  3.341773  0.267851  0.001294
  1.428571  0.022676  0.024323  3.940977  0.271216  0.001353
  1.483516  0.023156  0.025582  4.489625  0.274581  0.001414
  1.538462  0.023641  0.026868  4.967493  0.277946  0.001475
  1.593407  0.024132  0.028180  5.361875  0.281311  0.001537
  1.648352  0.024627  0.029520  5.670927  0.284676  0.001599
  1.703297  0.025127  0.030886  5.907350  0.288041  0.001662
  1.758242  0.025633  0.032281  6.173112  0.291406  0.001726
  1.813187  0.026143  0.033703  6.392819  0.294771  0.001790
  1.868132  0.026658  0.035154  6.605221  0.298136  0.001855
  1.923077  0.027179  0.036633  6.811002  0.301501  0.001921
  1.978022  0.027704  0.038141  7.010745  0.304866  0.001987
  2.000000  0.027916  0.038752  7.204952  0.306212  0.002014
  END FTABLE  2
END FTABLES
```

```
EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.8            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8            IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1.37           RCHRES   2     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.8            RCHRES   3     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL       REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL       REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL       REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL       REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1008 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1009 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1010 FLOW     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1011 STAG     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1012 STAG     ENGL       REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1013 FLOW     ENGL       REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                 RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                 COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

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WWHM2012

PROJECT REPORT

General Model Information

Project Name:	SRD-33 Basin 2 - bio
Site Name:	Columbia River Homes
Site Address:	
City:	
Report Date:	5/10/2019
Gage:	Troutdale
Data Start:	1948/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.370
Version Date:	2017/04/14
Version:	4.2.13

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C IMP DISP STEE	0.148
Pervious Total	0.148
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.148

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

driveway

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.042
Impervious Total	0.042
Basin Total	0.042

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 2	Surface retention 2	

roof

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	0.0583
Impervious Total	0.0583
Basin Total	0.0583

Element Flows To:

Surface	Interflow	Groundwater
Dispersion Trench 2	Dispersion Trench 2	

Basin 2

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C, Lawn, Mod	0.027
Pervious Total	0.027
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.027

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Dispersion Trench 2

Bottom Length: 36.00 ft.
Bottom Width: 25.00 ft.
Depth: 1.1 ft.
Volume at riser head: 0.0023 acre-feet.
Infiltration On
Infiltration rate: 0.5
Infiltration safety factor: 0.25
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 10.925
Total Volume Through Riser (ac-ft.): 1.327
Total Volume Through Facility (ac-ft.): 12.253
Percent Infiltrated: 89.16
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Side slope 1: 0 To 1
Side slope 2: 0 To 1
Side slope 3: 0 To 1
Side slope 4: 0 To 1
Discharge Structure
Riser Height: 0.1 ft.
Riser Diameter: 432 in.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.020	0.000	0.000	0.000
0.0122	0.020	0.000	0.000	0.002
0.0244	0.020	0.000	0.000	0.002
0.0367	0.020	0.000	0.000	0.002
0.0489	0.020	0.001	0.000	0.002
0.0611	0.020	0.001	0.000	0.002
0.0733	0.020	0.001	0.000	0.002
0.0856	0.020	0.001	0.000	0.002
0.0978	0.020	0.002	0.000	0.002
0.1100	0.020	0.002	0.382	0.002
0.1222	0.020	0.002	1.266	0.002
0.1344	0.020	0.002	2.444	0.002
0.1467	0.020	0.003	3.854	0.002
0.1589	0.020	0.003	5.464	0.002
0.1711	0.020	0.003	7.250	0.002
0.1833	0.020	0.003	9.197	0.002
0.1956	0.020	0.004	11.29	0.002
0.2078	0.020	0.004	13.52	0.002
0.2200	0.020	0.004	15.89	0.002
0.2322	0.020	0.004	18.38	0.002
0.2444	0.020	0.005	20.98	0.002
0.2567	0.020	0.005	23.70	0.002
0.2689	0.020	0.005	26.53	0.002
0.2811	0.020	0.005	29.46	0.002
0.2933	0.020	0.006	32.49	0.002
0.3056	0.020	0.006	35.62	0.002

0.3178	0.020	0.006	38.84	0.002
0.3300	0.020	0.006	42.16	0.002
0.3422	0.020	0.007	45.56	0.002
0.3544	0.020	0.007	49.05	0.002
0.3667	0.020	0.007	52.63	0.002
0.3789	0.020	0.007	56.29	0.002
0.3911	0.020	0.008	60.03	0.002
0.4033	0.020	0.008	63.85	0.002
0.4156	0.020	0.008	67.74	0.002
0.4278	0.020	0.008	71.72	0.002
0.4400	0.020	0.009	75.76	0.002
0.4522	0.020	0.009	79.88	0.002
0.4644	0.020	0.009	84.08	0.002
0.4767	0.020	0.009	88.34	0.002
0.4889	0.020	0.010	92.67	0.002
0.5011	0.020	0.010	97.07	0.002
0.5133	0.020	0.010	101.5	0.002
0.5256	0.020	0.010	106.0	0.002
0.5378	0.020	0.011	110.6	0.002
0.5500	0.020	0.011	115.3	0.002
0.5622	0.020	0.011	120.0	0.002
0.5744	0.020	0.011	124.8	0.002
0.5867	0.020	0.012	129.7	0.002
0.5989	0.020	0.012	134.6	0.002
0.6111	0.020	0.012	139.6	0.002
0.6233	0.020	0.012	144.6	0.002
0.6356	0.020	0.013	149.7	0.002
0.6478	0.020	0.013	154.9	0.002
0.6600	0.020	0.013	160.1	0.002
0.6722	0.020	0.013	165.3	0.002
0.6844	0.020	0.014	170.7	0.002
0.6967	0.020	0.014	176.0	0.002
0.7089	0.020	0.014	181.5	0.002
0.7211	0.020	0.014	187.0	0.002
0.7333	0.020	0.015	192.5	0.002
0.7456	0.020	0.015	198.1	0.002
0.7578	0.020	0.015	203.8	0.002
0.7700	0.020	0.015	209.5	0.002
0.7822	0.020	0.016	215.2	0.002
0.7944	0.020	0.016	221.0	0.002
0.8067	0.020	0.016	226.9	0.002
0.8189	0.020	0.016	232.8	0.002
0.8311	0.020	0.017	238.7	0.002
0.8433	0.020	0.017	244.8	0.002
0.8556	0.020	0.017	250.8	0.002
0.8678	0.020	0.017	256.9	0.002
0.8800	0.020	0.018	263.1	0.002
0.8922	0.020	0.018	269.3	0.002
0.9044	0.020	0.018	275.5	0.002
0.9167	0.020	0.018	281.8	0.002
0.9289	0.020	0.019	288.2	0.002
0.9411	0.020	0.019	294.6	0.002
0.9533	0.020	0.019	301.0	0.002
0.9656	0.020	0.019	307.5	0.002
0.9778	0.020	0.020	314.0	0.002
0.9900	0.020	0.020	320.6	0.002
1.0022	0.020	0.020	327.2	0.002
1.0144	0.020	0.021	333.9	0.002

1.0267	0.020	0.021	340.6	0.002
1.0389	0.020	0.021	347.4	0.002
1.0511	0.020	0.021	354.2	0.002
1.0633	0.020	0.022	361.0	0.002
1.0756	0.020	0.022	367.9	0.002
1.0878	0.020	0.022	374.8	0.002
1.1000	0.020	0.022	381.8	0.002

Bioretention 2

Bottom Length:	8.00 ft.
Bottom Width:	2.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW 12 in/hr
Material thickness of second layer:	1.5
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	0.25
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	8.675
Total Volume Through Riser (ac-ft.):	0.369
Total Volume Through Facility (ac-ft.):	9.044
Percent Infiltrated:	95.92
Total Precip Applied to Facility:	0.593
Total Evap From Facility:	0.352

Underdrain not used

Discharge Structure

Riser Height:	1 ft.	
Riser Diameter:	18 in.	
Orifice 1 Diameter:	0.25 in.	Elevation:0 ft.

Element Flows To:

Outlet 1 Outlet 2

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0119	0.0000	0.0000	0.0000
0.0549	0.0117	0.0000	0.0000	0.0000
0.1099	0.0114	0.0000	0.0000	0.0000
0.1648	0.0110	0.0000	0.0000	0.0000
0.2198	0.0107	0.0001	0.0000	0.0000
0.2747	0.0104	0.0001	0.0000	0.0000
0.3297	0.0101	0.0001	0.0000	0.0000
0.3846	0.0097	0.0001	0.0000	0.0000
0.4396	0.0094	0.0001	0.0000	0.0001
0.4945	0.0091	0.0002	0.0000	0.0001
0.5495	0.0088	0.0002	0.0000	0.0002
0.6044	0.0085	0.0002	0.0000	0.0002
0.6593	0.0082	0.0003	0.0000	0.0002
0.7143	0.0079	0.0003	0.0000	0.0002
0.7692	0.0077	0.0004	0.0000	0.0002
0.8242	0.0074	0.0004	0.0000	0.0003
0.8791	0.0071	0.0005	0.0000	0.0003
0.9341	0.0068	0.0005	0.0000	0.0003
0.9890	0.0066	0.0006	0.0000	0.0003
1.0440	0.0063	0.0007	0.0000	0.0003
1.0989	0.0061	0.0007	0.0000	0.0004
1.1538	0.0058	0.0008	0.0000	0.0004
1.2088	0.0056	0.0009	0.0000	0.0004
1.2637	0.0053	0.0010	0.0000	0.0004
1.3187	0.0051	0.0011	0.0000	0.0005
1.3736	0.0049	0.0012	0.0000	0.0005

1.4286	0.0047	0.0013	0.0000	0.0005
1.4835	0.0044	0.0014	0.0000	0.0005
1.5385	0.0042	0.0015	0.0000	0.0006
1.5934	0.0040	0.0016	0.0000	0.0006
1.6484	0.0038	0.0017	0.0000	0.0006
1.7033	0.0036	0.0018	0.0000	0.0006
1.7582	0.0034	0.0019	0.0000	0.0007
1.8132	0.0032	0.0020	0.0000	0.0007
1.8681	0.0031	0.0022	0.0000	0.0007
1.9231	0.0029	0.0023	0.0000	0.0008
1.9780	0.0027	0.0024	0.0000	0.0008
2.0330	0.0025	0.0026	0.0000	0.0008
2.0879	0.0024	0.0027	0.0000	0.0009
2.1429	0.0022	0.0029	0.0000	0.0009
2.1978	0.0021	0.0031	0.0000	0.0009
2.2527	0.0019	0.0032	0.0000	0.0010
2.3077	0.0018	0.0034	0.0000	0.0010
2.3626	0.0016	0.0036	0.0000	0.0010
2.4176	0.0015	0.0038	0.0000	0.0011
2.4725	0.0014	0.0040	0.0000	0.0011
2.5275	0.0013	0.0042	0.0000	0.0012
2.5824	0.0011	0.0044	0.0000	0.0012
2.6374	0.0010	0.0046	0.0000	0.0012
2.6923	0.0009	0.0048	0.0000	0.0013
2.7473	0.0008	0.0051	0.0000	0.0013
2.8022	0.0007	0.0053	0.0000	0.0014
2.8571	0.0006	0.0056	0.0000	0.0014
2.9121	0.0005	0.0058	0.0000	0.0014
2.9670	0.0004	0.0061	0.0000	0.0015
3.0000	0.0004	0.0062	0.0000	0.0015

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.011938	0.006242	0.0000	0.1541	0.0000
3.0549	0.012288	0.006908	0.0004	0.1541	0.0001
3.1099	0.012644	0.007593	0.0006	0.1642	0.0001
3.1648	0.013004	0.008297	0.0007	0.1746	0.0002
3.2198	0.013370	0.009022	0.0008	0.1855	0.0002
3.2747	0.013741	0.009767	0.0009	0.1967	0.0003
3.3297	0.014116	0.010532	0.0010	0.2039	0.0003
3.3846	0.014497	0.011318	0.0011	0.2073	0.0004
3.4396	0.014882	0.012125	0.0011	0.2106	0.0004
3.4945	0.015273	0.012954	0.0012	0.2140	0.0005
3.5495	0.015668	0.013804	0.0013	0.2174	0.0005
3.6044	0.016069	0.014675	0.0013	0.2207	0.0006
3.6593	0.016474	0.015570	0.0014	0.2241	0.0006
3.7143	0.016885	0.016486	0.0014	0.2275	0.0007
3.7692	0.017300	0.017425	0.0015	0.2308	0.0007
3.8242	0.017721	0.018387	0.0015	0.2342	0.0008
3.8791	0.018146	0.019373	0.0016	0.2376	0.0008
3.9341	0.018577	0.020382	0.0016	0.2409	0.0009
3.9890	0.019012	0.021414	0.0017	0.2443	0.0009
4.0440	0.019453	0.022471	0.1484	0.2477	0.0010
4.0989	0.019898	0.023552	0.4957	0.2510	0.0011
4.1538	0.020349	0.024658	0.9561	0.2544	0.0011
4.2088	0.020804	0.025788	1.4972	0.2578	0.0012
4.2637	0.021265	0.026944	2.0929	0.2611	0.0012
4.3187	0.021730	0.028125	2.7168	0.2645	0.0013

4.3736	0.022200	0.029332	3.3418	0.2679	0.0014
4.4286	0.022676	0.030565	3.9410	0.2712	0.0014
4.4835	0.023156	0.031824	4.4896	0.2746	0.0015
4.5385	0.023641	0.033110	4.9675	0.2779	0.0015
4.5934	0.024132	0.034422	5.3619	0.2813	0.0016
4.6484	0.024627	0.035762	5.6709	0.2847	0.0017
4.7033	0.025127	0.037129	5.9074	0.2880	0.0017
4.7582	0.025633	0.038523	6.1731	0.2914	0.0018
4.8132	0.026143	0.039946	6.3928	0.2948	0.0019
4.8681	0.026658	0.041396	6.6052	0.2981	0.0019
4.9231	0.027179	0.042875	6.8110	0.3015	0.0020
4.9780	0.027704	0.044383	7.0107	0.3049	0.0020
5.0000	0.027916	0.044994	7.2050	0.3062	0.0000

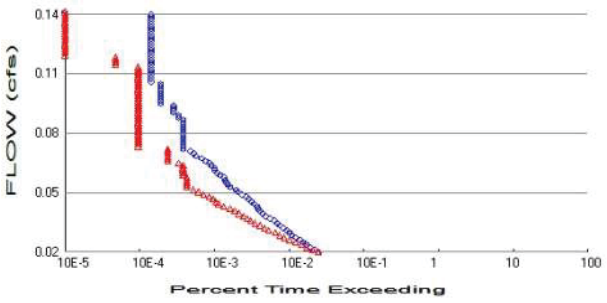
Surface retention 2

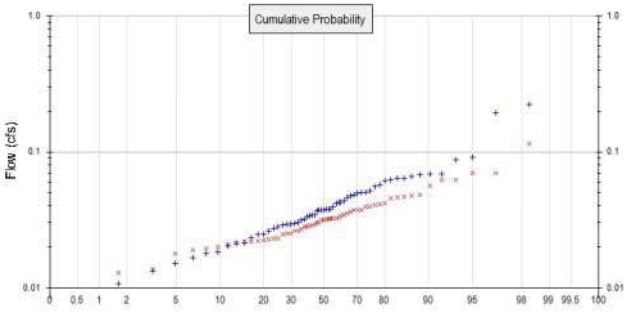
Element Flows To:

Outlet 1	Outlet 2
	Bioretention 2

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.148
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.027
Total Impervious Area: 0.1003

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.036452
5 year	0.060604
10 year	0.080391
25 year	0.110078
50 year	0.135833
100 year	0.164913

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.03069
5 year	0.044326
10 year	0.054156
25 year	0.067472
50 year	0.078038
100 year	0.089155

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.034	0.029
1950	0.026	0.023
1951	0.038	0.022
1952	0.055	0.048
1953	0.037	0.032
1954	0.043	0.032
1955	0.030	0.022
1956	0.062	0.041
1957	0.027	0.027
1958	0.038	0.035

1959	0.018	0.014
1960	0.025	0.032
1961	0.032	0.030
1962	0.034	0.025
1963	0.040	0.033
1964	0.043	0.032
1965	0.037	0.028
1966	0.042	0.034
1967	0.028	0.028
1968	0.069	0.070
1969	0.037	0.056
1970	0.194	0.115
1971	0.021	0.018
1972	0.021	0.019
1973	0.033	0.032
1974	0.051	0.037
1975	0.037	0.030
1976	0.067	0.046
1977	0.017	0.022
1978	0.064	0.032
1979	0.050	0.040
1980	0.029	0.026
1981	0.042	0.034
1982	0.052	0.040
1983	0.062	0.045
1984	0.046	0.020
1985	0.034	0.026
1986	0.018	0.036
1987	0.029	0.025
1988	0.020	0.022
1989	0.047	0.037
1990	0.029	0.021
1991	0.049	0.023
1992	0.030	0.019
1993	0.087	0.062
1994	0.023	0.022
1995	0.038	0.033
1996	0.091	0.062
1997	0.069	0.048
1998	0.057	0.047
1999	0.025	0.023
2000	0.010	0.010
2001	0.013	0.013
2002	0.064	0.029
2003	0.048	0.025
2004	0.011	0.040
2005	0.015	0.037
2006	0.066	0.042
2007	0.031	0.028
2008	0.222	0.070

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.2216	0.1146
2	0.1941	0.0700
3	0.0912	0.0695
4	0.0871	0.0624

5	0.0686	0.0620
6	0.0686	0.0560
7	0.0674	0.0480
8	0.0657	0.0477
9	0.0644	0.0469
10	0.0643	0.0464
11	0.0623	0.0452
12	0.0616	0.0420
13	0.0568	0.0412
14	0.0552	0.0404
15	0.0517	0.0397
16	0.0506	0.0396
17	0.0502	0.0373
18	0.0494	0.0372
19	0.0479	0.0372
20	0.0474	0.0363
21	0.0463	0.0353
22	0.0434	0.0343
23	0.0427	0.0340
24	0.0424	0.0329
25	0.0417	0.0326
26	0.0397	0.0325
27	0.0380	0.0323
28	0.0378	0.0320
29	0.0377	0.0317
30	0.0371	0.0317
31	0.0371	0.0315
32	0.0371	0.0303
33	0.0367	0.0303
34	0.0343	0.0291
35	0.0342	0.0290
36	0.0339	0.0284
37	0.0332	0.0283
38	0.0318	0.0281
39	0.0314	0.0268
40	0.0300	0.0263
41	0.0298	0.0262
42	0.0293	0.0250
43	0.0293	0.0249
44	0.0290	0.0246
45	0.0281	0.0230
46	0.0273	0.0229
47	0.0261	0.0228
48	0.0247	0.0223
49	0.0247	0.0219
50	0.0235	0.0219
51	0.0215	0.0219
52	0.0210	0.0215
53	0.0203	0.0209
54	0.0183	0.0200
55	0.0180	0.0194
56	0.0167	0.0190
57	0.0151	0.0179
58	0.0132	0.0136
59	0.0108	0.0129
60	0.0100	0.0101

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0182	517	518	100	Pass
0.0194	460	433	94	Pass
0.0206	403	363	90	Pass
0.0218	358	310	86	Pass
0.0230	321	255	79	Pass
0.0242	293	213	72	Pass
0.0254	255	182	71	Pass
0.0265	227	158	69	Pass
0.0277	214	138	64	Pass
0.0289	195	112	57	Pass
0.0301	177	98	55	Pass
0.0313	159	86	54	Pass
0.0325	146	74	50	Pass
0.0337	132	64	48	Pass
0.0349	117	58	49	Pass
0.0360	102	51	50	Pass
0.0372	93	45	48	Pass
0.0384	85	39	45	Pass
0.0396	81	34	41	Pass
0.0408	78	28	35	Pass
0.0420	72	24	33	Pass
0.0432	66	22	33	Pass
0.0444	61	20	32	Pass
0.0455	56	18	32	Pass
0.0467	49	15	30	Pass
0.0479	43	13	30	Pass
0.0491	41	11	26	Pass
0.0503	34	9	26	Pass
0.0515	32	9	28	Pass
0.0527	30	9	30	Pass
0.0539	29	9	31	Pass
0.0551	28	9	32	Pass
0.0562	25	8	32	Pass
0.0574	23	8	34	Pass
0.0586	21	8	38	Pass
0.0598	21	8	38	Pass
0.0610	19	8	42	Pass
0.0622	18	7	38	Pass
0.0634	16	5	31	Pass
0.0646	14	5	35	Pass
0.0657	12	5	41	Pass
0.0669	11	5	45	Pass
0.0681	10	5	50	Pass
0.0693	8	5	62	Pass
0.0705	8	2	25	Pass
0.0717	8	2	25	Pass
0.0729	8	2	25	Pass
0.0741	8	2	25	Pass
0.0752	8	2	25	Pass
0.0764	8	2	25	Pass
0.0776	8	2	25	Pass
0.0788	8	2	25	Pass
0.0800	8	2	25	Pass

0.0812	8	2	25	Pass
0.0824	8	2	25	Pass
0.0836	8	2	25	Pass
0.0848	7	2	28	Pass
0.0859	7	2	28	Pass
0.0871	6	2	33	Pass
0.0883	6	2	33	Pass
0.0895	6	2	33	Pass
0.0907	6	2	33	Pass
0.0919	4	2	50	Pass
0.0931	4	2	50	Pass
0.0943	4	2	50	Pass
0.0954	4	2	50	Pass
0.0966	4	2	50	Pass
0.0978	4	2	50	Pass
0.0990	4	2	50	Pass
0.1002	4	2	50	Pass
0.1014	4	2	50	Pass
0.1026	3	2	66	Pass
0.1038	3	2	66	Pass
0.1049	3	2	66	Pass
0.1061	3	2	66	Pass
0.1073	3	2	66	Pass
0.1085	3	2	66	Pass
0.1097	3	2	66	Pass
0.1109	3	1	33	Pass
0.1121	3	1	33	Pass
0.1133	3	1	33	Pass
0.1144	3	1	33	Pass
0.1156	3	0	0	Pass
0.1168	3	0	0	Pass
0.1180	3	0	0	Pass
0.1192	3	0	0	Pass
0.1204	3	0	0	Pass
0.1216	3	0	0	Pass
0.1228	3	0	0	Pass
0.1240	3	0	0	Pass
0.1251	3	0	0	Pass
0.1263	3	0	0	Pass
0.1275	3	0	0	Pass
0.1287	3	0	0	Pass
0.1299	3	0	0	Pass
0.1311	3	0	0	Pass
0.1323	3	0	0	Pass
0.1335	3	0	0	Pass
0.1346	3	0	0	Pass
0.1358	3	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Dispersion Trench 2 POC	☐	11.16			☐	89.10			
retention 2 POC	☐	8.23			☐	95.92			
Total Volume Infiltrated		19.39	0.00	0.00		92.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

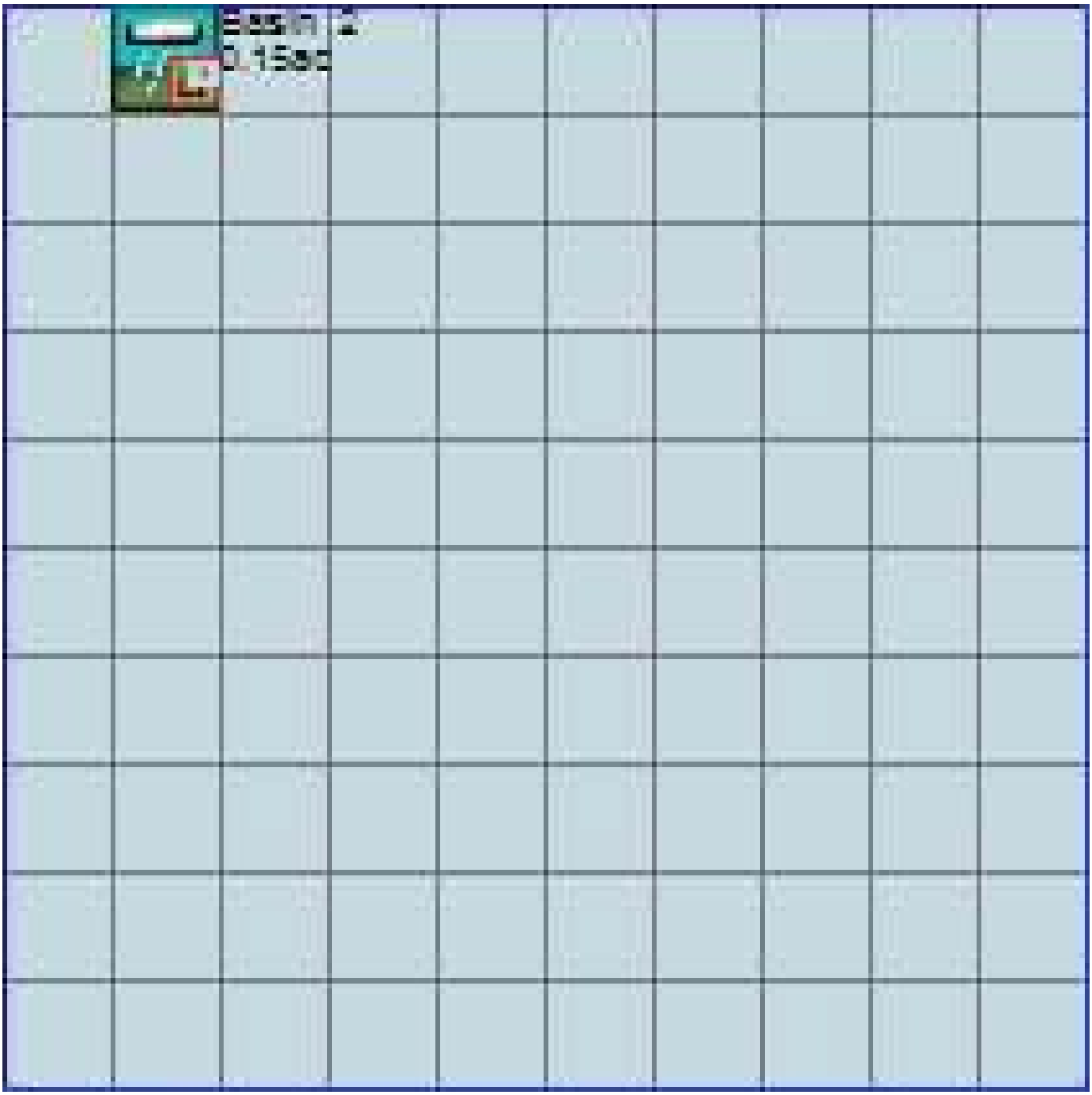
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 2 - bio.wdm
MESSU       25   MitSRD-33 Basin 2 - bio.MES
            27   MitSRD-33 Basin 2 - bio.L61
            28   MitSRD-33 Basin 2 - bio.L62
            30   POCSRD-33 Basin 2 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      IMPLND        1
      IMPLND        4
      PERLND       17
      RCHRES        1
      GENER         3
      RCHRES        2
      RCHRES        3
      COPY          1
      COPY        501
      COPY        601
      DISPLY        1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Dispersion Trench 2         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  601          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    3         24
  END OPCODE
  PARM
    #    #          K ***
    3              0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   17     C, Lawn, Mod             1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
```

```
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   17         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   17         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   17         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -   # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   17              0       4.5      0.03       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -   # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   17              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -   #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   17           0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -   # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   17              0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -   #                     User  t-series Engl Metr ***
                                      in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP  VRS  VNN RTLI     ***
```

```
    1          0    0    0    0    0
    4          0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >       IWATER input info: Part 2          ***
    # -  # ***  LSUR      SLSUR      NSUR      RETSC
    1             400       0.01       0.1        0.1
    4             400       0.01       0.1        0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >       IWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN
    1              0          0
    4              0          0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS       SURS
    1              0          0
    4              0          0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
driveway***
IMPLND   1                      0.042     RCHRES   2      5
roof***
IMPLND   4                     0.0583     RCHRES   1      5
Basin  2***
PERLND  17                      0.027     COPY   501     12
PERLND  17                      0.027     COPY   601     12
PERLND  17                      0.027     COPY   501     13
PERLND  17                      0.027     COPY   601     13

******Routing******
IMPLND   1                      0.042     COPY     1     15
IMPLND   4                     0.0583     COPY     1     15
RCHRES   2                          1     RCHRES   3      8
RCHRES   1                          1     COPY   501     17
RCHRES   3                          1     COPY   501     17
RCHRES   2                          1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    3 OUTPUT TIMSER      .0011111     RCHRES   2     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                        in  out                             ***
    1     Dispersion Trenc-007    2    1    1    1   28    0    1
    2     Surface retentio-010    3    1    1    1   28    0    1
    3     Bioretention  2         2    1    1    1   28    0    1
  END GEN-INFO
```

```
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -   # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -   # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -   #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2       0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -   #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------->  ***
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -   # ***   VOL    Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol3   RCHRES   3 VOL              4
  UVQUAN v2m3   GLOBAL     WORKSP  2        3
  UVQUAN vpo3   GLOBAL     WORKSP  3        3
  UVQUAN v2d3   GENER    3 K       1        3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <--->    <----><-><-><-> <---> <--->
  UVNAME  v2m3    1 WORKSP  2         1.0 QUAN
  UVNAME  vpo3    1 WORKSP  3         1.0 QUAN
  UVNAME  v2d3    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   3                               v2m3            =  251.
*** Compute remaining available pore space
  GENER   3                               vpo3            =  v2m3
  GENER   3                               vpo3           -=  vol3
```

```
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo3 < 0.0) THEN
  GENER   3                                 vpo3            =  0.0
END IF
*** Infiltration volume
  GENER   3                                 v2d3            =  vpo3
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   90    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.020661  0.000000  0.000000  0.000000
  0.012222  0.020661  0.000253  0.000000  0.002604
  0.024444  0.020661  0.000505  0.000000  0.002604
  0.036667  0.020661  0.000758  0.000000  0.002604
  0.048889  0.020661  0.001010  0.000000  0.002604
  0.061111  0.020661  0.001263  0.000000  0.002604
  0.073333  0.020661  0.001515  0.000000  0.002604
  0.085556  0.020661  0.001768  0.000000  0.002604
  0.097778  0.020661  0.002020  0.000000  0.002604
  0.110000  0.020661  0.002273  0.382386  0.002604
  0.122222  0.020661  0.002525  1.266698  0.002604
  0.134444  0.020661  0.002778  2.444334  0.002604
  0.146667  0.020661  0.003030  3.854625  0.002604
  0.158889  0.020661  0.003283  5.464020  0.002604
  0.171111  0.020661  0.003535  7.250348  0.002604
  0.183333  0.020661  0.003788  9.197530  0.002604
  0.195556  0.020661  0.004040  11.29321  0.002604
  0.207778  0.020661  0.004293  13.52752  0.002604
  0.220000  0.020661  0.004545  15.89230  0.002604
  0.232222  0.020661  0.004798  18.38072  0.002604
  0.244444  0.020661  0.005051  20.98688  0.002604
  0.256667  0.020661  0.005303  23.70569  0.002604
  0.268889  0.020661  0.005556  26.53263  0.002604
  0.281111  0.020661  0.005808  29.46372  0.002604
  0.293333  0.020661  0.006061  32.49535  0.002604
  0.305556  0.020661  0.006313  35.62429  0.002604
  0.317778  0.020661  0.006566  38.84760  0.002604
  0.330000  0.020661  0.006818  42.16256  0.002604
  0.342222  0.020661  0.007071  45.56672  0.002604
  0.354444  0.020661  0.007323  49.05778  0.002604
  0.366667  0.020661  0.007576  52.63362  0.002604
  0.378889  0.020661  0.007828  56.29226  0.002604
  0.391111  0.020661  0.008081  60.03187  0.002604
  0.403333  0.020661  0.008333  63.85073  0.002604
  0.415556  0.020661  0.008586  67.74720  0.002604
  0.427778  0.020661  0.008838  71.71978  0.002604
  0.440000  0.020661  0.009091  75.76701  0.002604
  0.452222  0.020661  0.009343  79.88755  0.002604
  0.464444  0.020661  0.009596  84.08010  0.002604
  0.476667  0.020661  0.009848  88.34344  0.002604
  0.488889  0.020661  0.010101  92.67641  0.002604
  0.501111  0.020661  0.010354  97.07791  0.002604
  0.513333  0.020661  0.010606  101.5469  0.002604
  0.525556  0.020661  0.010859  106.0823  0.002604
  0.537778  0.020661  0.011111  110.6832  0.002604
  0.550000  0.020661  0.011364  115.3486  0.002604
  0.562222  0.020661  0.011616  120.0778  0.002604
  0.574444  0.020661  0.011869  124.8698  0.002604
  0.586667  0.020661  0.012121  129.7238  0.002604
  0.598889  0.020661  0.012374  134.6390  0.002604
  0.611111  0.020661  0.012626  139.6146  0.002604
  0.623333  0.020661  0.012879  144.6500  0.002604
  0.635556  0.020661  0.013131  149.7445  0.002604
  0.647778  0.020661  0.013384  154.8973  0.002604
  0.660000  0.020661  0.013636  160.1077  0.002604
  0.672222  0.020661  0.013889  165.3753  0.002604
  0.684444  0.020661  0.014141  170.6992  0.002604
  0.696667  0.020661  0.014394  176.0791  0.002604
```

```
0.708889  0.020661  0.014646  181.5141  0.002604
0.721111  0.020661  0.014899  187.0039  0.002604
0.733333  0.020661  0.015152  192.5479  0.002604
0.745556  0.020661  0.015404  198.1455  0.002604
0.757778  0.020661  0.015657  203.7962  0.002604
0.770000  0.020661  0.015909  209.4995  0.002604
0.782222  0.020661  0.016162  215.2549  0.002604
0.794444  0.020661  0.016414  221.0620  0.002604
0.806667  0.020661  0.016667  226.9204  0.002604
0.818889  0.020661  0.016919  232.8295  0.002604
0.831111  0.020661  0.017172  238.7889  0.002604
0.843333  0.020661  0.017424  244.7982  0.002604
0.855556  0.020661  0.017677  250.8570  0.002604
0.867778  0.020661  0.017929  256.9648  0.002604
0.880000  0.020661  0.018182  263.1214  0.002604
0.892222  0.020661  0.018434  269.3262  0.002604
0.904444  0.020661  0.018687  275.5790  0.002604
0.916667  0.020661  0.018939  281.8793  0.002604
0.928889  0.020661  0.019192  288.2268  0.002604
0.941111  0.020661  0.019444  294.6212  0.002604
0.953333  0.020661  0.019697  301.0620  0.002604
0.965556  0.020661  0.019949  307.5490  0.002604
0.977778  0.020661  0.020202  314.0818  0.002604
0.990000  0.020661  0.020455  320.6602  0.002604
1.002222  0.020661  0.020707  327.2837  0.002604
1.014444  0.020661  0.020960  333.9521  0.002604
1.026667  0.020661  0.021212  340.6651  0.002604
1.038889  0.020661  0.021465  347.4224  0.002604
1.051111  0.020661  0.021717  354.2236  0.002604
1.063333  0.020661  0.021970  361.0686  0.002604
1.075556  0.020661  0.022222  367.9569  0.002604
1.087778  0.020661  0.022475  374.8884  0.002604
END FTABLE  1
FTABLE      3
 56    5
   Depth      Area      Volume   Outflow1   Outflow2  Velocity  Travel Time***
    (ft)    (acres)  (acre-ft)    (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.011938  0.000000  0.000000  0.000000
0.054945  0.011730  0.000010  0.000000  0.000000
0.109890  0.011387  0.000022  0.000000  0.000000
0.164835  0.011049  0.000037  0.000000  0.000001
0.219780  0.010717  0.000054  0.000000  0.000004
0.274725  0.010389  0.000073  0.000000  0.000011
0.329670  0.010066  0.000094  0.000000  0.000024
0.384615  0.009749  0.000118  0.000000  0.000046
0.439560  0.009436  0.000145  0.000000  0.000080
0.494505  0.009128  0.000175  0.000000  0.000129
0.549451  0.008825  0.000208  0.000000  0.000173
0.604396  0.008528  0.000244  0.000000  0.000189
0.659341  0.008235  0.000284  0.000000  0.000206
0.714286  0.007947  0.000327  0.000000  0.000223
0.769231  0.007664  0.000373  0.000000  0.000241
0.824176  0.007387  0.000423  0.000000  0.000260
0.879121  0.007114  0.000477  0.000000  0.000279
0.934066  0.006846  0.000535  0.000000  0.000299
0.989011  0.006583  0.000596  0.000000  0.000320
1.043956  0.006325  0.000662  0.000000  0.000341
1.098901  0.006073  0.000732  0.000000  0.000363
1.153846  0.005825  0.000807  0.000000  0.000385
1.208791  0.005582  0.000886  0.000000  0.000408
1.263736  0.005344  0.000970  0.000000  0.000432
1.318681  0.005111  0.001058  0.000000  0.000456
1.373626  0.004883  0.001152  0.000000  0.000481
1.428571  0.004660  0.001250  0.000000  0.000507
1.483516  0.004442  0.001354  0.000000  0.000533
1.538462  0.004230  0.001453  0.000000  0.000560
1.593407  0.004022  0.001557  0.000000  0.000587
1.648352  0.003819  0.001665  0.000000  0.000615
1.703297  0.003621  0.001779  0.000000  0.000644
1.758242  0.003428  0.001899  0.000000  0.000674
```

```
  1.813187  0.003240  0.002023  0.000000  0.000704
  1.868132  0.003057  0.002153  0.000000  0.000734
  1.923077  0.002879  0.002289  0.000000  0.000765
  1.978022  0.002706  0.002430  0.000000  0.000797
  2.032967  0.002538  0.002577  0.000000  0.000830
  2.087912  0.002375  0.002730  0.000000  0.000863
  2.142857  0.002217  0.002890  0.000000  0.000897
  2.197802  0.002064  0.003055  0.000000  0.000931
  2.252747  0.001916  0.003226  0.000000  0.000966
  2.307692  0.001773  0.003404  0.000000  0.001002
  2.362637  0.001635  0.003589  0.000000  0.001038
  2.417582  0.001502  0.003780  0.000000  0.001075
  2.472527  0.001374  0.003978  0.000000  0.001112
  2.527473  0.001251  0.004183  0.000000  0.001151
  2.582418  0.001132  0.004394  0.000000  0.001189
  2.637363  0.001019  0.004613  0.000000  0.001229
  2.692308  0.000911  0.004839  0.000000  0.001269
  2.747253  0.000808  0.005072  0.000000  0.001309
  2.802198  0.000710  0.005313  0.000000  0.001351
  2.857143  0.000617  0.005561  0.000000  0.001393
  2.912088  0.000529  0.005817  0.000000  0.001435
  2.967033  0.000445  0.006080  0.000000  0.001478
  3.000000  0.000367  0.013108  0.000000  0.001505
  END FTABLE  3
  FTABLE      2
   38    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)    (acres) (acre-ft)    (cfs)     (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.000367  0.000000  0.000000  0.000000  0.000044
  0.054945  0.012288  0.000666  0.000398  0.154134  0.000044
  0.109890  0.012644  0.001350  0.000562  0.164198  0.000089
  0.164835  0.013004  0.002055  0.000689  0.174645  0.000134
  0.219780  0.013370  0.002780  0.000795  0.185481  0.000181
  0.274725  0.013741  0.003524  0.000889  0.196712  0.000227
  0.329670  0.014116  0.004290  0.000974  0.203917  0.000275
  0.384615  0.014497  0.005076  0.001052  0.207282  0.000323
  0.439560  0.014882  0.005883  0.001124  0.210647  0.000371
  0.494505  0.015273  0.006711  0.001193  0.214012  0.000420
  0.549451  0.015668  0.007561  0.001257  0.217377  0.000470
  0.604396  0.016069  0.008433  0.001319  0.220742  0.000521
  0.659341  0.016474  0.009327  0.001377  0.224107  0.000572
  0.714286  0.016885  0.010244  0.001433  0.227472  0.000624
  0.769231  0.017300  0.011183  0.001488  0.230837  0.000676
  0.824176  0.017721  0.012145  0.001540  0.234202  0.000729
  0.879121  0.018146  0.013131  0.001590  0.237567  0.000783
  0.934066  0.018577  0.014139  0.001639  0.240932  0.000837
  0.989011  0.019012  0.015172  0.001687  0.244297  0.000892
  1.043956  0.019453  0.016229  0.148355  0.247662  0.000947
  1.098901  0.019898  0.017310  0.495727  0.251027  0.001003
  1.153846  0.020349  0.018416  0.956065  0.254391  0.001060
  1.208791  0.020804  0.019546  1.497247  0.257756  0.001118
  1.263736  0.021265  0.020702  2.092933  0.261121  0.001176
  1.318681  0.021730  0.021883  2.716801  0.264486  0.001234
  1.373626  0.022200  0.023090  3.341773  0.267851  0.001294
  1.428571  0.022676  0.024323  3.940977  0.271216  0.001353
  1.483516  0.023156  0.025582  4.489625  0.274581  0.001414
  1.538462  0.023641  0.026868  4.967493  0.277946  0.001475
  1.593407  0.024132  0.028180  5.361875  0.281311  0.001537
  1.648352  0.024627  0.029520  5.670927  0.284676  0.001599
  1.703297  0.025127  0.030886  5.907350  0.288041  0.001662
  1.758242  0.025633  0.032281  6.173112  0.291406  0.001726
  1.813187  0.026143  0.033703  6.392819  0.294771  0.001790
  1.868132  0.026658  0.035154  6.605221  0.298136  0.001855
  1.923077  0.027179  0.036633  6.811002  0.301501  0.001921
  1.978022  0.027704  0.038141  7.010745  0.304866  0.001987
  2.000000  0.027916  0.038752  7.204952  0.306212  0.002014
  END FTABLE  2
END FTABLES
```

```
EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.8            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8            IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1.37           RCHRES   2     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.8            RCHRES   3     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL       REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL       REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL       REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL       REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1008 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1009 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1010 FLOW     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1011 STAG     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1012 STAG     ENGL       REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1013 FLOW     ENGL       REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO      0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

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WWHM2012

PROJECT REPORT

General Model Information

Project Name:	SRD-33 Basin 3 - bio
Site Name:	Columbia River Homes
Site Address:	
City:	
Report Date:	5/10/2019
Gage:	Troutdale
Data Start:	1948/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.370
Version Date:	2017/04/14
Version:	4.2.13

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C IMP DISP STEE	0.158
Pervious Total	0.158
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.158

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

driveway

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.0643
Impervious Total	0.0643
Basin Total	0.0643

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 3	Surface retention 3	

roof

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	0.054
Impervious Total	0.054
Basin Total	0.054

Element Flows To:

Surface	Interflow	Groundwater
Dispersion Trench 3	Dispersion Trench 3	

Basin 3

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C, Lawn, Mod	0.019
Pervious Total	0.019
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.019

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Dispersion Trench 3

Bottom Length: 36.00 ft.
Bottom Width: 25.00 ft.
Depth: 1.1 ft.
Volume at riser head: 0.0023 acre-feet.
Infiltration On
Infiltration rate: 0.5
Infiltration safety factor: 0.25
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 10.311
Total Volume Through Riser (ac-ft.): 1.038
Total Volume Through Facility (ac-ft.): 11.349
Percent Infiltrated: 90.85
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Side slope 1: 0 To 1
Side slope 2: 0 To 1
Side slope 3: 0 To 1
Side slope 4: 0 To 1
Discharge Structure
Riser Height: 0.1 ft.
Riser Diameter: 432 in.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.020	0.000	0.000	0.000
0.0122	0.020	0.000	0.000	0.002
0.0244	0.020	0.000	0.000	0.002
0.0367	0.020	0.000	0.000	0.002
0.0489	0.020	0.001	0.000	0.002
0.0611	0.020	0.001	0.000	0.002
0.0733	0.020	0.001	0.000	0.002
0.0856	0.020	0.001	0.000	0.002
0.0978	0.020	0.002	0.000	0.002
0.1100	0.020	0.002	0.382	0.002
0.1222	0.020	0.002	1.266	0.002
0.1344	0.020	0.002	2.444	0.002
0.1467	0.020	0.003	3.854	0.002
0.1589	0.020	0.003	5.464	0.002
0.1711	0.020	0.003	7.250	0.002
0.1833	0.020	0.003	9.197	0.002
0.1956	0.020	0.004	11.29	0.002
0.2078	0.020	0.004	13.52	0.002
0.2200	0.020	0.004	15.89	0.002
0.2322	0.020	0.004	18.38	0.002
0.2444	0.020	0.005	20.98	0.002
0.2567	0.020	0.005	23.70	0.002
0.2689	0.020	0.005	26.53	0.002
0.2811	0.020	0.005	29.46	0.002
0.2933	0.020	0.006	32.49	0.002
0.3056	0.020	0.006	35.62	0.002

0.3178	0.020	0.006	38.84	0.002
0.3300	0.020	0.006	42.16	0.002
0.3422	0.020	0.007	45.56	0.002
0.3544	0.020	0.007	49.05	0.002
0.3667	0.020	0.007	52.63	0.002
0.3789	0.020	0.007	56.29	0.002
0.3911	0.020	0.008	60.03	0.002
0.4033	0.020	0.008	63.85	0.002
0.4156	0.020	0.008	67.74	0.002
0.4278	0.020	0.008	71.72	0.002
0.4400	0.020	0.009	75.76	0.002
0.4522	0.020	0.009	79.88	0.002
0.4644	0.020	0.009	84.08	0.002
0.4767	0.020	0.009	88.34	0.002
0.4889	0.020	0.010	92.67	0.002
0.5011	0.020	0.010	97.07	0.002
0.5133	0.020	0.010	101.5	0.002
0.5256	0.020	0.010	106.0	0.002
0.5378	0.020	0.011	110.6	0.002
0.5500	0.020	0.011	115.3	0.002
0.5622	0.020	0.011	120.0	0.002
0.5744	0.020	0.011	124.8	0.002
0.5867	0.020	0.012	129.7	0.002
0.5989	0.020	0.012	134.6	0.002
0.6111	0.020	0.012	139.6	0.002
0.6233	0.020	0.012	144.6	0.002
0.6356	0.020	0.013	149.7	0.002
0.6478	0.020	0.013	154.9	0.002
0.6600	0.020	0.013	160.1	0.002
0.6722	0.020	0.013	165.3	0.002
0.6844	0.020	0.014	170.7	0.002
0.6967	0.020	0.014	176.0	0.002
0.7089	0.020	0.014	181.5	0.002
0.7211	0.020	0.014	187.0	0.002
0.7333	0.020	0.015	192.5	0.002
0.7456	0.020	0.015	198.1	0.002
0.7578	0.020	0.015	203.8	0.002
0.7700	0.020	0.015	209.5	0.002
0.7822	0.020	0.016	215.2	0.002
0.7944	0.020	0.016	221.0	0.002
0.8067	0.020	0.016	226.9	0.002
0.8189	0.020	0.016	232.8	0.002
0.8311	0.020	0.017	238.7	0.002
0.8433	0.020	0.017	244.8	0.002
0.8556	0.020	0.017	250.8	0.002
0.8678	0.020	0.017	256.9	0.002
0.8800	0.020	0.018	263.1	0.002
0.8922	0.020	0.018	269.3	0.002
0.9044	0.020	0.018	275.5	0.002
0.9167	0.020	0.018	281.8	0.002
0.9289	0.020	0.019	288.2	0.002
0.9411	0.020	0.019	294.6	0.002
0.9533	0.020	0.019	301.0	0.002
0.9656	0.020	0.019	307.5	0.002
0.9778	0.020	0.020	314.0	0.002
0.9900	0.020	0.020	320.6	0.002
1.0022	0.020	0.020	327.2	0.002
1.0144	0.020	0.021	333.9	0.002

1.0267	0.020	0.021	340.6	0.002
1.0389	0.020	0.021	347.4	0.002
1.0511	0.020	0.021	354.2	0.002
1.0633	0.020	0.022	361.0	0.002
1.0756	0.020	0.022	367.9	0.002
1.0878	0.020	0.022	374.8	0.002
1.1000	0.020	0.022	381.8	0.002

Bioretention 3

Bottom Length:	10.00 ft.
Bottom Width:	2.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW 12 in/hr
Material thickness of second layer:	1.5
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	0.25
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	12.921
Total Volume Through Riser (ac-ft.):	1.184
Total Volume Through Facility (ac-ft.):	14.105
Percent Infiltrated:	91.61
Total Precip Applied to Facility:	1.015
Total Evap From Facility:	0.405
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Orifice 1 Diameter:	0.25 in. Elevation:0 ft.
Element Flows To:	
Outlet 1	Outlet 2

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0129	0.0000	0.0000	0.0000
0.0549	0.0126	0.0000	0.0000	0.0000
0.1099	0.0123	0.0000	0.0000	0.0000
0.1648	0.0119	0.0000	0.0000	0.0000
0.2198	0.0116	0.0001	0.0000	0.0000
0.2747	0.0112	0.0001	0.0000	0.0000
0.3297	0.0109	0.0001	0.0000	0.0000
0.3846	0.0106	0.0001	0.0000	0.0001
0.4396	0.0102	0.0002	0.0000	0.0001
0.4945	0.0099	0.0002	0.0000	0.0002
0.5495	0.0096	0.0003	0.0000	0.0002
0.6044	0.0093	0.0003	0.0000	0.0002
0.6593	0.0090	0.0003	0.0000	0.0002
0.7143	0.0087	0.0004	0.0000	0.0003
0.7692	0.0084	0.0004	0.0000	0.0003
0.8242	0.0081	0.0005	0.0000	0.0003
0.8791	0.0078	0.0006	0.0000	0.0003
0.9341	0.0075	0.0006	0.0000	0.0003
0.9890	0.0072	0.0007	0.0000	0.0004
1.0440	0.0070	0.0008	0.0000	0.0004
1.0989	0.0067	0.0009	0.0000	0.0004
1.1538	0.0064	0.0009	0.0000	0.0004
1.2088	0.0062	0.0010	0.0000	0.0005
1.2637	0.0059	0.0011	0.0000	0.0005
1.3187	0.0057	0.0012	0.0000	0.0005
1.3736	0.0054	0.0013	0.0000	0.0005

1.4286	0.0052	0.0014	0.0000	0.0006
1.4835	0.0050	0.0016	0.0000	0.0006
1.5385	0.0047	0.0017	0.0000	0.0006
1.5934	0.0045	0.0018	0.0000	0.0007
1.6484	0.0043	0.0019	0.0000	0.0007
1.7033	0.0041	0.0020	0.0000	0.0007
1.7582	0.0039	0.0022	0.0000	0.0007
1.8132	0.0037	0.0023	0.0000	0.0008
1.8681	0.0035	0.0024	0.0000	0.0008
1.9231	0.0033	0.0026	0.0000	0.0008
1.9780	0.0031	0.0027	0.0000	0.0009
2.0330	0.0029	0.0029	0.0000	0.0009
2.0879	0.0027	0.0031	0.0000	0.0009
2.1429	0.0026	0.0033	0.0000	0.0010
2.1978	0.0024	0.0034	0.0000	0.0010
2.2527	0.0022	0.0036	0.0000	0.0011
2.3077	0.0021	0.0038	0.0000	0.0011
2.3626	0.0019	0.0040	0.0000	0.0011
2.4176	0.0018	0.0042	0.0000	0.0012
2.4725	0.0016	0.0044	0.0000	0.0012
2.5275	0.0015	0.0047	0.0000	0.0012
2.5824	0.0013	0.0049	0.0000	0.0013
2.6374	0.0012	0.0051	0.0000	0.0013
2.6923	0.0011	0.0054	0.0000	0.0014
2.7473	0.0010	0.0056	0.0000	0.0014
2.8022	0.0009	0.0059	0.0000	0.0015
2.8571	0.0008	0.0062	0.0000	0.0015
2.9121	0.0007	0.0064	0.0000	0.0015
2.9670	0.0006	0.0067	0.0000	0.0016
3.0000	0.0005	0.0069	0.0000	0.0016

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.012856	0.006890	0.0000	0.1658	0.0000
3.0549	0.013222	0.007606	0.0004	0.1658	0.0001
3.1099	0.013592	0.008343	0.0006	0.1765	0.0001
3.1648	0.013968	0.009100	0.0007	0.1876	0.0002
3.2198	0.014349	0.009878	0.0008	0.1991	0.0002
3.2747	0.014735	0.010677	0.0009	0.2109	0.0003
3.3297	0.015125	0.011497	0.0010	0.2232	0.0003
3.3846	0.015521	0.012339	0.0011	0.2360	0.0004
3.4396	0.015922	0.013203	0.0011	0.2491	0.0004
3.4945	0.016327	0.014089	0.0012	0.2627	0.0005
3.5495	0.016738	0.014997	0.0013	0.2717	0.0005
3.6044	0.017154	0.015928	0.0013	0.2759	0.0006
3.6593	0.017574	0.016882	0.0014	0.2801	0.0006
3.7143	0.018000	0.017860	0.0014	0.2843	0.0007
3.7692	0.018431	0.018860	0.0015	0.2885	0.0008
3.8242	0.018866	0.019885	0.0015	0.2928	0.0008
3.8791	0.019307	0.020934	0.0016	0.2970	0.0009
3.9341	0.019753	0.022007	0.0016	0.3012	0.0009
3.9890	0.020203	0.023105	0.0017	0.3054	0.0010
4.0440	0.020659	0.024227	0.1484	0.3096	0.0010
4.0989	0.021119	0.025375	0.4957	0.3138	0.0011
4.1538	0.021585	0.026548	0.9561	0.3180	0.0012
4.2088	0.022055	0.027747	1.4972	0.3222	0.0012
4.2637	0.022531	0.028972	2.0929	0.3264	0.0013
4.3187	0.023012	0.030223	2.7168	0.3306	0.0013

4.3736	0.023497	0.031501	3.3418	0.3348	0.0014
4.4286	0.023988	0.032805	3.9410	0.3390	0.0015
4.4835	0.024483	0.034137	4.4896	0.3432	0.0015
4.5385	0.024984	0.035496	4.9675	0.3474	0.0016
4.5934	0.025489	0.036882	5.3619	0.3516	0.0017
4.6484	0.026000	0.038297	5.6709	0.3558	0.0017
4.7033	0.026515	0.039740	5.9074	0.3601	0.0018
4.7582	0.027035	0.041211	6.1731	0.3643	0.0019
4.8132	0.027561	0.042711	6.3928	0.3685	0.0019
4.8681	0.028091	0.044240	6.6052	0.3727	0.0020
4.9231	0.028627	0.045798	6.8110	0.3769	0.0021
4.9780	0.029167	0.047386	7.0107	0.3811	0.0021
5.0000	0.029385	0.048029	7.2050	0.3828	0.0000

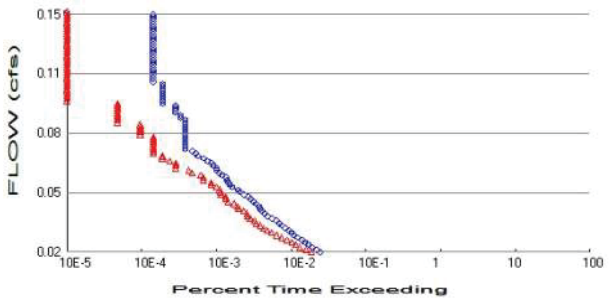
Surface retention 3

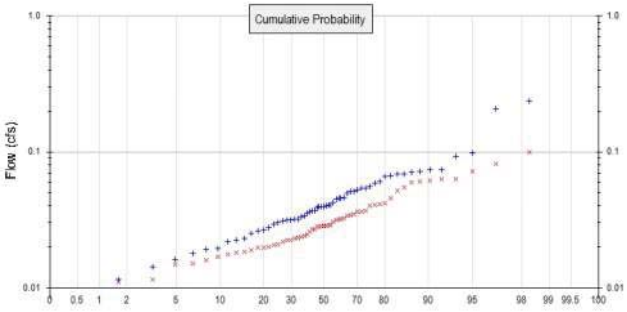
Element Flows To:

Outlet 1	Outlet 2
	Bioretention 3

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.158
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.019
Total Impervious Area: 0.1183

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.038915
5 year	0.064699
10 year	0.085823
25 year	0.117516
50 year	0.145011
100 year	0.176056

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.028787
5 year	0.044175
10 year	0.055522
25 year	0.071108
50 year	0.083599
100 year	0.096829

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.037	0.026
1950	0.028	0.019
1951	0.040	0.018
1952	0.059	0.042
1953	0.040	0.027
1954	0.046	0.029
1955	0.032	0.020
1956	0.066	0.036
1957	0.029	0.024
1958	0.041	0.032

1959	0.019	0.011
1960	0.026	0.029
1961	0.034	0.032
1962	0.037	0.022
1963	0.042	0.021
1964	0.046	0.029
1965	0.039	0.028
1966	0.045	0.031
1967	0.030	0.025
1968	0.073	0.061
1969	0.040	0.052
1970	0.207	0.099
1971	0.023	0.016
1972	0.022	0.015
1973	0.035	0.028
1974	0.054	0.063
1975	0.040	0.027
1976	0.072	0.041
1977	0.018	0.021
1978	0.069	0.029
1979	0.054	0.035
1980	0.031	0.023
1981	0.045	0.031
1982	0.055	0.036
1983	0.067	0.040
1984	0.049	0.018
1985	0.036	0.024
1986	0.020	0.034
1987	0.031	0.022
1988	0.022	0.020
1989	0.051	0.032
1990	0.031	0.018
1991	0.053	0.015
1992	0.032	0.017
1993	0.093	0.054
1994	0.025	0.020
1995	0.040	0.063
1996	0.097	0.081
1997	0.073	0.071
1998	0.061	0.041
1999	0.026	0.046
2000	0.011	0.008
2001	0.014	0.011
2002	0.069	0.023
2003	0.051	0.022
2004	0.011	0.037
2005	0.016	0.034
2006	0.070	0.028
2007	0.033	0.060
2008	0.237	0.061

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.2366	0.0991
2	0.2072	0.0811
3	0.0974	0.0712
4	0.0930	0.0628

5	0.0733	0.0626
6	0.0732	0.0613
7	0.0720	0.0609
8	0.0702	0.0599
9	0.0687	0.0545
10	0.0686	0.0515
11	0.0665	0.0458
12	0.0657	0.0418
13	0.0606	0.0410
14	0.0589	0.0408
15	0.0552	0.0398
16	0.0540	0.0366
17	0.0536	0.0363
18	0.0527	0.0362
19	0.0512	0.0346
20	0.0506	0.0345
21	0.0494	0.0336
22	0.0463	0.0324
23	0.0455	0.0319
24	0.0453	0.0319
25	0.0446	0.0313
26	0.0423	0.0306
27	0.0406	0.0290
28	0.0404	0.0288
29	0.0403	0.0287
30	0.0396	0.0286
31	0.0396	0.0285
32	0.0396	0.0283
33	0.0391	0.0280
34	0.0366	0.0270
35	0.0366	0.0270
36	0.0362	0.0259
37	0.0355	0.0247
38	0.0339	0.0241
39	0.0335	0.0238
40	0.0320	0.0234
41	0.0318	0.0231
42	0.0313	0.0224
43	0.0313	0.0223
44	0.0309	0.0218
45	0.0300	0.0207
46	0.0291	0.0205
47	0.0279	0.0201
48	0.0264	0.0198
49	0.0263	0.0198
50	0.0250	0.0189
51	0.0229	0.0183
52	0.0224	0.0182
53	0.0217	0.0176
54	0.0195	0.0168
55	0.0192	0.0159
56	0.0178	0.0150
57	0.0161	0.0148
58	0.0141	0.0115
59	0.0115	0.0110
60	0.0106	0.0079

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0195	517	393	76	Pass
0.0207	460	333	72	Pass
0.0220	403	275	68	Pass
0.0233	358	242	67	Pass
0.0245	321	215	66	Pass
0.0258	293	186	63	Pass
0.0271	255	157	61	Pass
0.0283	227	135	59	Pass
0.0296	212	115	54	Pass
0.0309	195	101	51	Pass
0.0321	177	89	50	Pass
0.0334	159	82	51	Pass
0.0347	146	71	48	Pass
0.0359	132	68	51	Pass
0.0372	117	59	50	Pass
0.0385	101	55	54	Pass
0.0397	93	54	58	Pass
0.0410	85	49	57	Pass
0.0423	81	42	51	Pass
0.0436	78	40	51	Pass
0.0448	72	36	50	Pass
0.0461	66	30	45	Pass
0.0474	61	28	45	Pass
0.0486	56	28	50	Pass
0.0499	49	24	48	Pass
0.0512	43	24	55	Pass
0.0524	41	23	56	Pass
0.0537	34	21	61	Pass
0.0550	32	18	56	Pass
0.0562	30	18	60	Pass
0.0575	29	14	48	Pass
0.0588	28	14	50	Pass
0.0600	25	13	52	Pass
0.0613	23	10	43	Pass
0.0626	21	9	42	Pass
0.0638	21	6	28	Pass
0.0651	19	6	31	Pass
0.0664	18	6	33	Pass
0.0676	16	5	31	Pass
0.0689	14	4	28	Pass
0.0702	12	4	33	Pass
0.0715	11	3	27	Pass
0.0727	10	3	30	Pass
0.0740	8	3	37	Pass
0.0753	8	3	37	Pass
0.0765	8	3	37	Pass
0.0778	8	3	37	Pass
0.0791	8	3	37	Pass
0.0803	8	3	37	Pass
0.0816	8	2	25	Pass
0.0829	8	2	25	Pass
0.0841	8	2	25	Pass
0.0854	8	2	25	Pass

0.0867	8	2	25	Pass
0.0879	8	1	12	Pass
0.0892	8	1	12	Pass
0.0905	7	1	14	Pass
0.0917	7	1	14	Pass
0.0930	6	1	16	Pass
0.0943	6	1	16	Pass
0.0956	6	1	16	Pass
0.0968	6	1	16	Pass
0.0981	4	1	25	Pass
0.0994	4	0	0	Pass
0.1006	4	0	0	Pass
0.1019	4	0	0	Pass
0.1032	4	0	0	Pass
0.1044	4	0	0	Pass
0.1057	4	0	0	Pass
0.1070	4	0	0	Pass
0.1082	4	0	0	Pass
0.1095	3	0	0	Pass
0.1108	3	0	0	Pass
0.1120	3	0	0	Pass
0.1133	3	0	0	Pass
0.1146	3	0	0	Pass
0.1158	3	0	0	Pass
0.1171	3	0	0	Pass
0.1184	3	0	0	Pass
0.1196	3	0	0	Pass
0.1209	3	0	0	Pass
0.1222	3	0	0	Pass
0.1235	3	0	0	Pass
0.1247	3	0	0	Pass
0.1260	3	0	0	Pass
0.1273	3	0	0	Pass
0.1285	3	0	0	Pass
0.1298	3	0	0	Pass
0.1311	3	0	0	Pass
0.1323	3	0	0	Pass
0.1336	3	0	0	Pass
0.1349	3	0	0	Pass
0.1361	3	0	0	Pass
0.1374	3	0	0	Pass
0.1387	3	0	0	Pass
0.1399	3	0	0	Pass
0.1412	3	0	0	Pass
0.1425	3	0	0	Pass
0.1437	3	0	0	Pass
0.1450	3	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Dispersion Trench 3 POC	☐	10.34			☐	90.79			
retention 3 POC	☐	12.84			☐	91.61			
Total Volume Infiltrated		23.17	0.00	0.00		91.24	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

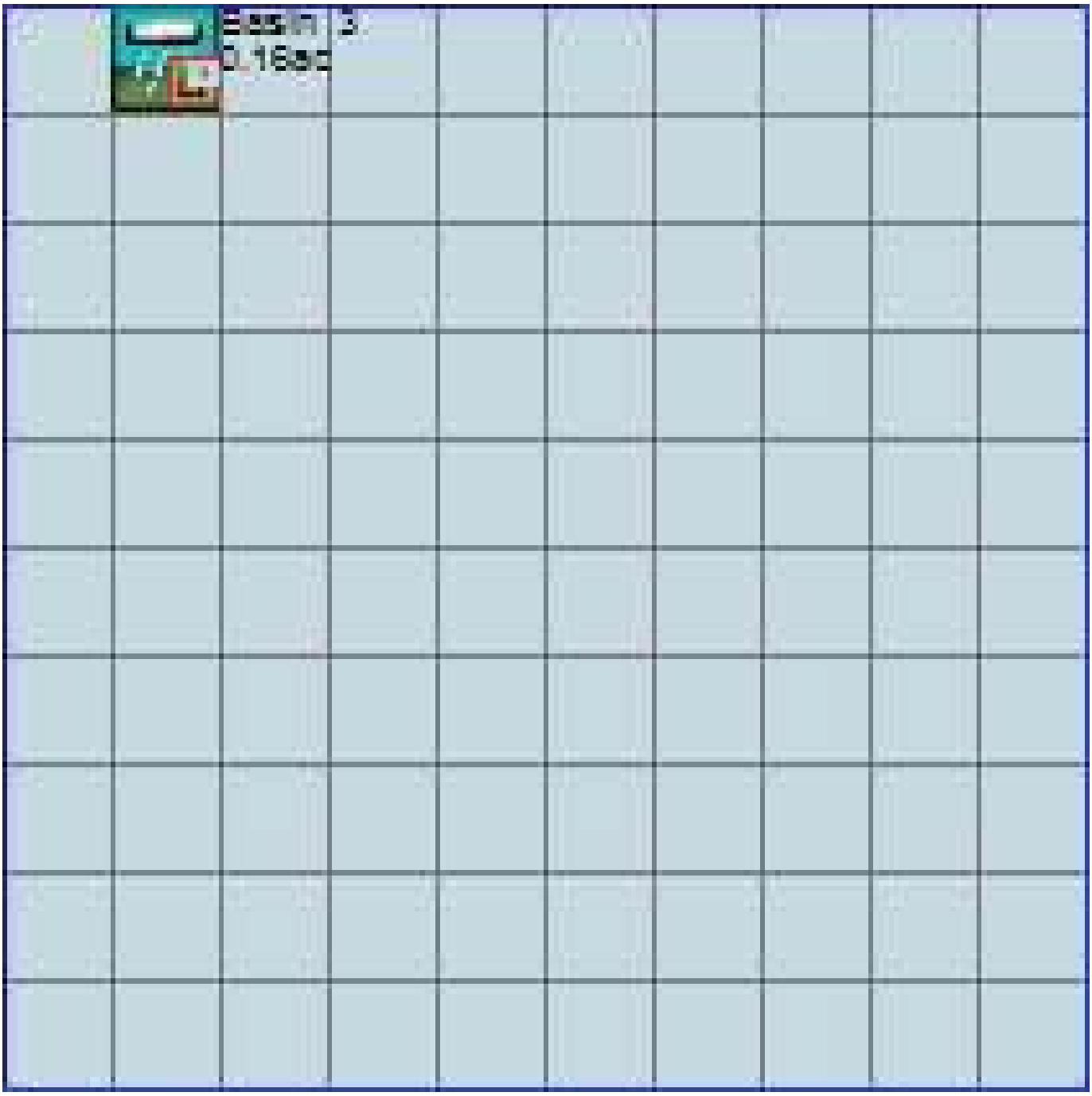
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 3 - bio.wdm
MESSU       25   PreSRD-33 Basin 3 - bio.MES
            27   PreSRD-33 Basin 3 - bio.L61
            28   PreSRD-33 Basin 3 - bio.L62
            30   POCSRD-33 Basin 3 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      30
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #          K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   30      C/IMP DISP /STEE       1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   30         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   30         0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   30              0       4.5      0.03       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   30             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   30          0.1      0.15      0.25         6       0.3      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   30             0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                  in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  30                       0.158     COPY   501     12
PERLND  30                       0.158     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                       in  out                              ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.8             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 3 - bio.wdm
MESSU       25   MitSRD-33 Basin 3 - bio.MES
            27   MitSRD-33 Basin 3 - bio.L61
            28   MitSRD-33 Basin 3 - bio.L62
            30   POCSRD-33 Basin 3 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      IMPLND        1
      IMPLND        4
      PERLND       17
      RCHRES        1
      GENER         3
      RCHRES        2
      RCHRES        3
      COPY          1
      COPY        501
      COPY        601
      DISPLY        1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Dispersion Trench 3         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  601          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    3         24
  END OPCODE
  PARM
    #    #          K ***
    3              0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   17     C, Lawn, Mod             1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
```

```
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   17         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   17         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   17         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -   # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   17              0       4.5      0.03       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -   # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   17              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -   #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   17           0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -   # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
   17              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -   #                     User  t-series Engl Metr ***
                                      in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP  VRS  VNN RTLI     ***
```

```
    1          0    0    0    0    0
    4          0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >       IWATER input info: Part 2          ***
    # -  # ***  LSUR      SLSUR      NSUR      RETSC
    1             400       0.01       0.1        0.1
    4             400       0.01       0.1        0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >       IWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN
    1              0          0
    4              0          0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS       SURS
    1              0          0
    4              0          0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
driveway***
IMPLND   1                       0.0643     RCHRES   2      5
roof***
IMPLND   4                        0.054     RCHRES   1      5
Basin  3***
PERLND  17                        0.019     COPY   501     12
PERLND  17                        0.019     COPY   601     12
PERLND  17                        0.019     COPY   501     13
PERLND  17                        0.019     COPY   601     13

******Routing******
IMPLND   1                       0.0643     COPY     1     15
IMPLND   4                        0.054     COPY     1     15
RCHRES   2                            1     RCHRES   3      8
RCHRES   1                            1     COPY   501     17
RCHRES   3                            1     COPY   501     17
RCHRES   2                            1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    3 OUTPUT TIMSER      .0011111     RCHRES   2     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                        in  out                             ***
    1     Dispersion Trenc-007    2    1    1    1   28    0    1
    2     Surface retentio-010    3    1    1    1   28    0    1
    3     Bioretention  3         2    1    1    1   28    0    1
  END GEN-INFO
```

```
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -   # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -   # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -   #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2       0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -   #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -   # ***   VOL    Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><---->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol3   RCHRES   3 VOL              4
  UVQUAN v2m3   GLOBAL     WORKSP  2        3
  UVQUAN vpo3   GLOBAL     WORKSP  3        3
  UVQUAN v2d3   GENER    3 K       1        3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <--->    <----><-><-><-> <---> <--->
  UVNAME  v2m3    1 WORKSP  2         1.0 QUAN
  UVNAME  vpo3    1 WORKSP  3         1.0 QUAN
  UVNAME  v2d3    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   3                               v2m3            =  277.
*** Compute remaining available pore space
  GENER   3                               vpo3            =  v2m3
  GENER   3                               vpo3           -=  vol3
```

```
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo3 < 0.0) THEN
  GENER   3                                   vpo3            =  0.0
END IF
*** Infiltration volume
  GENER   3                                   v2d3            =  vpo3
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   90    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.020661  0.000000  0.000000  0.000000
  0.012222  0.020661  0.000253  0.000000  0.002604
  0.024444  0.020661  0.000505  0.000000  0.002604
  0.036667  0.020661  0.000758  0.000000  0.002604
  0.048889  0.020661  0.001010  0.000000  0.002604
  0.061111  0.020661  0.001263  0.000000  0.002604
  0.073333  0.020661  0.001515  0.000000  0.002604
  0.085556  0.020661  0.001768  0.000000  0.002604
  0.097778  0.020661  0.002020  0.000000  0.002604
  0.110000  0.020661  0.002273  0.382386  0.002604
  0.122222  0.020661  0.002525  1.266698  0.002604
  0.134444  0.020661  0.002778  2.444334  0.002604
  0.146667  0.020661  0.003030  3.854625  0.002604
  0.158889  0.020661  0.003283  5.464020  0.002604
  0.171111  0.020661  0.003535  7.250348  0.002604
  0.183333  0.020661  0.003788  9.197530  0.002604
  0.195556  0.020661  0.004040  11.29321  0.002604
  0.207778  0.020661  0.004293  13.52752  0.002604
  0.220000  0.020661  0.004545  15.89230  0.002604
  0.232222  0.020661  0.004798  18.38072  0.002604
  0.244444  0.020661  0.005051  20.98688  0.002604
  0.256667  0.020661  0.005303  23.70569  0.002604
  0.268889  0.020661  0.005556  26.53263  0.002604
  0.281111  0.020661  0.005808  29.46372  0.002604
  0.293333  0.020661  0.006061  32.49535  0.002604
  0.305556  0.020661  0.006313  35.62429  0.002604
  0.317778  0.020661  0.006566  38.84760  0.002604
  0.330000  0.020661  0.006818  42.16256  0.002604
  0.342222  0.020661  0.007071  45.56672  0.002604
  0.354444  0.020661  0.007323  49.05778  0.002604
  0.366667  0.020661  0.007576  52.63362  0.002604
  0.378889  0.020661  0.007828  56.29226  0.002604
  0.391111  0.020661  0.008081  60.03187  0.002604
  0.403333  0.020661  0.008333  63.85073  0.002604
  0.415556  0.020661  0.008586  67.74720  0.002604
  0.427778  0.020661  0.008838  71.71978  0.002604
  0.440000  0.020661  0.009091  75.76701  0.002604
  0.452222  0.020661  0.009343  79.88755  0.002604
  0.464444  0.020661  0.009596  84.08010  0.002604
  0.476667  0.020661  0.009848  88.34344  0.002604
  0.488889  0.020661  0.010101  92.67641  0.002604
  0.501111  0.020661  0.010354  97.07791  0.002604
  0.513333  0.020661  0.010606  101.5469  0.002604
  0.525556  0.020661  0.010859  106.0823  0.002604
  0.537778  0.020661  0.011111  110.6832  0.002604
  0.550000  0.020661  0.011364  115.3486  0.002604
  0.562222  0.020661  0.011616  120.0778  0.002604
  0.574444  0.020661  0.011869  124.8698  0.002604
  0.586667  0.020661  0.012121  129.7238  0.002604
  0.598889  0.020661  0.012374  134.6390  0.002604
  0.611111  0.020661  0.012626  139.6146  0.002604
  0.623333  0.020661  0.012879  144.6500  0.002604
  0.635556  0.020661  0.013131  149.7445  0.002604
  0.647778  0.020661  0.013384  154.8973  0.002604
  0.660000  0.020661  0.013636  160.1077  0.002604
  0.672222  0.020661  0.013889  165.3753  0.002604
  0.684444  0.020661  0.014141  170.6992  0.002604
  0.696667  0.020661  0.014394  176.0791  0.002604
```

```
0.708889  0.020661  0.014646  181.5141  0.002604
0.721111  0.020661  0.014899  187.0039  0.002604
0.733333  0.020661  0.015152  192.5479  0.002604
0.745556  0.020661  0.015404  198.1455  0.002604
0.757778  0.020661  0.015657  203.7962  0.002604
0.770000  0.020661  0.015909  209.4995  0.002604
0.782222  0.020661  0.016162  215.2549  0.002604
0.794444  0.020661  0.016414  221.0620  0.002604
0.806667  0.020661  0.016667  226.9204  0.002604
0.818889  0.020661  0.016919  232.8295  0.002604
0.831111  0.020661  0.017172  238.7889  0.002604
0.843333  0.020661  0.017424  244.7982  0.002604
0.855556  0.020661  0.017677  250.8570  0.002604
0.867778  0.020661  0.017929  256.9648  0.002604
0.880000  0.020661  0.018182  263.1214  0.002604
0.892222  0.020661  0.018434  269.3262  0.002604
0.904444  0.020661  0.018687  275.5790  0.002604
0.916667  0.020661  0.018939  281.8793  0.002604
0.928889  0.020661  0.019192  288.2268  0.002604
0.941111  0.020661  0.019444  294.6212  0.002604
0.953333  0.020661  0.019697  301.0620  0.002604
0.965556  0.020661  0.019949  307.5490  0.002604
0.977778  0.020661  0.020202  314.0818  0.002604
0.990000  0.020661  0.020455  320.6602  0.002604
1.002222  0.020661  0.020707  327.2837  0.002604
1.014444  0.020661  0.020960  333.9521  0.002604
1.026667  0.020661  0.021212  340.6651  0.002604
1.038889  0.020661  0.021465  347.4224  0.002604
1.051111  0.020661  0.021717  354.2236  0.002604
1.063333  0.020661  0.021970  361.0686  0.002604
1.075556  0.020661  0.022222  367.9569  0.002604
1.087778  0.020661  0.022475  374.8884  0.002604
END FTABLE  1
FTABLE      3
 56    5
   Depth       Area      Volume   Outflow1   Outflow2  Velocity  Travel Time***
    (ft)    (acres)  (acre-ft)     (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.012856  0.000000  0.000000  0.000000
0.054945  0.012639  0.000013  0.000000  0.000000
0.109890  0.012281  0.000028  0.000000  0.000000
0.164835  0.011928  0.000045  0.000000  0.000001
0.219780  0.011580  0.000066  0.000000  0.000005
0.274725  0.011238  0.000089  0.000000  0.000013
0.329670  0.010900  0.000115  0.000000  0.000029
0.384615  0.010567  0.000144  0.000000  0.000055
0.439560  0.010239  0.000176  0.000000  0.000095
0.494505  0.009916  0.000212  0.000000  0.000153
0.549451  0.009598  0.000250  0.000000  0.000204
0.604396  0.009285  0.000293  0.000000  0.000222
0.659341  0.008978  0.000339  0.000000  0.000241
0.714286  0.008675  0.000389  0.000000  0.000260
0.769231  0.008377  0.000443  0.000000  0.000280
0.824176  0.008084  0.000500  0.000000  0.000300
0.879121  0.007796  0.000562  0.000000  0.000322
0.934066  0.007513  0.000629  0.000000  0.000343
0.989011  0.007235  0.000699  0.000000  0.000366
1.043956  0.006962  0.000775  0.000000  0.000389
1.098901  0.006694  0.000854  0.000000  0.000413
1.153846  0.006431  0.000939  0.000000  0.000437
1.208791  0.006173  0.001029  0.000000  0.000462
1.263736  0.005920  0.001123  0.000000  0.000488
1.318681  0.005672  0.001223  0.000000  0.000514
1.373626  0.005429  0.001328  0.000000  0.000541
1.428571  0.005191  0.001439  0.000000  0.000568
1.483516  0.004958  0.001555  0.000000  0.000596
1.538462  0.004730  0.001665  0.000000  0.000625
1.593407  0.004507  0.001781  0.000000  0.000654
1.648352  0.004289  0.001902  0.000000  0.000684
1.703297  0.004076  0.002029  0.000000  0.000715
1.758242  0.003868  0.002161  0.000000  0.000746
```

```
  1.813187  0.003665  0.002299  0.000000  0.000778
  1.868132  0.003467  0.002442  0.000000  0.000811
  1.923077  0.003274  0.002592  0.000000  0.000844
  1.978022  0.003085  0.002748  0.000000  0.000878
  2.032967  0.002902  0.002910  0.000000  0.000912
  2.087912  0.002724  0.003078  0.000000  0.000947
  2.142857  0.002551  0.003252  0.000000  0.000983
  2.197802  0.002383  0.003433  0.000000  0.001019
  2.252747  0.002220  0.003621  0.000000  0.001056
  2.307692  0.002061  0.003815  0.000000  0.001093
  2.362637  0.001908  0.004017  0.000000  0.001132
  2.417582  0.001760  0.004225  0.000000  0.001170
  2.472527  0.001617  0.004440  0.000000  0.001210
  2.527473  0.001479  0.004663  0.000000  0.001250
  2.582418  0.001345  0.004892  0.000000  0.001291
  2.637363  0.001217  0.005130  0.000000  0.001332
  2.692308  0.001094  0.005374  0.000000  0.001374
  2.747253  0.000976  0.005627  0.000000  0.001416
  2.802198  0.000862  0.005887  0.000000  0.001460
  2.857143  0.000754  0.006155  0.000000  0.001503
  2.912088  0.000651  0.006431  0.000000  0.001548
  2.967033  0.000552  0.006715  0.000000  0.001593
  3.000000  0.000459  0.014468  0.000000  0.001620
  END FTABLE  3
  FTABLE      2
   38    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)    (cfs)     (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.000459  0.000000  0.000000  0.000000  0.000046
  0.054945  0.013222  0.000716  0.000398  0.165842  0.000046
  0.109890  0.013592  0.001453  0.000562  0.176517  0.000093
  0.164835  0.013968  0.002210  0.000689  0.187587  0.000140
  0.219780  0.014349  0.002988  0.000795  0.199060  0.000188
  0.274725  0.014735  0.003787  0.000889  0.210942  0.000237
  0.329670  0.015125  0.004607  0.000974  0.223239  0.000286
  0.384615  0.015521  0.005449  0.001052  0.235959  0.000336
  0.439560  0.015922  0.006313  0.001124  0.249108  0.000386
  0.494505  0.016327  0.007199  0.001193  0.262692  0.000438
  0.549451  0.016738  0.008108  0.001257  0.271721  0.000489
  0.604396  0.017154  0.009039  0.001319  0.275927  0.000542
  0.659341  0.017574  0.009993  0.001377  0.280133  0.000595
  0.714286  0.018000  0.010970  0.001433  0.284340  0.000648
  0.769231  0.018431  0.011971  0.001488  0.288546  0.000703
  0.824176  0.018866  0.012996  0.001540  0.292752  0.000758
  0.879121  0.019307  0.014044  0.001590  0.296958  0.000813
  0.934066  0.019753  0.015117  0.001639  0.301165  0.000869
  0.989011  0.020203  0.016215  0.001687  0.305371  0.000926
  1.043956  0.020659  0.017338  0.148355  0.309577  0.000983
  1.098901  0.021119  0.018485  0.495727  0.313783  0.001042
  1.153846  0.021585  0.019659  0.956065  0.317989  0.001100
  1.208791  0.022055  0.020857  1.497247  0.322196  0.001160
  1.263736  0.022531  0.022082  2.092933  0.326402  0.001219
  1.318681  0.023012  0.023333  2.716801  0.330608  0.001280
  1.373626  0.023497  0.024611  3.341773  0.334814  0.001341
  1.428571  0.023988  0.025916  3.940977  0.339020  0.001403
  1.483516  0.024483  0.027247  4.489625  0.343227  0.001466
  1.538462  0.024984  0.028606  4.967493  0.347433  0.001529
  1.593407  0.025489  0.029993  5.361875  0.351639  0.001592
  1.648352  0.026000  0.031407  5.670927  0.355845  0.001657
  1.703297  0.026515  0.032850  5.907350  0.360051  0.001722
  1.758242  0.027035  0.034321  6.173112  0.364258  0.001787
  1.813187  0.027561  0.035821  6.392819  0.368464  0.001853
  1.868132  0.028091  0.037350  6.605221  0.372670  0.001920
  1.923077  0.028627  0.038908  6.811002  0.376876  0.001988
  1.978022  0.029167  0.040496  7.010745  0.381082  0.002056
  2.000000  0.029385  0.041139  7.204952  0.382765  0.002083
  END FTABLE  2
END FTABLES
```

```
EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.8            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8            IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1.37           RCHRES   2     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.8            RCHRES   3     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL       REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL       REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL       REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL       REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1008 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1009 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1010 FLOW     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1011 STAG     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1012 STAG     ENGL       REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1013 FLOW     ENGL       REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO      0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

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WWHM2012

PROJECT REPORT

General Model Information

Project Name:	SRD-33 Basin 4 - bio
Site Name:	Columbia River Homes
Site Address:	
City:	
Report Date:	5/10/2019
Gage:	Lacamas
Data Start:	1948/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.300
Version Date:	2017/04/14
Version:	4.2.13

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 4

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C IMP DISP STEE	0.184
Pervious Total	0.184
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.184

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

driveway

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.0683
Impervious Total	0.0683
Basin Total	0.0683

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 4	Surface retention 4	

roof

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	0.054
Impervious Total	0.054
Basin Total	0.054

Element Flows To:

Surface	Interflow	Groundwater
Dispersion Trench 4	Dispersion Trench 4	

Basin 4

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C, Lawn, Mod	0.041
Pervious Total	0.041
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.041

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Dispersion Trench 4

Bottom Length: 36.00 ft.
Bottom Width: 25.00 ft.
Depth: 1.1 ft.
Volume at riser head: 0.0023 acre-feet.
Infiltration On
Infiltration rate: 0.5
Infiltration safety factor: 0.25
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 9.807
Total Volume Through Riser (ac-ft.): 0.866
Total Volume Through Facility (ac-ft.): 10.673
Percent Infiltrated: 91.89
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Side slope 1: 0 To 1
Side slope 2: 0 To 1
Side slope 3: 0 To 1
Side slope 4: 0 To 1
Discharge Structure
Riser Height: 0.1 ft.
Riser Diameter: 432 in.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.020	0.000	0.000	0.000
0.0122	0.020	0.000	0.000	0.002
0.0244	0.020	0.000	0.000	0.002
0.0367	0.020	0.000	0.000	0.002
0.0489	0.020	0.001	0.000	0.002
0.0611	0.020	0.001	0.000	0.002
0.0733	0.020	0.001	0.000	0.002
0.0856	0.020	0.001	0.000	0.002
0.0978	0.020	0.002	0.000	0.002
0.1100	0.020	0.002	0.382	0.002
0.1222	0.020	0.002	1.266	0.002
0.1344	0.020	0.002	2.444	0.002
0.1467	0.020	0.003	3.854	0.002
0.1589	0.020	0.003	5.464	0.002
0.1711	0.020	0.003	7.250	0.002
0.1833	0.020	0.003	9.197	0.002
0.1956	0.020	0.004	11.29	0.002
0.2078	0.020	0.004	13.52	0.002
0.2200	0.020	0.004	15.89	0.002
0.2322	0.020	0.004	18.38	0.002
0.2444	0.020	0.005	20.98	0.002
0.2567	0.020	0.005	23.70	0.002
0.2689	0.020	0.005	26.53	0.002
0.2811	0.020	0.005	29.46	0.002
0.2933	0.020	0.006	32.49	0.002
0.3056	0.020	0.006	35.62	0.002

0.3178	0.020	0.006	38.84	0.002
0.3300	0.020	0.006	42.16	0.002
0.3422	0.020	0.007	45.56	0.002
0.3544	0.020	0.007	49.05	0.002
0.3667	0.020	0.007	52.63	0.002
0.3789	0.020	0.007	56.29	0.002
0.3911	0.020	0.008	60.03	0.002
0.4033	0.020	0.008	63.85	0.002
0.4156	0.020	0.008	67.74	0.002
0.4278	0.020	0.008	71.72	0.002
0.4400	0.020	0.009	75.76	0.002
0.4522	0.020	0.009	79.88	0.002
0.4644	0.020	0.009	84.08	0.002
0.4767	0.020	0.009	88.34	0.002
0.4889	0.020	0.010	92.67	0.002
0.5011	0.020	0.010	97.07	0.002
0.5133	0.020	0.010	101.5	0.002
0.5256	0.020	0.010	106.0	0.002
0.5378	0.020	0.011	110.6	0.002
0.5500	0.020	0.011	115.3	0.002
0.5622	0.020	0.011	120.0	0.002
0.5744	0.020	0.011	124.8	0.002
0.5867	0.020	0.012	129.7	0.002
0.5989	0.020	0.012	134.6	0.002
0.6111	0.020	0.012	139.6	0.002
0.6233	0.020	0.012	144.6	0.002
0.6356	0.020	0.013	149.7	0.002
0.6478	0.020	0.013	154.9	0.002
0.6600	0.020	0.013	160.1	0.002
0.6722	0.020	0.013	165.3	0.002
0.6844	0.020	0.014	170.7	0.002
0.6967	0.020	0.014	176.0	0.002
0.7089	0.020	0.014	181.5	0.002
0.7211	0.020	0.014	187.0	0.002
0.7333	0.020	0.015	192.5	0.002
0.7456	0.020	0.015	198.1	0.002
0.7578	0.020	0.015	203.8	0.002
0.7700	0.020	0.015	209.5	0.002
0.7822	0.020	0.016	215.2	0.002
0.7944	0.020	0.016	221.0	0.002
0.8067	0.020	0.016	226.9	0.002
0.8189	0.020	0.016	232.8	0.002
0.8311	0.020	0.017	238.7	0.002
0.8433	0.020	0.017	244.8	0.002
0.8556	0.020	0.017	250.8	0.002
0.8678	0.020	0.017	256.9	0.002
0.8800	0.020	0.018	263.1	0.002
0.8922	0.020	0.018	269.3	0.002
0.9044	0.020	0.018	275.5	0.002
0.9167	0.020	0.018	281.8	0.002
0.9289	0.020	0.019	288.2	0.002
0.9411	0.020	0.019	294.6	0.002
0.9533	0.020	0.019	301.0	0.002
0.9656	0.020	0.019	307.5	0.002
0.9778	0.020	0.020	314.0	0.002
0.9900	0.020	0.020	320.6	0.002
1.0022	0.020	0.020	327.2	0.002
1.0144	0.020	0.021	333.9	0.002

1.0267	0.020	0.021	340.6	0.002
1.0389	0.020	0.021	347.4	0.002
1.0511	0.020	0.021	354.2	0.002
1.0633	0.020	0.022	361.0	0.002
1.0756	0.020	0.022	367.9	0.002
1.0878	0.020	0.022	374.8	0.002
1.1000	0.020	0.022	381.8	0.002

Bioretention 4

Bottom Length:	10.00 ft.
Bottom Width:	2.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW 12 in/hr
Material thickness of second layer:	1.5
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	0.25
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	12.862
Total Volume Through Riser (ac-ft.):	1.178
Total Volume Through Facility (ac-ft.):	14.04
Percent Infiltrated:	91.61
Total Precip Applied to Facility:	0.96
Total Evap From Facility:	0.401
Underdrain not used	
Discharge Structure	
Riser Height:	1 ft.
Riser Diameter:	18 in.
Orifice 1 Diameter:	0.25 in. Elevation:0 ft.
Element Flows To:	
Outlet 1	Outlet 2

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0129	0.0000	0.0000	0.0000
0.0549	0.0126	0.0000	0.0000	0.0000
0.1099	0.0123	0.0000	0.0000	0.0000
0.1648	0.0119	0.0000	0.0000	0.0000
0.2198	0.0116	0.0001	0.0000	0.0000
0.2747	0.0112	0.0001	0.0000	0.0000
0.3297	0.0109	0.0001	0.0000	0.0000
0.3846	0.0106	0.0001	0.0000	0.0001
0.4396	0.0102	0.0002	0.0000	0.0001
0.4945	0.0099	0.0002	0.0000	0.0002
0.5495	0.0096	0.0003	0.0000	0.0002
0.6044	0.0093	0.0003	0.0000	0.0002
0.6593	0.0090	0.0003	0.0000	0.0002
0.7143	0.0087	0.0004	0.0000	0.0003
0.7692	0.0084	0.0004	0.0000	0.0003
0.8242	0.0081	0.0005	0.0000	0.0003
0.8791	0.0078	0.0006	0.0000	0.0003
0.9341	0.0075	0.0006	0.0000	0.0003
0.9890	0.0072	0.0007	0.0000	0.0004
1.0440	0.0070	0.0008	0.0000	0.0004
1.0989	0.0067	0.0009	0.0000	0.0004
1.1538	0.0064	0.0009	0.0000	0.0004
1.2088	0.0062	0.0010	0.0000	0.0005
1.2637	0.0059	0.0011	0.0000	0.0005
1.3187	0.0057	0.0012	0.0000	0.0005
1.3736	0.0054	0.0013	0.0000	0.0005

1.4286	0.0052	0.0014	0.0000	0.0006
1.4835	0.0050	0.0016	0.0000	0.0006
1.5385	0.0047	0.0017	0.0000	0.0006
1.5934	0.0045	0.0018	0.0000	0.0007
1.6484	0.0043	0.0019	0.0000	0.0007
1.7033	0.0041	0.0020	0.0000	0.0007
1.7582	0.0039	0.0022	0.0000	0.0007
1.8132	0.0037	0.0023	0.0000	0.0008
1.8681	0.0035	0.0024	0.0000	0.0008
1.9231	0.0033	0.0026	0.0000	0.0008
1.9780	0.0031	0.0027	0.0000	0.0009
2.0330	0.0029	0.0029	0.0000	0.0009
2.0879	0.0027	0.0031	0.0000	0.0009
2.1429	0.0026	0.0033	0.0000	0.0010
2.1978	0.0024	0.0034	0.0000	0.0010
2.2527	0.0022	0.0036	0.0000	0.0011
2.3077	0.0021	0.0038	0.0000	0.0011
2.3626	0.0019	0.0040	0.0000	0.0011
2.4176	0.0018	0.0042	0.0000	0.0012
2.4725	0.0016	0.0044	0.0000	0.0012
2.5275	0.0015	0.0047	0.0000	0.0012
2.5824	0.0013	0.0049	0.0000	0.0013
2.6374	0.0012	0.0051	0.0000	0.0013
2.6923	0.0011	0.0054	0.0000	0.0014
2.7473	0.0010	0.0056	0.0000	0.0014
2.8022	0.0009	0.0059	0.0000	0.0015
2.8571	0.0008	0.0062	0.0000	0.0015
2.9121	0.0007	0.0064	0.0000	0.0015
2.9670	0.0006	0.0067	0.0000	0.0016
3.0000	0.0005	0.0069	0.0000	0.0016

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.012856	0.006890	0.0000	0.1658	0.0000
3.0549	0.013222	0.007606	0.0004	0.1658	0.0001
3.1099	0.013592	0.008343	0.0006	0.1765	0.0001
3.1648	0.013968	0.009100	0.0007	0.1876	0.0002
3.2198	0.014349	0.009878	0.0008	0.1991	0.0002
3.2747	0.014735	0.010677	0.0009	0.2109	0.0003
3.3297	0.015125	0.011497	0.0010	0.2232	0.0003
3.3846	0.015521	0.012339	0.0011	0.2360	0.0004
3.4396	0.015922	0.013203	0.0011	0.2491	0.0004
3.4945	0.016327	0.014089	0.0012	0.2627	0.0005
3.5495	0.016738	0.014997	0.0013	0.2717	0.0005
3.6044	0.017154	0.015928	0.0013	0.2759	0.0006
3.6593	0.017574	0.016882	0.0014	0.2801	0.0006
3.7143	0.018000	0.017860	0.0014	0.2843	0.0007
3.7692	0.018431	0.018860	0.0015	0.2885	0.0008
3.8242	0.018866	0.019885	0.0015	0.2928	0.0008
3.8791	0.019307	0.020934	0.0016	0.2970	0.0009
3.9341	0.019753	0.022007	0.0016	0.3012	0.0009
3.9890	0.020203	0.023105	0.0017	0.3054	0.0010
4.0440	0.020659	0.024227	0.1484	0.3096	0.0010
4.0989	0.021119	0.025375	0.4957	0.3138	0.0011
4.1538	0.021585	0.026548	0.9561	0.3180	0.0012
4.2088	0.022055	0.027747	1.4972	0.3222	0.0012
4.2637	0.022531	0.028972	2.0929	0.3264	0.0013
4.3187	0.023012	0.030223	2.7168	0.3306	0.0013

4.3736	0.023497	0.031501	3.3418	0.3348	0.0014
4.4286	0.023988	0.032805	3.9410	0.3390	0.0015
4.4835	0.024483	0.034137	4.4896	0.3432	0.0015
4.5385	0.024984	0.035496	4.9675	0.3474	0.0016
4.5934	0.025489	0.036882	5.3619	0.3516	0.0017
4.6484	0.026000	0.038297	5.6709	0.3558	0.0017
4.7033	0.026515	0.039740	5.9074	0.3601	0.0018
4.7582	0.027035	0.041211	6.1731	0.3643	0.0019
4.8132	0.027561	0.042711	6.3928	0.3685	0.0019
4.8681	0.028091	0.044240	6.6052	0.3727	0.0020
4.9231	0.028627	0.045798	6.8110	0.3769	0.0021
4.9780	0.029167	0.047386	7.0107	0.3811	0.0021
5.0000	0.029385	0.048029	7.2050	0.3828	0.0000

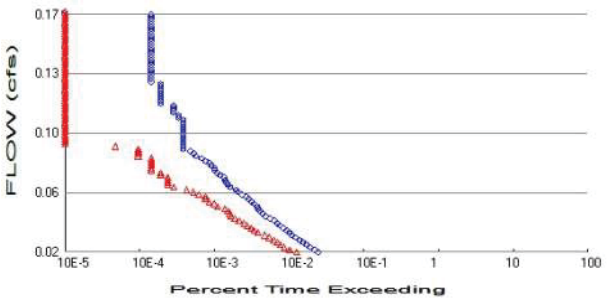
Surface retention 4

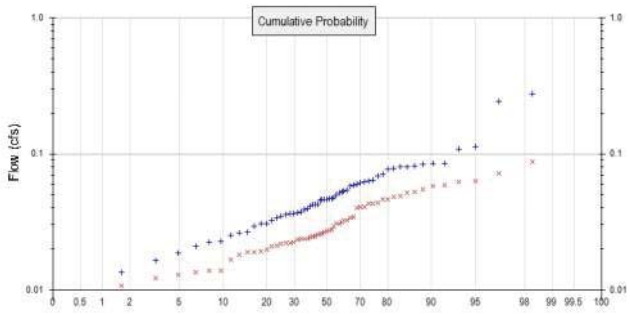
Element Flows To:

Outlet 1	Outlet 2
	Bioretention 4

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.184
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.041
Total Impervious Area: 0.1223

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.045318
5 year	0.075346
10 year	0.099946
25 year	0.136854
50 year	0.168873
100 year	0.205027

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.028571
5 year	0.043584
10 year	0.054348
25 year	0.068773
50 year	0.080067
100 year	0.091803

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.043	0.019
1950	0.032	0.023
1951	0.047	0.021
1952	0.069	0.031
1953	0.046	0.031
1954	0.054	0.046
1955	0.037	0.022
1956	0.077	0.049
1957	0.034	0.027
1958	0.047	0.043

1959	0.022	0.012
1960	0.031	0.022
1961	0.040	0.034
1962	0.043	0.028
1963	0.049	0.029
1964	0.053	0.024
1965	0.046	0.024
1966	0.052	0.026
1967	0.035	0.019
1968	0.085	0.059
1969	0.046	0.051
1970	0.241	0.088
1971	0.027	0.014
1972	0.026	0.020
1973	0.041	0.026
1974	0.063	0.062
1975	0.046	0.018
1976	0.084	0.027
1977	0.021	0.013
1978	0.080	0.044
1979	0.062	0.041
1980	0.036	0.022
1981	0.053	0.040
1982	0.064	0.034
1983	0.077	0.032
1984	0.058	0.019
1985	0.042	0.025
1986	0.023	0.040
1987	0.036	0.027
1988	0.025	0.021
1989	0.059	0.023
1990	0.036	0.014
1991	0.061	0.013
1992	0.037	0.017
1993	0.108	0.043
1994	0.029	0.025
1995	0.047	0.054
1996	0.113	0.063
1997	0.085	0.071
1998	0.071	0.048
1999	0.031	0.052
2000	0.012	0.008
2001	0.016	0.011
2002	0.080	0.024
2003	0.060	0.032
2004	0.013	0.024
2005	0.019	0.030
2006	0.082	0.025
2007	0.039	0.046
2008	0.275	0.058

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.2755	0.0879
2	0.2414	0.0714
3	0.1134	0.0628
4	0.1083	0.0624

5	0.0853	0.0589
6	0.0853	0.0580
7	0.0838	0.0544
8	0.0817	0.0524
9	0.0800	0.0514
10	0.0799	0.0491
11	0.0775	0.0484
12	0.0766	0.0464
13	0.0706	0.0462
14	0.0686	0.0436
15	0.0643	0.0430
16	0.0629	0.0427
17	0.0624	0.0408
18	0.0614	0.0405
19	0.0596	0.0401
20	0.0590	0.0342
21	0.0575	0.0338
22	0.0539	0.0324
23	0.0530	0.0323
24	0.0527	0.0314
25	0.0519	0.0306
26	0.0493	0.0305
27	0.0472	0.0293
28	0.0470	0.0279
29	0.0469	0.0274
30	0.0462	0.0269
31	0.0461	0.0266
32	0.0461	0.0259
33	0.0456	0.0257
34	0.0426	0.0254
35	0.0426	0.0246
36	0.0421	0.0246
37	0.0413	0.0243
38	0.0395	0.0238
39	0.0390	0.0237
40	0.0373	0.0237
41	0.0370	0.0234
42	0.0365	0.0225
43	0.0364	0.0222
44	0.0360	0.0220
45	0.0349	0.0218
46	0.0339	0.0212
47	0.0325	0.0209
48	0.0307	0.0197
49	0.0307	0.0192
50	0.0292	0.0190
51	0.0267	0.0189
52	0.0261	0.0181
53	0.0252	0.0167
54	0.0228	0.0139
55	0.0224	0.0138
56	0.0207	0.0135
57	0.0187	0.0129
58	0.0165	0.0122
59	0.0134	0.0107
60	0.0124	0.0082

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0227	517	264	51	Pass
0.0241	460	214	46	Pass
0.0256	403	182	45	Pass
0.0271	358	159	44	Pass
0.0286	321	145	45	Pass
0.0300	292	131	44	Pass
0.0315	255	114	44	Pass
0.0330	227	99	43	Pass
0.0345	213	80	37	Pass
0.0360	195	71	36	Pass
0.0374	177	65	36	Pass
0.0389	159	58	36	Pass
0.0404	146	52	35	Pass
0.0419	132	45	34	Pass
0.0433	117	39	33	Pass
0.0448	102	35	34	Pass
0.0463	93	34	36	Pass
0.0478	85	32	37	Pass
0.0492	81	29	35	Pass
0.0507	78	23	29	Pass
0.0522	72	21	29	Pass
0.0537	66	18	27	Pass
0.0552	61	16	26	Pass
0.0566	56	16	28	Pass
0.0581	49	13	26	Pass
0.0596	43	11	25	Pass
0.0611	41	9	21	Pass
0.0625	34	6	17	Pass
0.0640	32	5	15	Pass
0.0655	30	5	16	Pass
0.0670	29	5	17	Pass
0.0684	28	5	17	Pass
0.0699	25	4	16	Pass
0.0714	23	4	17	Pass
0.0729	21	3	14	Pass
0.0744	21	3	14	Pass
0.0758	19	3	15	Pass
0.0773	18	3	16	Pass
0.0788	16	3	18	Pass
0.0803	14	3	21	Pass
0.0817	12	2	16	Pass
0.0832	11	2	18	Pass
0.0847	10	2	20	Pass
0.0862	8	2	25	Pass
0.0876	8	1	12	Pass
0.0891	8	0	0	Pass
0.0906	8	0	0	Pass
0.0921	8	0	0	Pass
0.0936	8	0	0	Pass
0.0950	8	0	0	Pass
0.0965	8	0	0	Pass
0.0980	8	0	0	Pass
0.0995	8	0	0	Pass

0.1009	8	0	0	Pass
0.1024	8	0	0	Pass
0.1039	8	0	0	Pass
0.1054	7	0	0	Pass
0.1068	7	0	0	Pass
0.1083	6	0	0	Pass
0.1098	6	0	0	Pass
0.1113	6	0	0	Pass
0.1128	6	0	0	Pass
0.1142	4	0	0	Pass
0.1157	4	0	0	Pass
0.1172	4	0	0	Pass
0.1187	4	0	0	Pass
0.1201	4	0	0	Pass
0.1216	4	0	0	Pass
0.1231	4	0	0	Pass
0.1246	4	0	0	Pass
0.1260	4	0	0	Pass
0.1275	3	0	0	Pass
0.1290	3	0	0	Pass
0.1305	3	0	0	Pass
0.1320	3	0	0	Pass
0.1334	3	0	0	Pass
0.1349	3	0	0	Pass
0.1364	3	0	0	Pass
0.1379	3	0	0	Pass
0.1393	3	0	0	Pass
0.1408	3	0	0	Pass
0.1423	3	0	0	Pass
0.1438	3	0	0	Pass
0.1452	3	0	0	Pass
0.1467	3	0	0	Pass
0.1482	3	0	0	Pass
0.1497	3	0	0	Pass
0.1512	3	0	0	Pass
0.1526	3	0	0	Pass
0.1541	3	0	0	Pass
0.1556	3	0	0	Pass
0.1571	3	0	0	Pass
0.1585	3	0	0	Pass
0.1600	3	0	0	Pass
0.1615	3	0	0	Pass
0.1630	3	0	0	Pass
0.1644	3	0	0	Pass
0.1659	3	0	0	Pass
0.1674	3	0	0	Pass
0.1689	3	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Dispersion Trench 4 POC	☐	9.72			☐	91.82			
retention 4 POC	☐	12.78			☐	91.61			
Total Volume Infiltrated		22.50	0.00	0.00		91.70	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

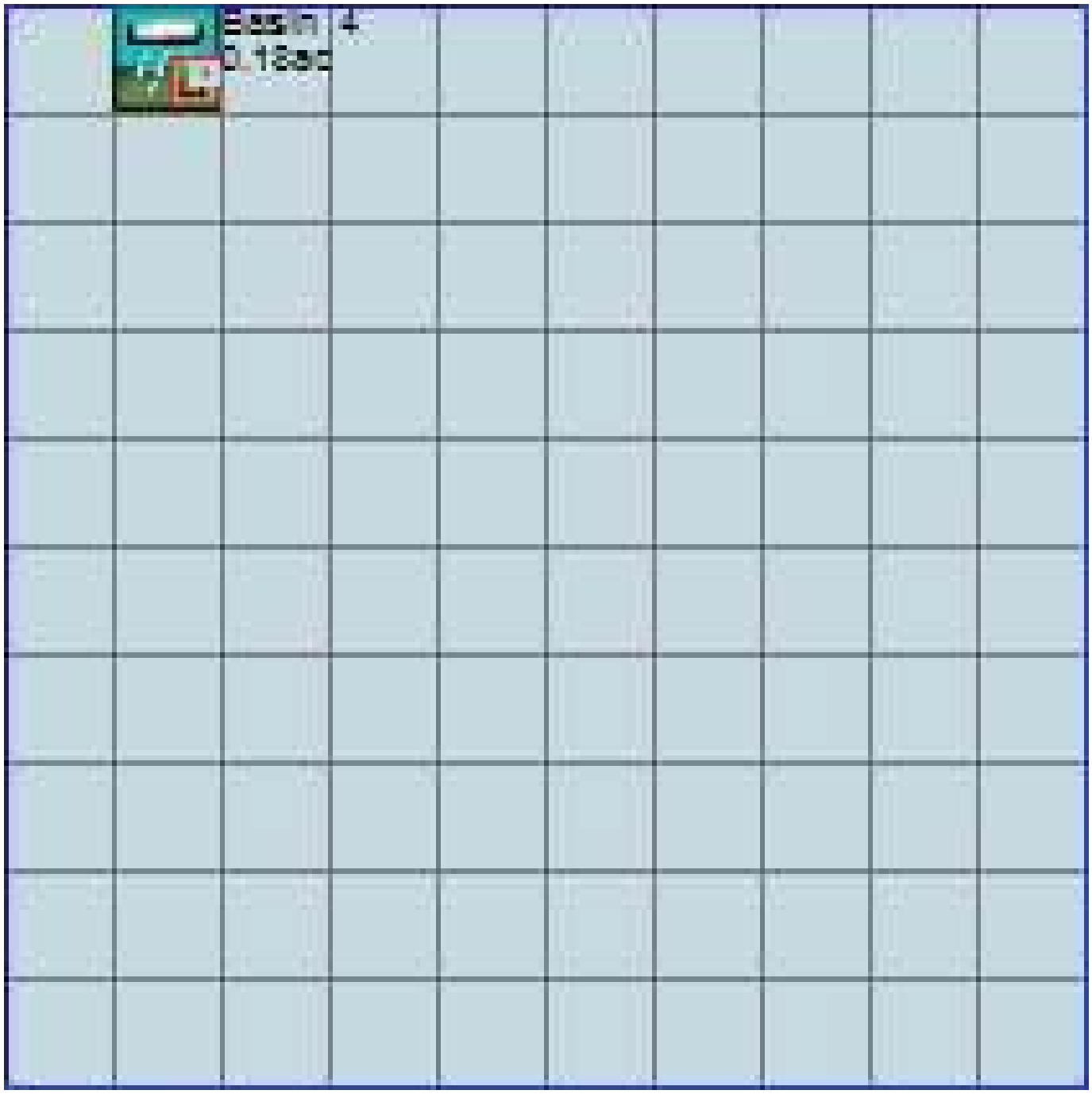
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 4 - bio.wdm
MESSU       25   PreSRD-33 Basin 4 - bio.MES
            27   PreSRD-33 Basin 4 - bio.L61
            28   PreSRD-33 Basin 4 - bio.L62
            30   POCSRD-33 Basin 4 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      30
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #          K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   30      C/IMP DISP /STEE       1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   30         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   30         0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   30              0       4.5      0.03       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   30             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   30          0.1      0.15      0.25         6       0.3      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   30             0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                  in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  30                       0.184     COPY   501     12
PERLND  30                       0.184     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.8             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 4 - bio.wdm
MESSU       25   MitSRD-33 Basin 4 - bio.MES
            27   MitSRD-33 Basin 4 - bio.L61
            28   MitSRD-33 Basin 4 - bio.L62
            30   POCSRD-33 Basin 4 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      IMPLND        1
      IMPLND        4
      PERLND       17
      RCHRES        1
      GENER         3
      RCHRES        2
      RCHRES        3
      COPY          1
      COPY        501
      COPY        601
      DISPLY        1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Dispersion Trench 4         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  601          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    3         24
  END OPCODE
  PARM
    #    #          K ***
    3              0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   17     C, Lawn, Mod             1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
```

```
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   17         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   17         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   17         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -   # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   17              0       4.5      0.03       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -   # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   17              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -   #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   17           0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -   # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   17              0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -   #                     User  t-series Engl Metr ***
                                      in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP  VRS  VNN RTLI     ***
```

```
    1          0     0     0     0     0
    4          0     0     0     0     0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >       IWATER input info: Part 2          ***
    # -  # ***  LSUR      SLSUR      NSUR      RETSC
    1             400       0.01       0.1        0.1
    4             400       0.01       0.1        0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >       IWATER input info: Part 3          ***
    # -  # ***PETMAX    PETMIN
    1              0          0
    4              0          0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS       SURS
    1              0          0
    4              0          0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK    ***
<Name>   #                  <-factor->     <Name>   #   Tbl#    ***
driveway***
IMPLND   1                       0.0683     RCHRES   2      5
roof***
IMPLND   4                        0.054     RCHRES   1      5
Basin  4***
PERLND  17                        0.041     COPY   501     12
PERLND  17                        0.041     COPY   601     12
PERLND  17                        0.041     COPY   501     13
PERLND  17                        0.041     COPY   601     13

******Routing******
IMPLND   1                       0.0683     COPY     1     15
IMPLND   4                        0.054     COPY     1     15
RCHRES   2                            1     RCHRES   3      8
RCHRES   1                            1     COPY   501     17
RCHRES   3                            1     COPY   501     17
RCHRES   2                            1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    3 OUTPUT TIMSER      .0011111     RCHRES   2     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                        in  out                             ***
    1     Dispersion Trenc-007    2    1    1    1   28    0    1
    2     Surface retentio-010    3    1    1    1   28    0    1
    3     Bioretention  4         2    1    1    1   28    0    1
  END GEN-INFO
```

```
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -   # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -   # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -   #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2       0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -   #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -   # ***   VOL    Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><---->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol3   RCHRES   3 VOL              4
  UVQUAN v2m3   GLOBAL     WORKSP  2        3
  UVQUAN vpo3   GLOBAL     WORKSP  3        3
  UVQUAN v2d3   GENER    3 K       1        3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <--->    <----><-><-><-> <---> <--->
  UVNAME  v2m3    1 WORKSP  2         1.0 QUAN
  UVNAME  vpo3    1 WORKSP  3         1.0 QUAN
  UVNAME  v2d3    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   3                               v2m3            =  277.
*** Compute remaining available pore space
  GENER   3                               vpo3            =  v2m3
  GENER   3                               vpo3           -=  vol3
```

```
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo3 < 0.0) THEN
  GENER   3                                vpo3            =  0.0
END IF
*** Infiltration volume
  GENER   3                                v2d3            =  vpo3
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   90    5
     Depth       Area     Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)    (acres) (acre-ft)    (cfs)      (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.020661  0.000000  0.000000  0.000000
  0.012222  0.020661  0.000253  0.000000  0.002604
  0.024444  0.020661  0.000505  0.000000  0.002604
  0.036667  0.020661  0.000758  0.000000  0.002604
  0.048889  0.020661  0.001010  0.000000  0.002604
  0.061111  0.020661  0.001263  0.000000  0.002604
  0.073333  0.020661  0.001515  0.000000  0.002604
  0.085556  0.020661  0.001768  0.000000  0.002604
  0.097778  0.020661  0.002020  0.000000  0.002604
  0.110000  0.020661  0.002273  0.382386  0.002604
  0.122222  0.020661  0.002525  1.266698  0.002604
  0.134444  0.020661  0.002778  2.444334  0.002604
  0.146667  0.020661  0.003030  3.854625  0.002604
  0.158889  0.020661  0.003283  5.464020  0.002604
  0.171111  0.020661  0.003535  7.250348  0.002604
  0.183333  0.020661  0.003788  9.197530  0.002604
  0.195556  0.020661  0.004040  11.29321  0.002604
  0.207778  0.020661  0.004293  13.52752  0.002604
  0.220000  0.020661  0.004545  15.89230  0.002604
  0.232222  0.020661  0.004798  18.38072  0.002604
  0.244444  0.020661  0.005051  20.98688  0.002604
  0.256667  0.020661  0.005303  23.70569  0.002604
  0.268889  0.020661  0.005556  26.53263  0.002604
  0.281111  0.020661  0.005808  29.46372  0.002604
  0.293333  0.020661  0.006061  32.49535  0.002604
  0.305556  0.020661  0.006313  35.62429  0.002604
  0.317778  0.020661  0.006566  38.84760  0.002604
  0.330000  0.020661  0.006818  42.16256  0.002604
  0.342222  0.020661  0.007071  45.56672  0.002604
  0.354444  0.020661  0.007323  49.05778  0.002604
  0.366667  0.020661  0.007576  52.63362  0.002604
  0.378889  0.020661  0.007828  56.29226  0.002604
  0.391111  0.020661  0.008081  60.03187  0.002604
  0.403333  0.020661  0.008333  63.85073  0.002604
  0.415556  0.020661  0.008586  67.74720  0.002604
  0.427778  0.020661  0.008838  71.71978  0.002604
  0.440000  0.020661  0.009091  75.76701  0.002604
  0.452222  0.020661  0.009343  79.88755  0.002604
  0.464444  0.020661  0.009596  84.08010  0.002604
  0.476667  0.020661  0.009848  88.34344  0.002604
  0.488889  0.020661  0.010101  92.67641  0.002604
  0.501111  0.020661  0.010354  97.07791  0.002604
  0.513333  0.020661  0.010606  101.5469  0.002604
  0.525556  0.020661  0.010859  106.0823  0.002604
  0.537778  0.020661  0.011111  110.6832  0.002604
  0.550000  0.020661  0.011364  115.3486  0.002604
  0.562222  0.020661  0.011616  120.0778  0.002604
  0.574444  0.020661  0.011869  124.8698  0.002604
  0.586667  0.020661  0.012121  129.7238  0.002604
  0.598889  0.020661  0.012374  134.6390  0.002604
  0.611111  0.020661  0.012626  139.6146  0.002604
  0.623333  0.020661  0.012879  144.6500  0.002604
  0.635556  0.020661  0.013131  149.7445  0.002604
  0.647778  0.020661  0.013384  154.8973  0.002604
  0.660000  0.020661  0.013636  160.1077  0.002604
  0.672222  0.020661  0.013889  165.3753  0.002604
  0.684444  0.020661  0.014141  170.6992  0.002604
  0.696667  0.020661  0.014394  176.0791  0.002604
```

```
0.708889  0.020661  0.014646  181.5141  0.002604
0.721111  0.020661  0.014899  187.0039  0.002604
0.733333  0.020661  0.015152  192.5479  0.002604
0.745556  0.020661  0.015404  198.1455  0.002604
0.757778  0.020661  0.015657  203.7962  0.002604
0.770000  0.020661  0.015909  209.4995  0.002604
0.782222  0.020661  0.016162  215.2549  0.002604
0.794444  0.020661  0.016414  221.0620  0.002604
0.806667  0.020661  0.016667  226.9204  0.002604
0.818889  0.020661  0.016919  232.8295  0.002604
0.831111  0.020661  0.017172  238.7889  0.002604
0.843333  0.020661  0.017424  244.7982  0.002604
0.855556  0.020661  0.017677  250.8570  0.002604
0.867778  0.020661  0.017929  256.9648  0.002604
0.880000  0.020661  0.018182  263.1214  0.002604
0.892222  0.020661  0.018434  269.3262  0.002604
0.904444  0.020661  0.018687  275.5790  0.002604
0.916667  0.020661  0.018939  281.8793  0.002604
0.928889  0.020661  0.019192  288.2268  0.002604
0.941111  0.020661  0.019444  294.6212  0.002604
0.953333  0.020661  0.019697  301.0620  0.002604
0.965556  0.020661  0.019949  307.5490  0.002604
0.977778  0.020661  0.020202  314.0818  0.002604
0.990000  0.020661  0.020455  320.6602  0.002604
1.002222  0.020661  0.020707  327.2837  0.002604
1.014444  0.020661  0.020960  333.9521  0.002604
1.026667  0.020661  0.021212  340.6651  0.002604
1.038889  0.020661  0.021465  347.4224  0.002604
1.051111  0.020661  0.021717  354.2236  0.002604
1.063333  0.020661  0.021970  361.0686  0.002604
1.075556  0.020661  0.022222  367.9569  0.002604
1.087778  0.020661  0.022475  374.8884  0.002604
END FTABLE  1
FTABLE      3
 56    5
   Depth       Area      Volume   Outflow1   Outflow2  Velocity  Travel Time***
    (ft)    (acres)  (acre-ft)     (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.012856  0.000000  0.000000  0.000000
0.054945  0.012639  0.000013  0.000000  0.000000
0.109890  0.012281  0.000028  0.000000  0.000000
0.164835  0.011928  0.000045  0.000000  0.000001
0.219780  0.011580  0.000066  0.000000  0.000005
0.274725  0.011238  0.000089  0.000000  0.000013
0.329670  0.010900  0.000115  0.000000  0.000029
0.384615  0.010567  0.000144  0.000000  0.000055
0.439560  0.010239  0.000176  0.000000  0.000095
0.494505  0.009916  0.000212  0.000000  0.000153
0.549451  0.009598  0.000250  0.000000  0.000204
0.604396  0.009285  0.000293  0.000000  0.000222
0.659341  0.008978  0.000339  0.000000  0.000241
0.714286  0.008675  0.000389  0.000000  0.000260
0.769231  0.008377  0.000443  0.000000  0.000280
0.824176  0.008084  0.000500  0.000000  0.000300
0.879121  0.007796  0.000562  0.000000  0.000322
0.934066  0.007513  0.000629  0.000000  0.000343
0.989011  0.007235  0.000699  0.000000  0.000366
1.043956  0.006962  0.000775  0.000000  0.000389
1.098901  0.006694  0.000854  0.000000  0.000413
1.153846  0.006431  0.000939  0.000000  0.000437
1.208791  0.006173  0.001029  0.000000  0.000462
1.263736  0.005920  0.001123  0.000000  0.000488
1.318681  0.005672  0.001223  0.000000  0.000514
1.373626  0.005429  0.001328  0.000000  0.000541
1.428571  0.005191  0.001439  0.000000  0.000568
1.483516  0.004958  0.001555  0.000000  0.000596
1.538462  0.004730  0.001665  0.000000  0.000625
1.593407  0.004507  0.001781  0.000000  0.000654
1.648352  0.004289  0.001902  0.000000  0.000684
1.703297  0.004076  0.002029  0.000000  0.000715
1.758242  0.003868  0.002161  0.000000  0.000746
```

```
  1.813187  0.003665  0.002299  0.000000  0.000778
  1.868132  0.003467  0.002442  0.000000  0.000811
  1.923077  0.003274  0.002592  0.000000  0.000844
  1.978022  0.003085  0.002748  0.000000  0.000878
  2.032967  0.002902  0.002910  0.000000  0.000912
  2.087912  0.002724  0.003078  0.000000  0.000947
  2.142857  0.002551  0.003252  0.000000  0.000983
  2.197802  0.002383  0.003433  0.000000  0.001019
  2.252747  0.002220  0.003621  0.000000  0.001056
  2.307692  0.002061  0.003815  0.000000  0.001093
  2.362637  0.001908  0.004017  0.000000  0.001132
  2.417582  0.001760  0.004225  0.000000  0.001170
  2.472527  0.001617  0.004440  0.000000  0.001210
  2.527473  0.001479  0.004663  0.000000  0.001250
  2.582418  0.001345  0.004892  0.000000  0.001291
  2.637363  0.001217  0.005130  0.000000  0.001332
  2.692308  0.001094  0.005374  0.000000  0.001374
  2.747253  0.000976  0.005627  0.000000  0.001416
  2.802198  0.000862  0.005887  0.000000  0.001460
  2.857143  0.000754  0.006155  0.000000  0.001503
  2.912088  0.000651  0.006431  0.000000  0.001548
  2.967033  0.000552  0.006715  0.000000  0.001593
  3.000000  0.000459  0.014468  0.000000  0.001620
  END FTABLE  3
  FTABLE      2
   38    6
     Depth      Area    Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)   (acres) (acre-ft)    (cfs)     (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.000459  0.000000  0.000000  0.000000  0.000046
  0.054945  0.013222  0.000716  0.000398  0.165842  0.000046
  0.109890  0.013592  0.001453  0.000562  0.176517  0.000093
  0.164835  0.013968  0.002210  0.000689  0.187587  0.000140
  0.219780  0.014349  0.002988  0.000795  0.199060  0.000188
  0.274725  0.014735  0.003787  0.000889  0.210942  0.000237
  0.329670  0.015125  0.004607  0.000974  0.223239  0.000286
  0.384615  0.015521  0.005449  0.001052  0.235959  0.000336
  0.439560  0.015922  0.006313  0.001124  0.249108  0.000386
  0.494505  0.016327  0.007199  0.001193  0.262692  0.000438
  0.549451  0.016738  0.008108  0.001257  0.271721  0.000489
  0.604396  0.017154  0.009039  0.001319  0.275927  0.000542
  0.659341  0.017574  0.009993  0.001377  0.280133  0.000595
  0.714286  0.018000  0.010970  0.001433  0.284340  0.000648
  0.769231  0.018431  0.011971  0.001488  0.288546  0.000703
  0.824176  0.018866  0.012996  0.001540  0.292752  0.000758
  0.879121  0.019307  0.014044  0.001590  0.296958  0.000813
  0.934066  0.019753  0.015117  0.001639  0.301165  0.000869
  0.989011  0.020203  0.016215  0.001687  0.305371  0.000926
  1.043956  0.020659  0.017338  0.148355  0.309577  0.000983
  1.098901  0.021119  0.018485  0.495727  0.313783  0.001042
  1.153846  0.021585  0.019659  0.956065  0.317989  0.001100
  1.208791  0.022055  0.020857  1.497247  0.322196  0.001160
  1.263736  0.022531  0.022082  2.092933  0.326402  0.001219
  1.318681  0.023012  0.023333  2.716801  0.330608  0.001280
  1.373626  0.023497  0.024611  3.341773  0.334814  0.001341
  1.428571  0.023988  0.025916  3.940977  0.339020  0.001403
  1.483516  0.024483  0.027247  4.489625  0.343227  0.001466
  1.538462  0.024984  0.028606  4.967493  0.347433  0.001529
  1.593407  0.025489  0.029993  5.361875  0.351639  0.001592
  1.648352  0.026000  0.031407  5.670927  0.355845  0.001657
  1.703297  0.026515  0.032850  5.907350  0.360051  0.001722
  1.758242  0.027035  0.034321  6.173112  0.364258  0.001787
  1.813187  0.027561  0.035821  6.392819  0.368464  0.001853
  1.868132  0.028091  0.037350  6.605221  0.372670  0.001920
  1.923077  0.028627  0.038908  6.811002  0.376876  0.001988
  1.978022  0.029167  0.040496  7.010745  0.381082  0.002056
  2.000000  0.029385  0.041139  7.204952  0.382765  0.002083
  END FTABLE  2
END FTABLES
```

```
EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.3            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.3            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.8            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8            IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1.3            RCHRES   2     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.8            RCHRES   3     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL       REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL       REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL       REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL       REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1008 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1009 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1010 FLOW     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1011 STAG     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1012 STAG     ENGL       REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1013 FLOW     ENGL       REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO     0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2               RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO       0.083333    COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333    COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333    COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1               COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

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WWHM2012

PROJECT REPORT

General Model Information

Project Name:	SRD-33 Basin 5 - bio
Site Name:	Columbia River Homes
Site Address:	
City:	
Report Date:	5/10/2019
Gage:	Troutdale
Data Start:	1948/10/01
Data End:	2008/09/30
Timestep:	15 Minute
Precip Scale:	1.370
Version Date:	2017/04/14
Version:	4.2.13

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 5

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C IMP DISP STEE	0.205
Pervious Total	0.205
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.205

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

driveway

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROADS FLAT	0.0678
Impervious Total	0.0678
Basin Total	0.0678

Element Flows To:

Surface	Interflow	Groundwater
Surface retention 5	Surface retention 5	

roof

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	0.0527
Impervious Total	0.0527
Basin Total	0.0527

Element Flows To:

Surface	Interflow	Groundwater
Dispersion Trench 5	Dispersion Trench 5	

Basin 5

Bypass:	Yes
GroundWater:	No
Pervious Land Use	acre
C, Lawn, Mod	0.0638
Pervious Total	0.0638
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.0638

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Dispersion Trench 5

Bottom Length: 36.00 ft.
Bottom Width: 25.00 ft.
Depth: 1.1 ft.
Volume at riser head: 0.0023 acre-feet.
Infiltration On
Infiltration rate: 0.5
Infiltration safety factor: 0.25
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 10.118
Total Volume Through Riser (ac-ft.): 0.957
Total Volume Through Facility (ac-ft.): 11.075
Percent Infiltrated: 91.36
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Side slope 1: 0 To 1
Side slope 2: 0 To 1
Side slope 3: 0 To 1
Side slope 4: 0 To 1
Discharge Structure
Riser Height: 0.1 ft.
Riser Diameter: 432 in.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.020	0.000	0.000	0.000
0.0122	0.020	0.000	0.000	0.002
0.0244	0.020	0.000	0.000	0.002
0.0367	0.020	0.000	0.000	0.002
0.0489	0.020	0.001	0.000	0.002
0.0611	0.020	0.001	0.000	0.002
0.0733	0.020	0.001	0.000	0.002
0.0856	0.020	0.001	0.000	0.002
0.0978	0.020	0.002	0.000	0.002
0.1100	0.020	0.002	0.382	0.002
0.1222	0.020	0.002	1.266	0.002
0.1344	0.020	0.002	2.444	0.002
0.1467	0.020	0.003	3.854	0.002
0.1589	0.020	0.003	5.464	0.002
0.1711	0.020	0.003	7.250	0.002
0.1833	0.020	0.003	9.197	0.002
0.1956	0.020	0.004	11.29	0.002
0.2078	0.020	0.004	13.52	0.002
0.2200	0.020	0.004	15.89	0.002
0.2322	0.020	0.004	18.38	0.002
0.2444	0.020	0.005	20.98	0.002
0.2567	0.020	0.005	23.70	0.002
0.2689	0.020	0.005	26.53	0.002
0.2811	0.020	0.005	29.46	0.002
0.2933	0.020	0.006	32.49	0.002
0.3056	0.020	0.006	35.62	0.002

0.3178	0.020	0.006	38.84	0.002
0.3300	0.020	0.006	42.16	0.002
0.3422	0.020	0.007	45.56	0.002
0.3544	0.020	0.007	49.05	0.002
0.3667	0.020	0.007	52.63	0.002
0.3789	0.020	0.007	56.29	0.002
0.3911	0.020	0.008	60.03	0.002
0.4033	0.020	0.008	63.85	0.002
0.4156	0.020	0.008	67.74	0.002
0.4278	0.020	0.008	71.72	0.002
0.4400	0.020	0.009	75.76	0.002
0.4522	0.020	0.009	79.88	0.002
0.4644	0.020	0.009	84.08	0.002
0.4767	0.020	0.009	88.34	0.002
0.4889	0.020	0.010	92.67	0.002
0.5011	0.020	0.010	97.07	0.002
0.5133	0.020	0.010	101.5	0.002
0.5256	0.020	0.010	106.0	0.002
0.5378	0.020	0.011	110.6	0.002
0.5500	0.020	0.011	115.3	0.002
0.5622	0.020	0.011	120.0	0.002
0.5744	0.020	0.011	124.8	0.002
0.5867	0.020	0.012	129.7	0.002
0.5989	0.020	0.012	134.6	0.002
0.6111	0.020	0.012	139.6	0.002
0.6233	0.020	0.012	144.6	0.002
0.6356	0.020	0.013	149.7	0.002
0.6478	0.020	0.013	154.9	0.002
0.6600	0.020	0.013	160.1	0.002
0.6722	0.020	0.013	165.3	0.002
0.6844	0.020	0.014	170.7	0.002
0.6967	0.020	0.014	176.0	0.002
0.7089	0.020	0.014	181.5	0.002
0.7211	0.020	0.014	187.0	0.002
0.7333	0.020	0.015	192.5	0.002
0.7456	0.020	0.015	198.1	0.002
0.7578	0.020	0.015	203.8	0.002
0.7700	0.020	0.015	209.5	0.002
0.7822	0.020	0.016	215.2	0.002
0.7944	0.020	0.016	221.0	0.002
0.8067	0.020	0.016	226.9	0.002
0.8189	0.020	0.016	232.8	0.002
0.8311	0.020	0.017	238.7	0.002
0.8433	0.020	0.017	244.8	0.002
0.8556	0.020	0.017	250.8	0.002
0.8678	0.020	0.017	256.9	0.002
0.8800	0.020	0.018	263.1	0.002
0.8922	0.020	0.018	269.3	0.002
0.9044	0.020	0.018	275.5	0.002
0.9167	0.020	0.018	281.8	0.002
0.9289	0.020	0.019	288.2	0.002
0.9411	0.020	0.019	294.6	0.002
0.9533	0.020	0.019	301.0	0.002
0.9656	0.020	0.019	307.5	0.002
0.9778	0.020	0.020	314.0	0.002
0.9900	0.020	0.020	320.6	0.002
1.0022	0.020	0.020	327.2	0.002
1.0144	0.020	0.021	333.9	0.002

1.0267	0.020	0.021	340.6	0.002
1.0389	0.020	0.021	347.4	0.002
1.0511	0.020	0.021	354.2	0.002
1.0633	0.020	0.022	361.0	0.002
1.0756	0.020	0.022	367.9	0.002
1.0878	0.020	0.022	374.8	0.002
1.1000	0.020	0.022	381.8	0.002

Bioretention 5

Bottom Length:	11.00 ft.
Bottom Width:	2.00 ft.
Material thickness of first layer:	1.5
Material type for first layer:	SMMWW 12 in/hr
Material thickness of second layer:	1.5
Material type for second layer:	GRAVEL
Material thickness of third layer:	0
Material type for third layer:	GRAVEL
Infiltration On	
Infiltration rate:	0.5
Infiltration safety factor:	0.25
Wetted surface area On	
Total Volume Infiltrated (ac-ft.):	13.617
Total Volume Through Riser (ac-ft.):	1.254
Total Volume Through Facility (ac-ft.):	14.871
Percent Infiltrated:	91.57
Total Precip Applied to Facility:	1.069
Total Evap From Facility:	0.429

Underdrain not used

Discharge Structure

Riser Height:	1 ft.		
Riser Diameter:	18 in.		
Orifice 1 Diameter:	0.25 in.	Elevation:	0 ft.

Element Flows To:

Outlet 1 Outlet 2

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.0133	0.0000	0.0000	0.0000
0.0549	0.0131	0.0000	0.0000	0.0000
0.1099	0.0127	0.0000	0.0000	0.0000
0.1648	0.0124	0.0000	0.0000	0.0000
0.2198	0.0120	0.0001	0.0000	0.0000
0.2747	0.0117	0.0001	0.0000	0.0000
0.3297	0.0113	0.0001	0.0000	0.0000
0.3846	0.0110	0.0002	0.0000	0.0001
0.4396	0.0106	0.0002	0.0000	0.0001
0.4945	0.0103	0.0002	0.0000	0.0002
0.5495	0.0100	0.0003	0.0000	0.0002
0.6044	0.0097	0.0003	0.0000	0.0002
0.6593	0.0093	0.0004	0.0000	0.0003
0.7143	0.0090	0.0004	0.0000	0.0003
0.7692	0.0087	0.0005	0.0000	0.0003
0.8242	0.0084	0.0005	0.0000	0.0003
0.8791	0.0081	0.0006	0.0000	0.0003
0.9341	0.0078	0.0007	0.0000	0.0004
0.9890	0.0076	0.0008	0.0000	0.0004
1.0440	0.0073	0.0008	0.0000	0.0004
1.0989	0.0070	0.0009	0.0000	0.0004
1.1538	0.0067	0.0010	0.0000	0.0005
1.2088	0.0065	0.0011	0.0000	0.0005
1.2637	0.0062	0.0012	0.0000	0.0005
1.3187	0.0060	0.0013	0.0000	0.0005
1.3736	0.0057	0.0014	0.0000	0.0006

1.4286	0.0055	0.0015	0.0000	0.0006
1.4835	0.0052	0.0017	0.0000	0.0006
1.5385	0.0050	0.0018	0.0000	0.0007
1.5934	0.0047	0.0019	0.0000	0.0007
1.6484	0.0045	0.0020	0.0000	0.0007
1.7033	0.0043	0.0022	0.0000	0.0008
1.7582	0.0041	0.0023	0.0000	0.0008
1.8132	0.0039	0.0024	0.0000	0.0008
1.8681	0.0037	0.0026	0.0000	0.0008
1.9231	0.0035	0.0027	0.0000	0.0009
1.9780	0.0033	0.0029	0.0000	0.0009
2.0330	0.0031	0.0031	0.0000	0.0010
2.0879	0.0029	0.0033	0.0000	0.0010
2.1429	0.0027	0.0034	0.0000	0.0010
2.1978	0.0025	0.0036	0.0000	0.0011
2.2527	0.0024	0.0038	0.0000	0.0011
2.3077	0.0022	0.0040	0.0000	0.0011
2.3626	0.0020	0.0042	0.0000	0.0012
2.4176	0.0019	0.0044	0.0000	0.0012
2.4725	0.0017	0.0047	0.0000	0.0013
2.5275	0.0016	0.0049	0.0000	0.0013
2.5824	0.0015	0.0051	0.0000	0.0013
2.6374	0.0013	0.0054	0.0000	0.0014
2.6923	0.0012	0.0056	0.0000	0.0014
2.7473	0.0011	0.0059	0.0000	0.0015
2.8022	0.0009	0.0062	0.0000	0.0015
2.8571	0.0008	0.0065	0.0000	0.0016
2.9121	0.0007	0.0067	0.0000	0.0016
2.9670	0.0006	0.0070	0.0000	0.0017
3.0000	0.0005	0.0072	0.0000	0.0017

Bioretention Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infilt(cfs)
3.0000	0.013315	0.007213	0.0000	0.1717	0.0000
3.0549	0.013688	0.007955	0.0004	0.1717	0.0001
3.1099	0.014067	0.008718	0.0006	0.1827	0.0001
3.1648	0.014450	0.009501	0.0007	0.1941	0.0002
3.2198	0.014838	0.010306	0.0008	0.2058	0.0002
3.2747	0.015232	0.011132	0.0009	0.2181	0.0003
3.3297	0.015630	0.011980	0.0010	0.2307	0.0003
3.3846	0.016033	0.012849	0.0011	0.2437	0.0004
3.4396	0.016441	0.013742	0.0011	0.2572	0.0004
3.4945	0.016855	0.014656	0.0012	0.2712	0.0005
3.5495	0.017273	0.015594	0.0013	0.2856	0.0006
3.6044	0.017696	0.016555	0.0013	0.3004	0.0006
3.6593	0.018124	0.017539	0.0014	0.3081	0.0007
3.7143	0.018558	0.018546	0.0014	0.3128	0.0007
3.7692	0.018996	0.019578	0.0015	0.3174	0.0008
3.8242	0.019439	0.020634	0.0015	0.3220	0.0008
3.8791	0.019887	0.021714	0.0016	0.3267	0.0009
3.9341	0.020340	0.022819	0.0016	0.3313	0.0009
3.9890	0.020798	0.023950	0.0017	0.3359	0.0010
4.0440	0.021262	0.025105	0.1484	0.3405	0.0011
4.0989	0.021730	0.026286	0.4957	0.3452	0.0011
4.1538	0.022203	0.027493	0.9561	0.3498	0.0012
4.2088	0.022681	0.028726	1.4972	0.3544	0.0012
4.2637	0.023164	0.029986	2.0929	0.3590	0.0013
4.3187	0.023652	0.031272	2.7168	0.3637	0.0014

4.3736	0.024145	0.032585	3.3418	0.3683	0.0014
4.4286	0.024643	0.033925	3.9410	0.3729	0.0015
4.4835	0.025147	0.035293	4.4896	0.3775	0.0016
4.5385	0.025655	0.036689	4.9675	0.3822	0.0016
4.5934	0.026168	0.038113	5.3619	0.3868	0.0017
4.6484	0.026686	0.039565	5.6709	0.3914	0.0018
4.7033	0.027209	0.041045	5.9074	0.3961	0.0018
4.7582	0.027737	0.042555	6.1731	0.4007	0.0019
4.8132	0.028270	0.044093	6.3928	0.4053	0.0020
4.8681	0.028808	0.045661	6.6052	0.4099	0.0020
4.9231	0.029351	0.047259	6.8110	0.4146	0.0021
4.9780	0.029899	0.048887	7.0107	0.4192	0.0021
5.0000	0.030119	0.049546	7.2050	0.4210	0.0000

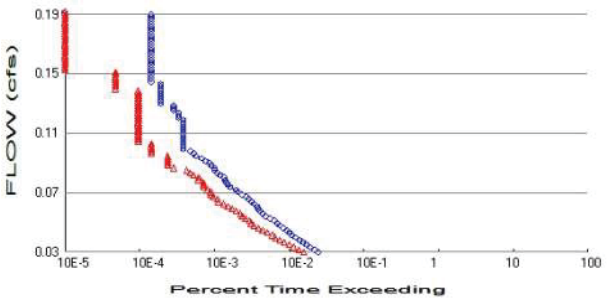
Surface retention 5

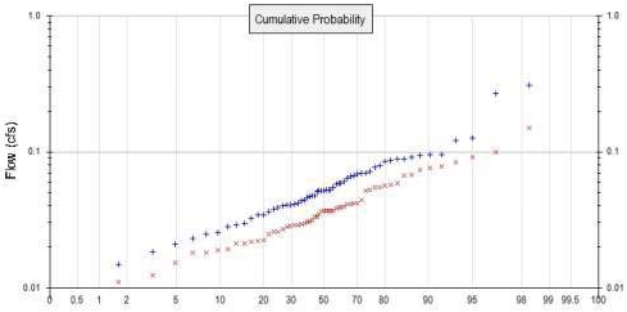
Element Flows To:

Outlet 1	Outlet 2
	Bioretention 5

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.205
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.0638
Total Impervious Area: 0.1205

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.050491
5 year	0.083945
10 year	0.111353
25 year	0.152473
50 year	0.188147
100 year	0.228427

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.035297
5 year	0.056104
10 year	0.071481
25 year	0.092549
50 year	0.109355
100 year	0.127065

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.047	0.031
1950	0.036	0.022
1951	0.052	0.021
1952	0.076	0.056
1953	0.051	0.033
1954	0.060	0.037
1955	0.042	0.027
1956	0.085	0.052
1957	0.038	0.031
1958	0.053	0.041

1959	0.025	0.012
1960	0.034	0.032
1961	0.044	0.037
1962	0.047	0.026
1963	0.055	0.026
1964	0.059	0.038
1965	0.051	0.033
1966	0.058	0.042
1967	0.039	0.030
1968	0.095	0.076
1969	0.051	0.055
1970	0.269	0.149
1971	0.030	0.015
1972	0.029	0.019
1973	0.046	0.037
1974	0.070	0.074
1975	0.051	0.036
1976	0.093	0.059
1977	0.023	0.022
1978	0.089	0.039
1979	0.070	0.044
1980	0.041	0.029
1981	0.059	0.042
1982	0.072	0.041
1983	0.086	0.057
1984	0.064	0.021
1985	0.047	0.028
1986	0.025	0.037
1987	0.041	0.029
1988	0.028	0.022
1989	0.066	0.040
1990	0.040	0.018
1991	0.068	0.018
1992	0.041	0.019
1993	0.121	0.078
1994	0.032	0.025
1995	0.052	0.067
1996	0.126	0.099
1997	0.095	0.084
1998	0.079	0.054
1999	0.034	0.052
2000	0.014	0.008
2001	0.018	0.011
2002	0.089	0.028
2003	0.066	0.029
2004	0.015	0.037
2005	0.021	0.035
2006	0.091	0.039
2007	0.043	0.068
2008	0.307	0.091

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.3069	0.1490
2	0.2689	0.0994
3	0.1263	0.0911
4	0.1206	0.0843

5	0.0951	0.0783
6	0.0950	0.0763
7	0.0934	0.0741
8	0.0911	0.0676
9	0.0892	0.0669
10	0.0890	0.0588
11	0.0863	0.0571
12	0.0853	0.0562
13	0.0786	0.0546
14	0.0764	0.0544
15	0.0716	0.0521
16	0.0701	0.0516
17	0.0695	0.0445
18	0.0684	0.0421
19	0.0664	0.0417
20	0.0657	0.0415
21	0.0641	0.0413
22	0.0601	0.0396
23	0.0591	0.0392
24	0.0587	0.0388
25	0.0578	0.0384
26	0.0549	0.0369
27	0.0526	0.0369
28	0.0524	0.0368
29	0.0523	0.0368
30	0.0514	0.0367
31	0.0514	0.0363
32	0.0514	0.0350
33	0.0508	0.0334
34	0.0475	0.0331
35	0.0474	0.0317
36	0.0469	0.0308
37	0.0460	0.0306
38	0.0440	0.0297
39	0.0435	0.0294
40	0.0416	0.0288
41	0.0412	0.0288
42	0.0406	0.0284
43	0.0406	0.0281
44	0.0401	0.0268
45	0.0389	0.0258
46	0.0378	0.0257
47	0.0362	0.0249
48	0.0342	0.0223
49	0.0341	0.0222
50	0.0325	0.0217
51	0.0298	0.0211
52	0.0291	0.0210
53	0.0281	0.0192
54	0.0254	0.0188
55	0.0249	0.0182
56	0.0231	0.0181
57	0.0209	0.0153
58	0.0183	0.0123
59	0.0149	0.0110
60	0.0138	0.0081

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0252	516	331	64	Pass
0.0269	459	285	62	Pass
0.0285	403	242	60	Pass
0.0302	358	210	58	Pass
0.0318	321	182	56	Pass
0.0335	292	158	54	Pass
0.0351	255	138	54	Pass
0.0368	227	125	55	Pass
0.0384	214	108	50	Pass
0.0401	195	93	47	Pass
0.0417	177	82	46	Pass
0.0433	159	71	44	Pass
0.0450	146	65	44	Pass
0.0466	132	62	46	Pass
0.0483	117	55	47	Pass
0.0499	102	50	49	Pass
0.0516	93	47	50	Pass
0.0532	85	41	48	Pass
0.0549	81	36	44	Pass
0.0565	78	32	41	Pass
0.0582	72	28	38	Pass
0.0598	66	24	36	Pass
0.0614	61	23	37	Pass
0.0631	56	20	35	Pass
0.0647	49	19	38	Pass
0.0664	43	19	44	Pass
0.0680	41	17	41	Pass
0.0697	34	15	44	Pass
0.0713	32	15	46	Pass
0.0730	30	15	50	Pass
0.0746	29	13	44	Pass
0.0763	28	13	46	Pass
0.0779	25	11	44	Pass
0.0795	23	10	43	Pass
0.0812	21	9	42	Pass
0.0828	21	6	28	Pass
0.0845	19	5	26	Pass
0.0861	18	5	27	Pass
0.0878	16	5	31	Pass
0.0894	14	5	35	Pass
0.0911	12	5	41	Pass
0.0927	11	3	27	Pass
0.0944	10	3	30	Pass
0.0960	8	3	37	Pass
0.0976	8	3	37	Pass
0.0993	8	3	37	Pass
0.1009	8	2	25	Pass
0.1026	8	2	25	Pass
0.1042	8	2	25	Pass
0.1059	8	2	25	Pass
0.1075	8	2	25	Pass
0.1092	8	2	25	Pass
0.1108	8	2	25	Pass

0.1125	8	2	25	Pass
0.1141	8	2	25	Pass
0.1157	8	2	25	Pass
0.1174	7	2	28	Pass
0.1190	7	2	28	Pass
0.1207	7	2	28	Pass
0.1223	6	2	33	Pass
0.1240	6	2	33	Pass
0.1256	6	2	33	Pass
0.1273	4	2	50	Pass
0.1289	4	2	50	Pass
0.1306	4	2	50	Pass
0.1322	4	2	50	Pass
0.1338	4	2	50	Pass
0.1355	4	2	50	Pass
0.1371	4	1	25	Pass
0.1388	4	1	25	Pass
0.1404	4	1	25	Pass
0.1421	3	1	33	Pass
0.1437	3	1	33	Pass
0.1454	3	1	33	Pass
0.1470	3	1	33	Pass
0.1487	3	1	33	Pass
0.1503	3	0	0	Pass
0.1519	3	0	0	Pass
0.1536	3	0	0	Pass
0.1552	3	0	0	Pass
0.1569	3	0	0	Pass
0.1585	3	0	0	Pass
0.1602	3	0	0	Pass
0.1618	3	0	0	Pass
0.1635	3	0	0	Pass
0.1651	3	0	0	Pass
0.1668	3	0	0	Pass
0.1684	3	0	0	Pass
0.1700	3	0	0	Pass
0.1717	3	0	0	Pass
0.1733	3	0	0	Pass
0.1750	3	0	0	Pass
0.1766	3	0	0	Pass
0.1783	3	0	0	Pass
0.1799	3	0	0	Pass
0.1816	3	0	0	Pass
0.1832	3	0	0	Pass
0.1849	3	0	0	Pass
0.1865	3	0	0	Pass
0.1881	3	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Dispersion Trench 5 POC	☐	10.09			☐	91.29			
retention 5 POC	☐	13.53			☐	91.57			
Total Volume Infiltrated		23.62	0.00	0.00		91.45	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

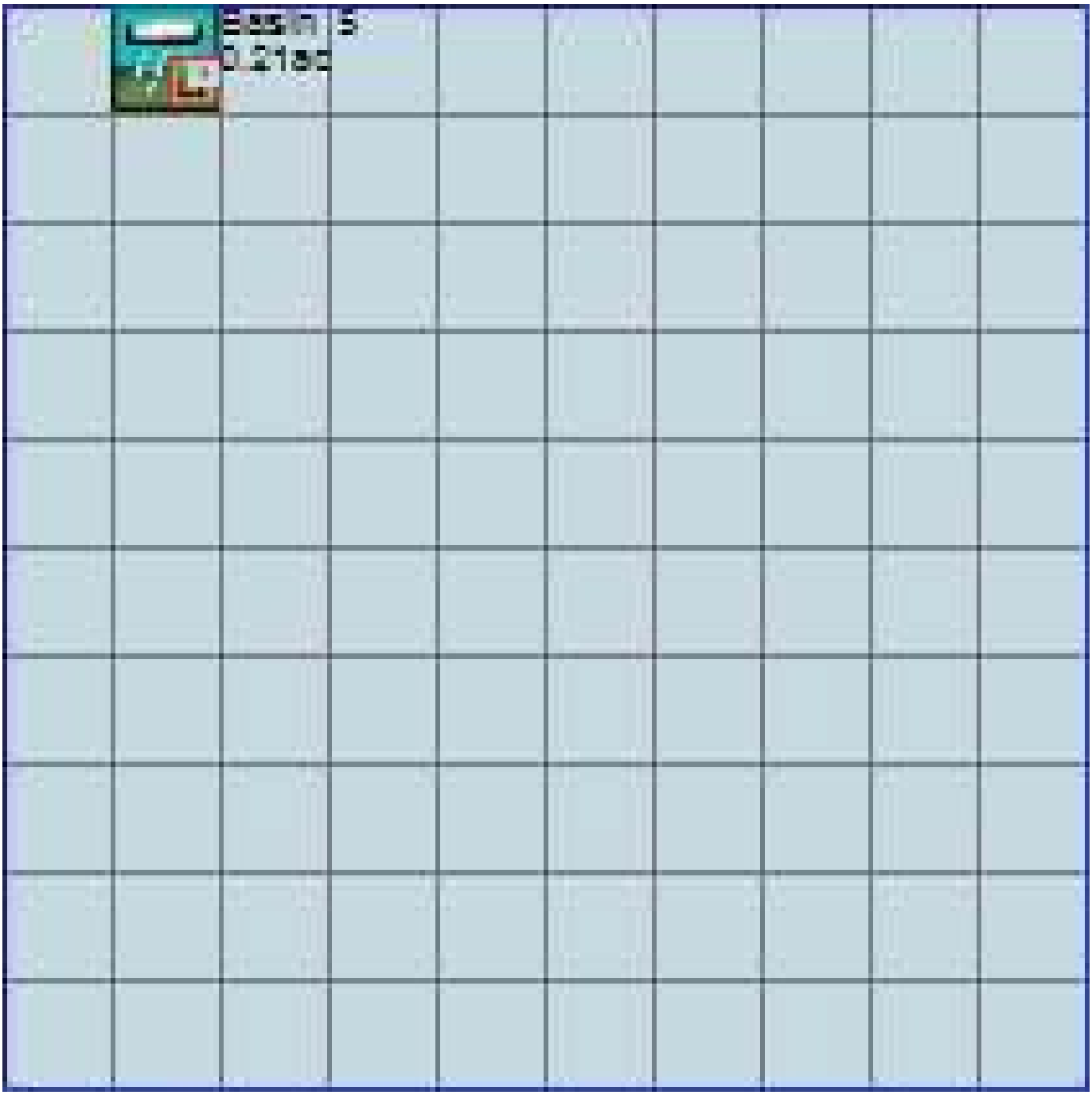
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix

Predeveloped Schematic



Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 5 - bio.wdm
MESSU       25   PreSRD-33 Basin 5 - bio.MES
            27   PreSRD-33 Basin 5 - bio.L61
            28   PreSRD-33 Basin 5 - bio.L62
            30   POCSRD-33 Basin 5 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      30
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #          K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   30      C/IMP DISP /STEE       1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   30         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   30         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   30         0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   30              0       4.5      0.03       400      0.15       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   30             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   30          0.1      0.15      0.25         6       0.3      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   30             0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name-------> Unit-systems   Printer ***
    # -  #                    User  t-series Engl Metr ***
                                  in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  30                       0.205     COPY   501     12
PERLND  30                       0.205     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                       in  out                               ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                   ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.8             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1948 10 01         END    2008 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   SRD-33 Basin 5 - bio.wdm
MESSU       25   MitSRD-33 Basin 5 - bio.MES
            27   MitSRD-33 Basin 5 - bio.L61
            28   MitSRD-33 Basin 5 - bio.L62
            30   POCSRD-33 Basin 5 - bio1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      IMPLND        1
      IMPLND        4
      PERLND       17
      RCHRES        1
      GENER         3
      RCHRES        2
      RCHRES        3
      COPY          1
      COPY        501
      COPY        601
      DISPLY        1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Dispersion Trench 5         MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1          1    1
  501          1    1
  601          1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
    3         24
  END OPCODE
  PARM
    #    #          K ***
    3              0.
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   17     C, Lawn, Mod             1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
```

```
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   17         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -   # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   17         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   17         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2          ***
    # -   # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   17              0       4.5      0.03       400       0.1       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3          ***
    # -   # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   17              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -   #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   17           0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -   # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
   17              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -   #                     User  t-series Engl Metr ***
                                      in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ****************************
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -   # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    1         0    0    4    0    0    0    1    9
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -   # CSNO RTOP  VRS  VNN RTLI     ***
```

```
    1          0     0     0     0     0
    4          0     0     0     0     0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >       IWATER input info: Part 2         ***
    # -  # ***  LSUR      SLSUR      NSUR      RETSC
    1             400       0.01       0.1        0.1
    4             400       0.01       0.1        0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >       IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0          0
    4              0          0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS       SURS
    1              0          0
    4              0          0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
driveway***
IMPLND   1                      0.0678     RCHRES   2      5
roof***
IMPLND   4                      0.0527     RCHRES   1      5
Basin  5***
PERLND  17                      0.0638     COPY   501     12
PERLND  17                      0.0638     COPY   601     12
PERLND  17                      0.0638     COPY   501     13
PERLND  17                      0.0638     COPY   601     13

******Routing******
IMPLND   1                      0.0678     COPY     1     15
IMPLND   4                      0.0527     COPY     1     15
RCHRES   2                           1     RCHRES   3      8
RCHRES   1                           1     COPY   501     17
RCHRES   3                           1     COPY   501     17
RCHRES   2                           1     COPY   501     17
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1
GENER    3 OUTPUT TIMSER      .0011111     RCHRES   2     EXTNL  OUTDGT 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG           ***
                                        in  out                             ***
    1     Dispersion Trenc-007    2    1    1    1   28    0    1
    2     Surface retentio-010    3    1    1    1   28    0    1
    3     Bioretention  5         2    1    1    1   28    0    1
  END GEN-INFO
```

```
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -   # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
    2         1    0    0    0    0    0    0    0    0    0
    3         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -   # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
    2         4    0    0    0    0    0    0    0    0    0    1    9
    3         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                  ***
    # -   #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
           FG FG FG FG  possible  exit  *** possible  exit      possible  exit
            *  *  *  *    *  *  *  *  *       *  *  *  *  *        ***
    1       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
    2       0  1  0  0    4  5  6  0  0       0  1  0  0  0       2  1  2  2  2
    3       0  1  0  0    4  5  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -   #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><--------><------>***
    1              1      0.01       0.0       0.0       0.5       0.0
    2              2      0.01       0.0       0.0       0.5       0.0
    3              3      0.01       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                     ***
    # -   # ***   VOL    Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    2            0         4.0  5.0  6.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
    3            0         4.0  5.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***                          addr
***                         <------>
*** kwd  varnam optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
  <****> <----> <----> <-> <----><-><-><-><-><--------> <><-> <><-> <--> ***
  UVQUAN vol3   RCHRES   3 VOL              4
  UVQUAN v2m3   GLOBAL     WORKSP  2        3
  UVQUAN vpo3   GLOBAL     WORKSP  3        3
  UVQUAN v2d3   GENER    3 K       1        3
*** User-Defined Target Variable Names
***                  addr or                        addr or
***                 <------>                       <------>
*** kwd   varnam ct  vari  s1 s2 s3  frac oper     vari  s1 s2 s3  frac oper
  <****>  <----><-> <----><-><-><-> <---> <--->    <----><-><-><-> <---> <--->
  UVNAME  v2m3    1 WORKSP  2         1.0 QUAN
  UVNAME  vpo3    1 WORKSP  3         1.0 QUAN
  UVNAME  v2d3    1 K       1         1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t   vnam  s1 s2 s3 ac quantity  tc  ts rp
  <****><-><--><><-><--> <> <> <> <><><>  <----><-><-><-><-><--------> <> <-><->
  GENER   3                               v2m3            =  291.
*** Compute remaining available pore space
  GENER   3                               vpo3            =  v2m3
  GENER   3                               vpo3           -=  vol3
```

```
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo3 < 0.0) THEN
  GENER   3                                 vpo3            =  0.0
END IF
*** Infiltration volume
  GENER   3                                 v2d3            =  vpo3
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   90    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)    (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.020661  0.000000  0.000000  0.000000
  0.012222  0.020661  0.000253  0.000000  0.002604
  0.024444  0.020661  0.000505  0.000000  0.002604
  0.036667  0.020661  0.000758  0.000000  0.002604
  0.048889  0.020661  0.001010  0.000000  0.002604
  0.061111  0.020661  0.001263  0.000000  0.002604
  0.073333  0.020661  0.001515  0.000000  0.002604
  0.085556  0.020661  0.001768  0.000000  0.002604
  0.097778  0.020661  0.002020  0.000000  0.002604
  0.110000  0.020661  0.002273  0.382386  0.002604
  0.122222  0.020661  0.002525  1.266698  0.002604
  0.134444  0.020661  0.002778  2.444334  0.002604
  0.146667  0.020661  0.003030  3.854625  0.002604
  0.158889  0.020661  0.003283  5.464020  0.002604
  0.171111  0.020661  0.003535  7.250348  0.002604
  0.183333  0.020661  0.003788  9.197530  0.002604
  0.195556  0.020661  0.004040  11.29321  0.002604
  0.207778  0.020661  0.004293  13.52752  0.002604
  0.220000  0.020661  0.004545  15.89230  0.002604
  0.232222  0.020661  0.004798  18.38072  0.002604
  0.244444  0.020661  0.005051  20.98688  0.002604
  0.256667  0.020661  0.005303  23.70569  0.002604
  0.268889  0.020661  0.005556  26.53263  0.002604
  0.281111  0.020661  0.005808  29.46372  0.002604
  0.293333  0.020661  0.006061  32.49535  0.002604
  0.305556  0.020661  0.006313  35.62429  0.002604
  0.317778  0.020661  0.006566  38.84760  0.002604
  0.330000  0.020661  0.006818  42.16256  0.002604
  0.342222  0.020661  0.007071  45.56672  0.002604
  0.354444  0.020661  0.007323  49.05778  0.002604
  0.366667  0.020661  0.007576  52.63362  0.002604
  0.378889  0.020661  0.007828  56.29226  0.002604
  0.391111  0.020661  0.008081  60.03187  0.002604
  0.403333  0.020661  0.008333  63.85073  0.002604
  0.415556  0.020661  0.008586  67.74720  0.002604
  0.427778  0.020661  0.008838  71.71978  0.002604
  0.440000  0.020661  0.009091  75.76701  0.002604
  0.452222  0.020661  0.009343  79.88755  0.002604
  0.464444  0.020661  0.009596  84.08010  0.002604
  0.476667  0.020661  0.009848  88.34344  0.002604
  0.488889  0.020661  0.010101  92.67641  0.002604
  0.501111  0.020661  0.010354  97.07791  0.002604
  0.513333  0.020661  0.010606  101.5469  0.002604
  0.525556  0.020661  0.010859  106.0823  0.002604
  0.537778  0.020661  0.011111  110.6832  0.002604
  0.550000  0.020661  0.011364  115.3486  0.002604
  0.562222  0.020661  0.011616  120.0778  0.002604
  0.574444  0.020661  0.011869  124.8698  0.002604
  0.586667  0.020661  0.012121  129.7238  0.002604
  0.598889  0.020661  0.012374  134.6390  0.002604
  0.611111  0.020661  0.012626  139.6146  0.002604
  0.623333  0.020661  0.012879  144.6500  0.002604
  0.635556  0.020661  0.013131  149.7445  0.002604
  0.647778  0.020661  0.013384  154.8973  0.002604
  0.660000  0.020661  0.013636  160.1077  0.002604
  0.672222  0.020661  0.013889  165.3753  0.002604
  0.684444  0.020661  0.014141  170.6992  0.002604
  0.696667  0.020661  0.014394  176.0791  0.002604
```

```
0.708889  0.020661  0.014646  181.5141  0.002604
0.721111  0.020661  0.014899  187.0039  0.002604
0.733333  0.020661  0.015152  192.5479  0.002604
0.745556  0.020661  0.015404  198.1455  0.002604
0.757778  0.020661  0.015657  203.7962  0.002604
0.770000  0.020661  0.015909  209.4995  0.002604
0.782222  0.020661  0.016162  215.2549  0.002604
0.794444  0.020661  0.016414  221.0620  0.002604
0.806667  0.020661  0.016667  226.9204  0.002604
0.818889  0.020661  0.016919  232.8295  0.002604
0.831111  0.020661  0.017172  238.7889  0.002604
0.843333  0.020661  0.017424  244.7982  0.002604
0.855556  0.020661  0.017677  250.8570  0.002604
0.867778  0.020661  0.017929  256.9648  0.002604
0.880000  0.020661  0.018182  263.1214  0.002604
0.892222  0.020661  0.018434  269.3262  0.002604
0.904444  0.020661  0.018687  275.5790  0.002604
0.916667  0.020661  0.018939  281.8793  0.002604
0.928889  0.020661  0.019192  288.2268  0.002604
0.941111  0.020661  0.019444  294.6212  0.002604
0.953333  0.020661  0.019697  301.0620  0.002604
0.965556  0.020661  0.019949  307.5490  0.002604
0.977778  0.020661  0.020202  314.0818  0.002604
0.990000  0.020661  0.020455  320.6602  0.002604
1.002222  0.020661  0.020707  327.2837  0.002604
1.014444  0.020661  0.020960  333.9521  0.002604
1.026667  0.020661  0.021212  340.6651  0.002604
1.038889  0.020661  0.021465  347.4224  0.002604
1.051111  0.020661  0.021717  354.2236  0.002604
1.063333  0.020661  0.021970  361.0686  0.002604
1.075556  0.020661  0.022222  367.9569  0.002604
1.087778  0.020661  0.022475  374.8884  0.002604
END FTABLE  1
FTABLE      3
 56    5
   Depth       Area      Volume   Outflow1   Outflow2  Velocity  Travel Time***
    (ft)    (acres)  (acre-ft)     (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.013315  0.000000  0.000000  0.000000
0.054945  0.013093  0.000014  0.000000  0.000000
0.109890  0.012728  0.000031  0.000000  0.000000
0.164835  0.012368  0.000050  0.000000  0.000001
0.219780  0.012012  0.000072  0.000000  0.000005
0.274725  0.011662  0.000097  0.000000  0.000014
0.329670  0.011317  0.000125  0.000000  0.000031
0.384615  0.010976  0.000157  0.000000  0.000060
0.439560  0.010641  0.000191  0.000000  0.000103
0.494505  0.010310  0.000230  0.000000  0.000165
0.549451  0.009985  0.000272  0.000000  0.000219
0.604396  0.009664  0.000317  0.000000  0.000238
0.659341  0.009349  0.000367  0.000000  0.000258
0.714286  0.009038  0.000420  0.000000  0.000278
0.769231  0.008733  0.000477  0.000000  0.000299
0.824176  0.008433  0.000539  0.000000  0.000320
0.879121  0.008137  0.000605  0.000000  0.000343
0.934066  0.007847  0.000676  0.000000  0.000365
0.989011  0.007561  0.000751  0.000000  0.000389
1.043956  0.007280  0.000831  0.000000  0.000413
1.098901  0.007005  0.000916  0.000000  0.000437
1.153846  0.006734  0.001005  0.000000  0.000463
1.208791  0.006469  0.001100  0.000000  0.000489
1.263736  0.006208  0.001200  0.000000  0.000515
1.318681  0.005953  0.001306  0.000000  0.000542
1.373626  0.005702  0.001417  0.000000  0.000570
1.428571  0.005457  0.001533  0.000000  0.000599
1.483516  0.005216  0.001655  0.000000  0.000628
1.538462  0.004980  0.001772  0.000000  0.000657
1.593407  0.004750  0.001893  0.000000  0.000688
1.648352  0.004524  0.002020  0.000000  0.000719
1.703297  0.004303  0.002153  0.000000  0.000750
1.758242  0.004088  0.002292  0.000000  0.000783
```

```
  1.813187  0.003877  0.002437  0.000000  0.000815
  1.868132  0.003671  0.002587  0.000000  0.000849
  1.923077  0.003471  0.002744  0.000000  0.000883
  1.978022  0.003275  0.002907  0.000000  0.000918
  2.032967  0.003084  0.003076  0.000000  0.000953
  2.087912  0.002899  0.003251  0.000000  0.000989
  2.142857  0.002718  0.003434  0.000000  0.001026
  2.197802  0.002542  0.003623  0.000000  0.001063
  2.252747  0.002371  0.003818  0.000000  0.001101
  2.307692  0.002206  0.004021  0.000000  0.001139
  2.362637  0.002045  0.004231  0.000000  0.001178
  2.417582  0.001889  0.004447  0.000000  0.001218
  2.472527  0.001738  0.004671  0.000000  0.001259
  2.527473  0.001593  0.004903  0.000000  0.001300
  2.582418  0.001452  0.005142  0.000000  0.001341
  2.637363  0.001316  0.005388  0.000000  0.001383
  2.692308  0.001185  0.005642  0.000000  0.001426
  2.747253  0.001059  0.005904  0.000000  0.001470
  2.802198  0.000939  0.006174  0.000000  0.001514
  2.857143  0.000823  0.006452  0.000000  0.001559
  2.912088  0.000712  0.006738  0.000000  0.001604
  2.967033  0.000606  0.007033  0.000000  0.001650
  3.000000  0.000505  0.015148  0.000000  0.001678
  END FTABLE  3
  FTABLE      2
   38    6
     Depth      Area     Volume  Outflow1  Outflow2  outflow 3 Velocity  Travel
Time***
      (ft)    (acres) (acre-ft)    (cfs)     (cfs)     (cfs)   (ft/sec)
(Minutes)***
  0.000000  0.000505  0.000000  0.000000  0.000000  0.000047
  0.054945  0.013688  0.000742  0.000398  0.171696  0.000047
  0.109890  0.014067  0.001504  0.000562  0.182676  0.000095
  0.164835  0.014450  0.002288  0.000689  0.194058  0.000143
  0.219780  0.014838  0.003092  0.000795  0.205850  0.000192
  0.274725  0.015232  0.003918  0.000889  0.218057  0.000242
  0.329670  0.015630  0.004766  0.000974  0.230686  0.000292
  0.384615  0.016033  0.005636  0.001052  0.243745  0.000343
  0.439560  0.016441  0.006528  0.001124  0.257239  0.000394
  0.494505  0.016855  0.007443  0.001193  0.271175  0.000446
  0.549451  0.017273  0.008381  0.001257  0.285560  0.000499
  0.604396  0.017696  0.009341  0.001319  0.300400  0.000552
  0.659341  0.018124  0.010325  0.001377  0.308147  0.000606
  0.714286  0.018558  0.011333  0.001433  0.312774  0.000661
  0.769231  0.018996  0.012365  0.001488  0.317400  0.000716
  0.824176  0.019439  0.013421  0.001540  0.322027  0.000772
  0.879121  0.019887  0.014501  0.001590  0.326654  0.000828
  0.934066  0.020340  0.015606  0.001639  0.331281  0.000885
  0.989011  0.020798  0.016736  0.001687  0.335908  0.000943
  1.043956  0.021262  0.017892  0.148355  0.340535  0.001002
  1.098901  0.021730  0.019073  0.495727  0.345161  0.001061
  1.153846  0.022203  0.020280  0.956065  0.349788  0.001120
  1.208791  0.022681  0.021513  1.497247  0.354415  0.001181
  1.263736  0.023164  0.022773  2.092933  0.359042  0.001241
  1.318681  0.023652  0.024059  2.716801  0.363669  0.001303
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  1.428571  0.024643  0.026712  3.940977  0.372922  0.001428
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  1.648352  0.026686  0.032351  5.670927  0.391430  0.001685
  1.703297  0.027209  0.033832  5.907350  0.396057  0.001751
  1.758242  0.027737  0.035341  6.173112  0.400683  0.001818
  1.813187  0.028270  0.036880  6.392819  0.405310  0.001885
  1.868132  0.028808  0.038448  6.605221  0.409937  0.001953
  1.923077  0.029351  0.040046  6.811002  0.414564  0.002021
  1.978022  0.029899  0.041674  7.010745  0.419191  0.002090
  2.000000  0.030119  0.042333  7.204952  0.421041  0.002118
  END FTABLE  2
END FTABLES
```

```
EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
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WDM      2 PREC     ENGL    1.37           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.37           IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.8            PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.8            IMPLND   1 999 EXTNL  PETINP
WDM      2 PREC     ENGL    1.37           RCHRES   2     EXTNL  PREC
WDM      1 EVAP     ENGL    0.5            RCHRES   2     EXTNL  POTEV
WDM      1 EVAP     ENGL    0.8            RCHRES   3     EXTNL  POTEV

END EXT SOURCES

EXT TARGETS
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COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL       REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL       REPL
COPY   601 OUTPUT MEAN   1 1     48.4      WDM    901 FLOW     ENGL       REPL
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      1 1        1      WDM   1001 FLOW     ENGL       REPL
RCHRES   1 HYDR   O      2 1        1      WDM   1002 FLOW     ENGL       REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1003 STAG     ENGL       REPL
RCHRES   3 HYDR   RO     1 1        1      WDM   1008 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      1 1        1      WDM   1009 FLOW     ENGL       REPL
RCHRES   3 HYDR   O      2 1        1      WDM   1010 FLOW     ENGL       REPL
RCHRES   3 HYDR   STAGE  1 1        1      WDM   1011 STAG     ENGL       REPL
RCHRES   2 HYDR   STAGE  1 1        1      WDM   1012 STAG     ENGL       REPL
RCHRES   2 HYDR   O      1 1        1      WDM   1013 FLOW     ENGL       REPL
END EXT TARGETS

MASS-LINK
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<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
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IMPLND     IWATER SURO      0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK        8
RCHRES     OFLOW  OVOL   2                RCHRES         INFLOW IVOL
  END MASS-LINK    8

  MASS-LINK       12
PERLND     PWATER SURO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13

  MASS-LINK       15
IMPLND     IWATER SURO      0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       17
RCHRES     OFLOW  OVOL   1                COPY           INPUT  MEAN
  END MASS-LINK   17


END MASS-LINK

END RUN
```

Disclaimer

Legal Notice

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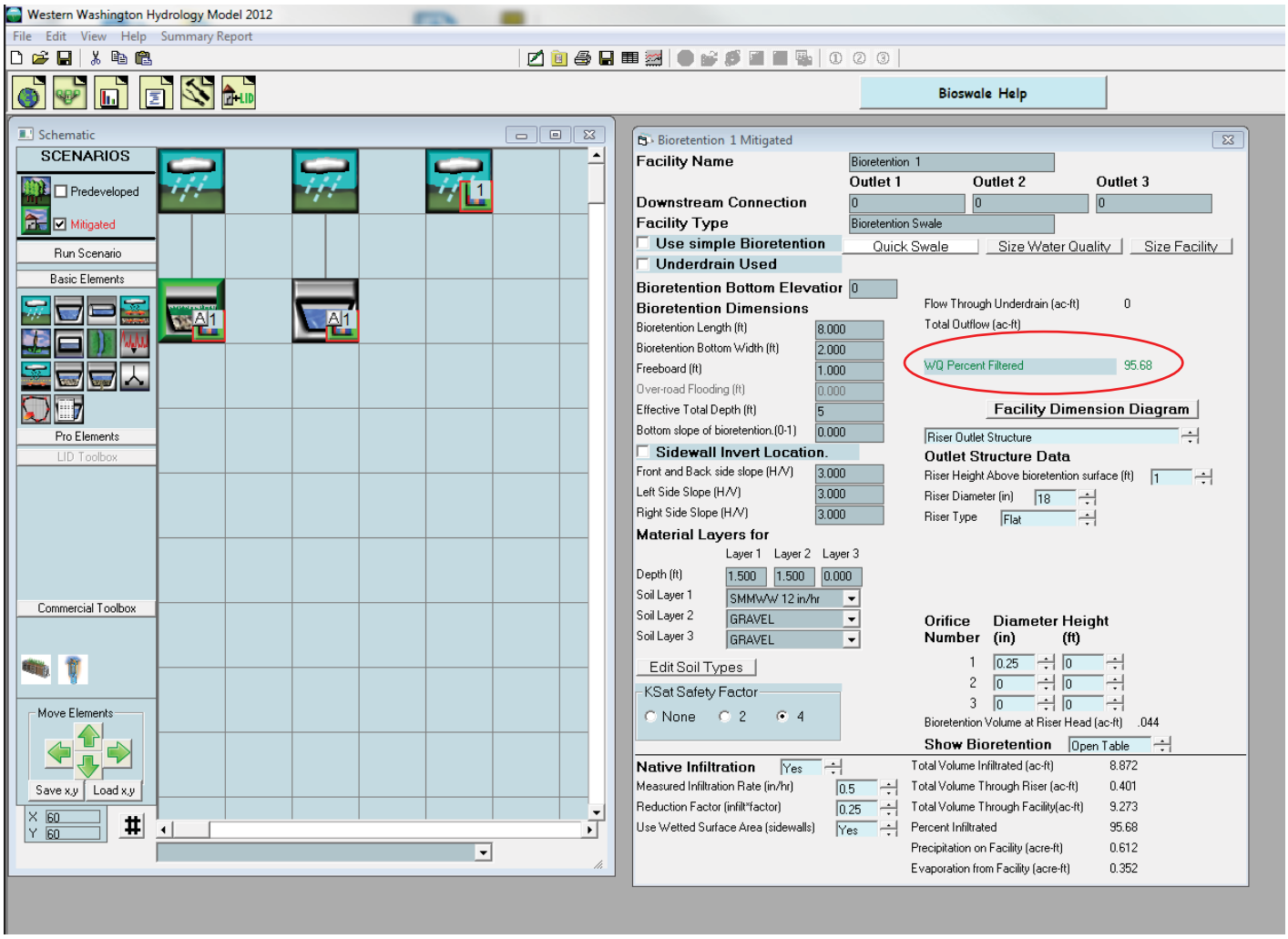
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

WATER QUALITY


Western Washington Hydrology Model 2012
File Edit View Help Summary Report
Bioswale Help
Schematic
SCENARIOS
Predeveloped
Mitigated
Run Scenario
Basic Elements
Pro Elements
LID Toolbox
Commercial Toolbox
Move Elements
Save x,y
Load x,y
X 60
Y 60
Bioretention 1 Mitigated
Facility Name
Bioretention 1
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
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0
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Facility Type
Bioretention Swale
Use simple Bioretention
Quick Swale
Size Water Quality
Size Facility
Underdrain Used
Bioretention Bottom Elevation
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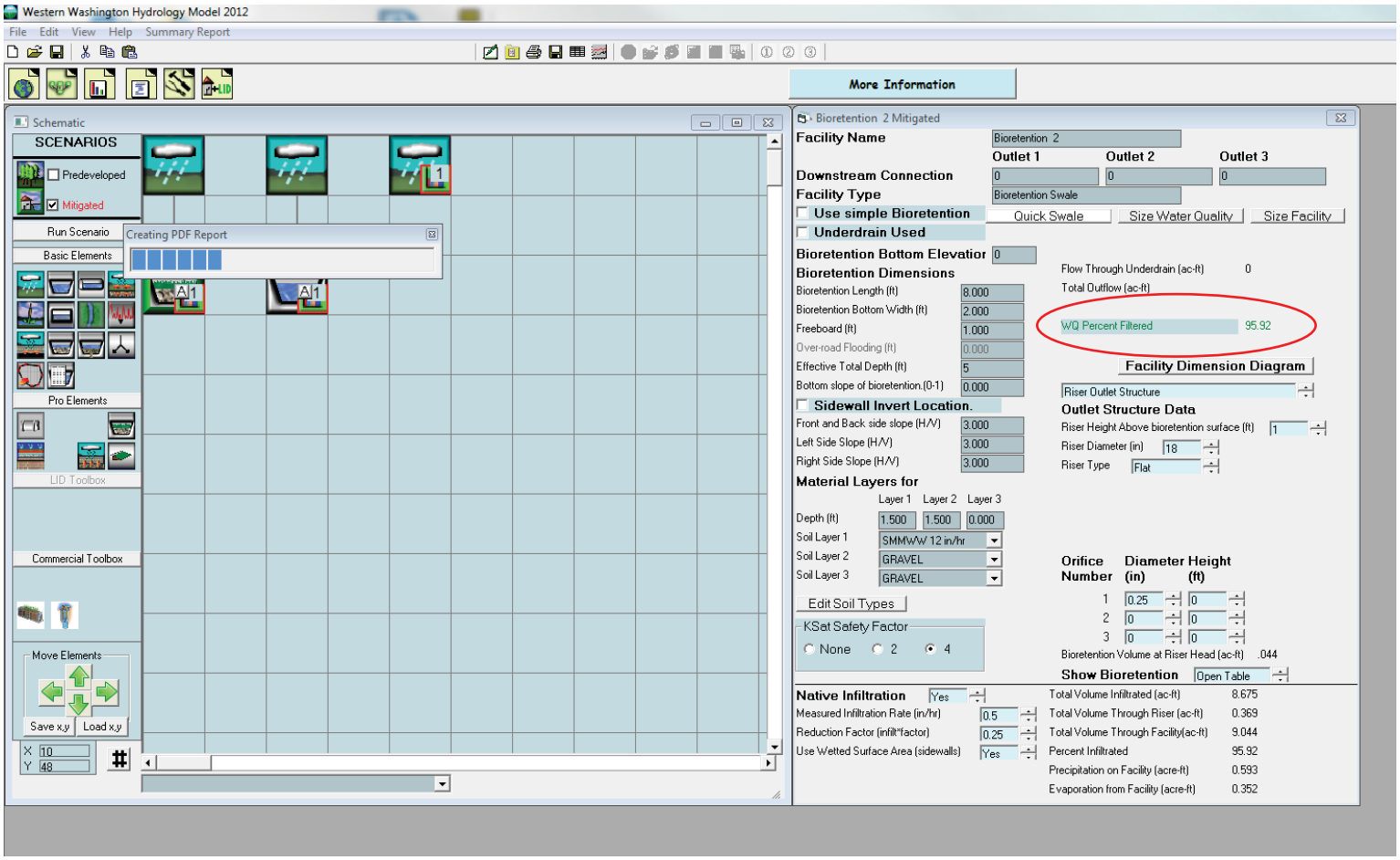
Bioretention Dimensions
Bioretention Length (ft) 8.000
Bioretention Bottom Width (ft) 2.000
Freeboard (ft) 1.000
Over-road Flooding (ft) 0.000
Effective Total Depth (ft) 5
Bottom slope of bioretention.(0-1) 0.000
Sidewall Invert Location.
Front and Back side slope (H/V) 3.000
Left Side Slope (H/V) 3.000
Right Side Slope (H/V) 3.000
Material Layers for
Layer 1 Layer 2 Layer 3
Depth (ft) 1.500 1.500 0.000
Soil Layer 1 SMMWW 12 in/hr
Soil Layer 2 GRAVEL
Soil Layer 3 GRAVEL
Edit Soil Types
KSat Safety Factor
None 2 4
Native Infiltration Yes
Measured Infiltration Rate (in/hr) 0.5
Reduction Factor (infilt*factor) 0.25
Use Wetted Surface Area (sidewalls) Yes
Flow Through Underdrain (ac-ft) 0
Total Outflow (ac-ft)
WQ Percent Filtered 95.68
Facility Dimension Diagram
Riser Outlet Structure
Outlet Structure Data
Riser Height Above bioretention surface (ft) 1
Riser Diameter (in) 18
Riser Type Flat
Orifice Number
Diameter (in)
Height (ft)
1 0.25 0
2 0 0
3 0 0
Bioretention Volume at Riser Head (ac-ft) .044
Show Bioretention Open Table
Total Volume Infiltrated (ac-ft) 8.872
Total Volume Through Riser (ac-ft) 0.401
Total Volume Through Facility(ac-ft) 9.273
Percent Infiltrated 95.68
Precipitation on Facility (acre-ft) 0.612
Evaporation from Facility (acre-ft) 0.352


Western Washington Hydrology Model 2012
File Edit View Help Summary Report
More Information
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Mitigated
Run Scenario
Basic Elements
Creating PDF Report
Pro Elements
LID Toolbox
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Move Elements
Save x,y
Load x,y
X 10
Y 48
Bioretention 2 Mitigated
Facility Name
Bioretention 2
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
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0
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Facility Type
Bioretention Swale
Use simple Bioretention
Quick Swale
Size Water Quality
Size Facility
Underdrain Used
Bioretention Bottom Elevation
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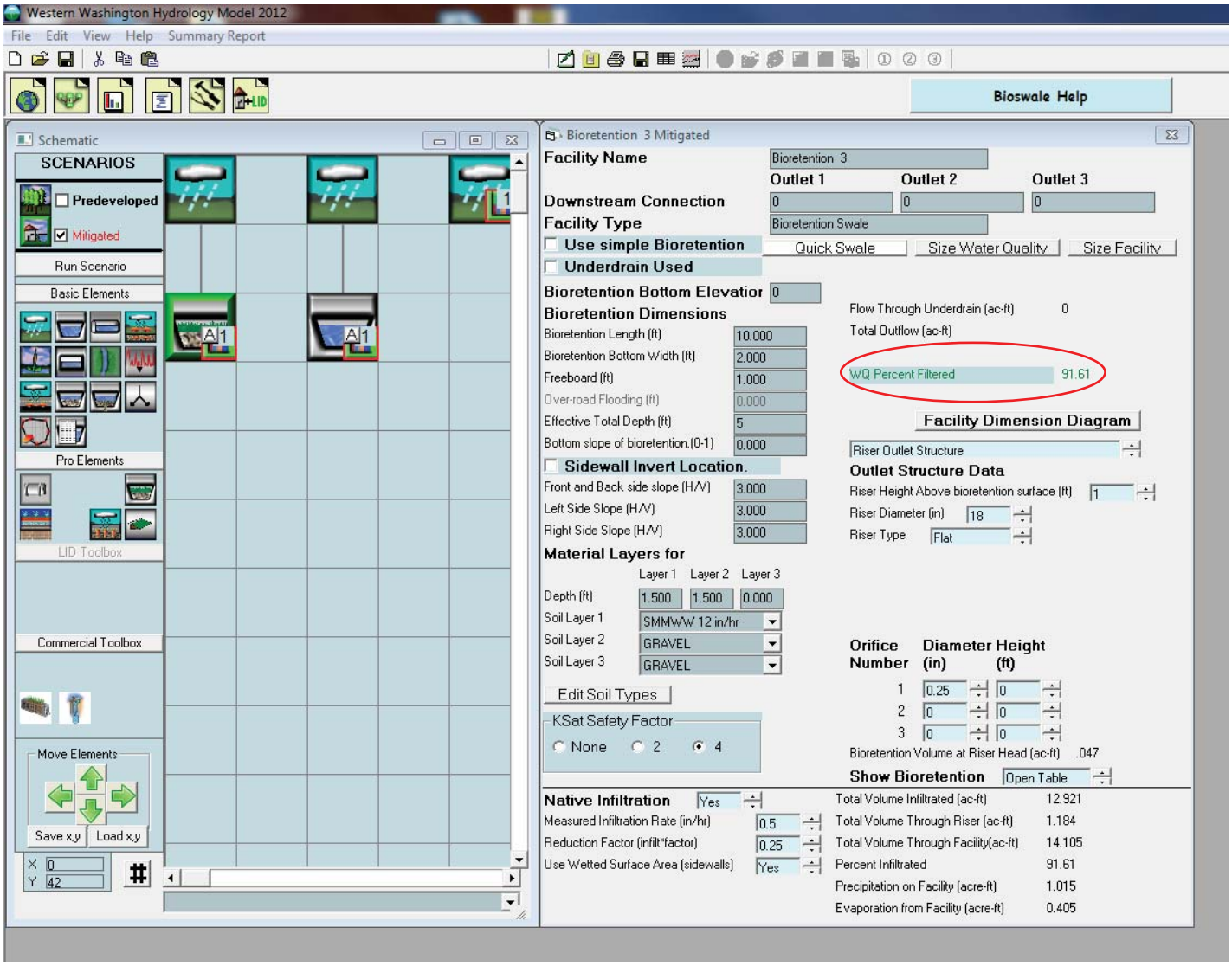
Bioretention Bottom Width (ft) 2.000
Freeboard (ft) 1.000
Over-road Flooding (ft) 0.000
Effective Total Depth (ft) 5
Bottom slope of bioretention.(0-1) 0.000
Sidewall Invert Location.
Front and Back side slope (H/V) 3.000
Left Side Slope (H/V) 3.000
Right Side Slope (H/V) 3.000
Material Layers for
Layer 1 Layer 2 Layer 3
Depth (ft) 1.500 1.500 0.000
Soil Layer 1 SMMWW 12 in/hr
Soil Layer 2 GRAVEL
Soil Layer 3 GRAVEL
Edit Soil Types
KSat Safety Factor
None 2 4
Native Infiltration Yes
Measured Infiltration Rate (in/hr) 0.5
Reduction Factor (infilt*factor) 0.25
Use Wetted Surface Area (sidewalls) Yes
Flow Through Underdrain (ac-ft) 0
Total Outflow (ac-ft)
WQ Percent Filtered 95.92
Facility Dimension Diagram
Riser Outlet Structure
Outlet Structure Data
Riser Height Above bioretention surface (ft) 1
Riser Diameter (in) 18
Riser Type Flat
Orifice Number
Diameter (in)
Height (ft)
1 0.25 0
2 0 0
3 0 0
Bioretention Volume at Riser Head (ac-ft) .044
Show Bioretention Open Table
Total Volume Infiltrated (ac-ft) 8.675
Total Volume Through Riser (ac-ft) 0.369
Total Volume Through Facility(ac-ft) 9.044
Percent Infiltrated 95.92
Precipitation on Facility (acre-ft) 0.593
Evaporation from Facility (acre-ft) 0.352


Western Washington Hydrology Model 2012
File Edit View Help Summary Report
Bioswale Help
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Predeveloped
Mitigated
Run Scenario
Basic Elements
Pro Elements
LID Toolbox
Commercial Toolbox
Move Elements
Save x,y
Load x,y
X 0
Y 42
Bioretention 3 Mitigated
Facility Name
Bioretention 3
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
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0
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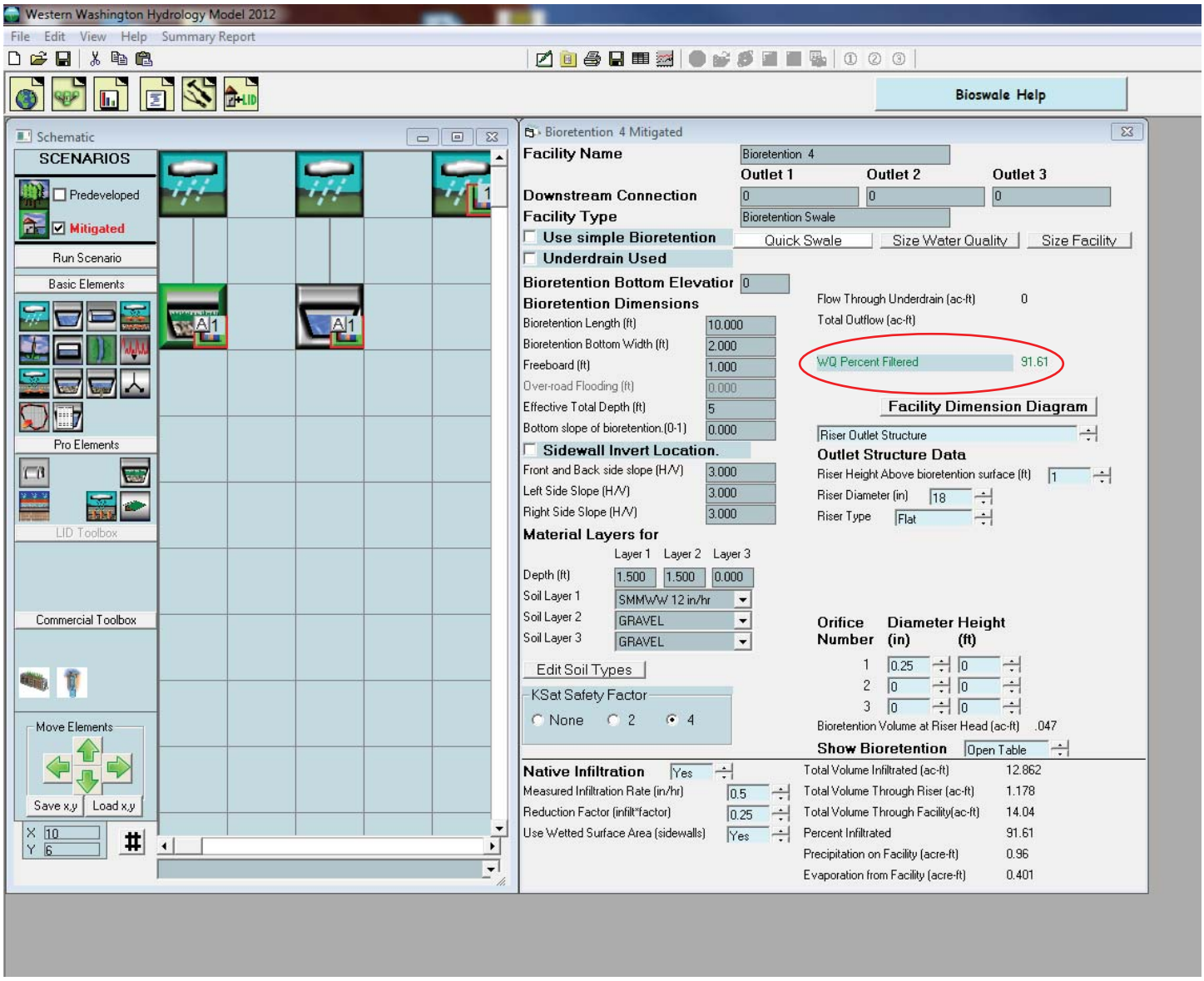
Facility Type
Bioretention Swale
Use simple Bioretention
Quick Swale
Size Water Quality
Size Facility
Underdrain Used
Bioretention Bottom Elevation 0
Bioretention Dimensions
Bioretention Length (ft) 10.000
Bioretention Bottom Width (ft) 2.000
Freeboard (ft) 1.000
Over-road Flooding (ft) 0.000
Effective Total Depth (ft) 5
Bottom slope of bioretention.(0-1) 0.000
Sidewall Invert Location.
Front and Back side slope (H/V) 3.000
Left Side Slope (H/V) 3.000
Right Side Slope (H/V) 3.000
Material Layers for
Layer 1 Layer 2 Layer 3
Depth (ft) 1.500 1.500 0.000
Soil Layer 1 SMMWW 12 in/hr
Soil Layer 2 GRAVEL
Soil Layer 3 GRAVEL
Edit Soil Types
KSat Safety Factor
None 2 4
Flow Through Underdrain (ac-ft) 0
Total Outflow (ac-ft)
WQ Percent Filtered 91.61
Facility Dimension Diagram
Riser Outlet Structure
Outlet Structure Data
Riser Height Above bioretention surface (ft) 1
Riser Diameter (in) 18
Riser Type Flat
Orifice Number
Diameter (in)
Height (ft)
1 0.25 0
2 0 0
3 0 0
Bioretention Volume at Riser Head (ac-ft) .047
Show Bioretention Open Table
Native Infiltration Yes
Measured Infiltration Rate (in/hr) 0.5
Reduction Factor (infilt*factor) 0.25
Use Wetted Surface Area (sidewalls) Yes
Total Volume Infiltrated (ac-ft) 12.921
Total Volume Through Riser (ac-ft) 1.184
Total Volume Through Facility(ac-ft) 14.105
Percent Infiltrated 91.61
Precipitation on Facility (acre-ft) 1.015
Evaporation from Facility (acre-ft) 0.405


Western Washington Hydrology Model 2012
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Basic Elements
Pro Elements
LID Toolbox
Commercial Toolbox
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Load x,y
X 10
Y 6
Bioretention 4 Mitigated
Facility Name
Bioretention 4
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
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0
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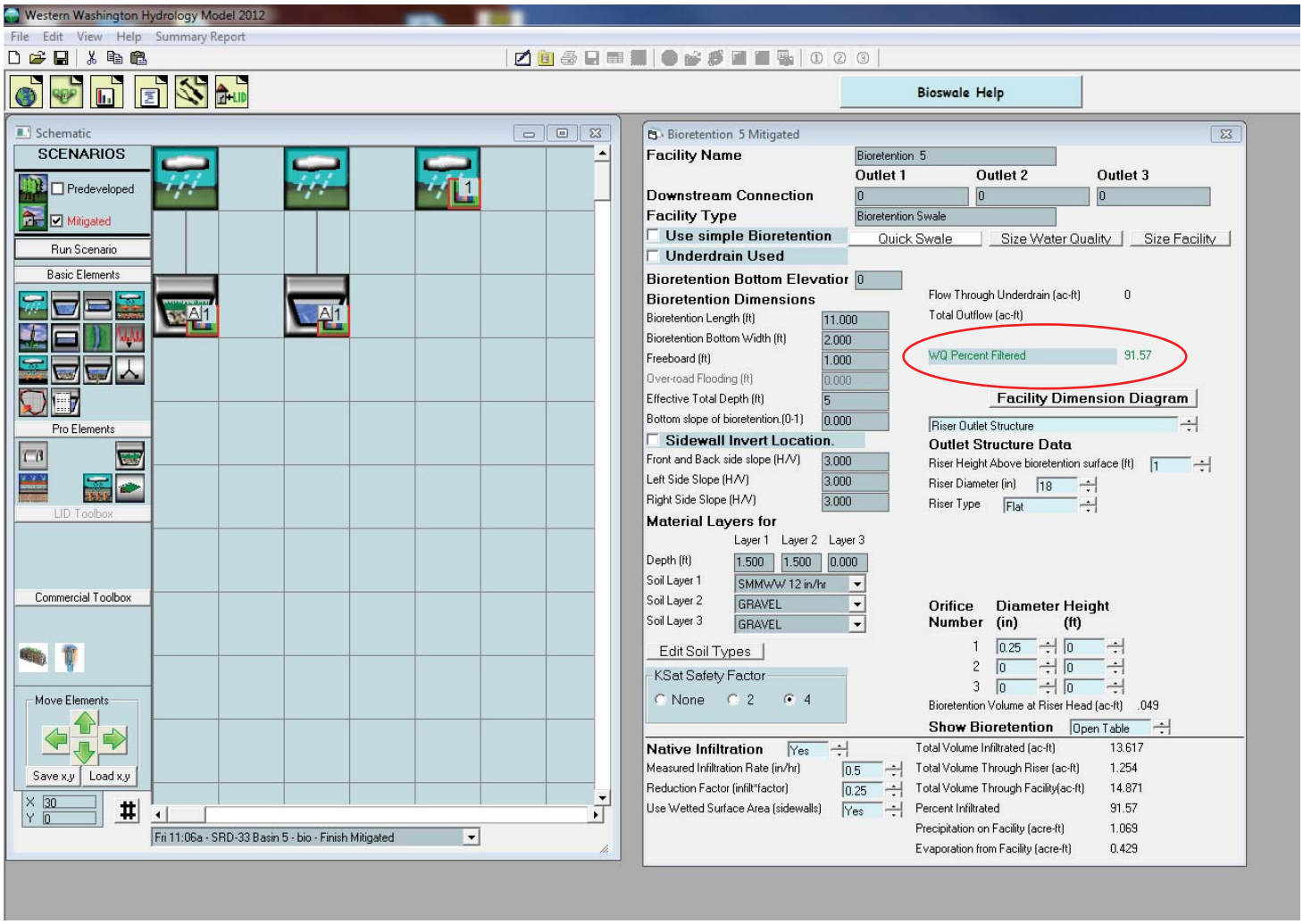
Facility Type
Bioretention Swale
Use simple Bioretention
Quick Swale
Size Water Quality
Size Facility
Underdrain Used
Bioretention Bottom Elevation
0
Bioretention Dimensions
Bioretention Length (ft) 10.000
Bioretention Bottom Width (ft) 2.000
Freeboard (ft) 1.000
Over-road Flooding (ft) 0.000
Effective Total Depth (ft) 5
Bottom slope of bioretention.(0-1) 0.000
Sidewall Invert Location.
Front and Back side slope (H/V) 3.000
Left Side Slope (H/V) 3.000
Right Side Slope (H/V) 3.000
Material Layers for
Layer 1 Layer 2 Layer 3
Depth (ft) 1.500 1.500 0.000
Soil Layer 1 SMMWW 12 in/hr
Soil Layer 2 GRAVEL
Soil Layer 3 GRAVEL
Edit Soil Types
KSat Safety Factor
None 2 4
Flow Through Underdrain (ac-ft) 0
Total Outflow (ac-ft)
WQ Percent Filtered 91.61
Facility Dimension Diagram
Riser Outlet Structure
Outlet Structure Data
Riser Height Above bioretention surface (ft) 1
Riser Diameter (in) 18
Riser Type Flat
Orifice Number
Diameter (in)
Height (ft)
1 0.25 0
2 0 0
3 0 0
Bioretention Volume at Riser Head (ac-ft) .047
Show Bioretention Open Table
Native Infiltration Yes
Measured Infiltration Rate (in/hr) 0.5
Reduction Factor (infilt*factor) 0.25
Use Wetted Surface Area (sidewalls) Yes
Total Volume Infiltrated (ac-ft) 12.862
Total Volume Through Riser (ac-ft) 1.178
Total Volume Through Facility(ac-ft) 14.04
Percent Infiltrated 91.61
Precipitation on Facility (acre-ft) 0.96
Evaporation from Facility (acre-ft) 0.401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Fri 11:06a - SRD-33 Basin 5 - bio - Finish Mitigated
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Facility Name
Bioretention 5
Outlet 1
Outlet 2
Outlet 3
Downstream Connection
Facility Type
Bioretention Swale
Use simple Bioretention
Quick Swale
Size Water Quality
Size Facility
Underdrain Used
Bioretention Bottom Elevation
Bioretention Dimensions
Bioretention Length (ft) 11.000
Bioretention Bottom Width (ft) 2.000
Freeboard (ft) 1.000
Over-road Flooding (ft) 0.000
Effective Total Depth (ft) 5
Bottom slope of bioretention.(0-1) 0.000
Sidewall Invert Location.
Front and Back side slope (H/V) 3.000
Left Side Slope (H/V) 3.000
Right Side Slope (H/V) 3.000
Material Layers for
Layer 1 Layer 2 Layer 3
Depth (ft) 1.500 1.500 0.000
Soil Layer 1 SMMWW 12 in/hr
Soil Layer 2 GRAVEL
Soil Layer 3 GRAVEL
Edit Soil Types
KSat Safety Factor
None 2 4
Native Infiltration Yes
Measured Infiltration Rate (in/hr) 0.5
Reduction Factor (infilt*factor) 0.25
Use Wetted Surface Area (sidewalls) Yes
Flow Through Underdrain (ac-ft) 0
Total Outflow (ac-ft)
WQ Percent Filtered 91.57
Facility Dimension Diagram
Riser Outlet Structure
Outlet Structure Data
Riser Height Above bioretention surface (ft) 1
Riser Diameter (in) 18
Riser Type Flat
Orifice Number Diameter (in) Height (ft)
1 0.25 0
2 0 0
3 0 0
Bioretention Volume at Riser Head (ac-ft) .049
Show Bioretention Open Table
Total Volume Infiltrated (ac-ft) 13.617
Total Volume Through Riser (ac-ft) 1.254
Total Volume Through Facility(ac-ft) 14.871
Percent Infiltrated 91.57
Precipitation on Facility (acre-ft) 1.069
Evaporation from Facility (acre-ft) 0.429

APPENDIX 4
GEOTECHNICAL REPORT

GEOTECHNICAL ENGINEERING REPORT
PROPOSED CAMAS RIVERFRONT TOWNHOMES
3210 SW 6TH AVENUE
CAMAS, WASHINGTON

Terrie Cox Revocable Living Trust,
Terrie Cox Trustee
16408 SE Mill Plain Blvd.
Vancouver, WA 98684

October 8, 2018
Project No. 839-001

TERRA DOLCE CONSULTANTS, INC.

TERRA DOLCE CONSULTANTS, INC.
4706 NE 75TH AVE
PORTLAND, OREGON 97218
503-502-5114

October 8, 2018
Project No. 839-001

Terrie Cox Revocable Living Trust,
Terrie Cox Trustee
16408 SE Mill Plain Blvd.
Vancouver, WA 98684

GEOTECHNICAL REPORT
PROPOSED CAMAS RIVERFRONT TOWNHOMES
3210 SE 6TH AVENUE
CAMAS, WASHINGTON

Dear Terry:
Terra Dolce Consultants, Inc. (TDC) is pleased to present our report summarizing the results of our geotechnical evaluation for the referenced project. Our project work included site visit, engineering analyses, and preparation of our report. Our work was completed in general accordance with our proposal dated June 29, 2018.

SITE DESCRIPTION

The referenced site is located in Camas, Washington (see Figure 1). The 0.78-acre property is developed in 1936 with a 1,443-square-foot single-story house, with an unfinished basement. Adjacent to the house is a single-story detached garage. and a shed (see Figure 2). The existing buildings will be demolished and the property will be divided into six townhomes.

A gravel driveway, off of Evergreen Highway, provides access to the referenced property and to the property to the west. The house and driveway is downslope of the driveway (see Figure 2).

The property slopes towards the southeast, with elevations ranging from on the property range between 86 feet along the northern property line to 58 feet at the southeast property corner.

It appears that there are two areas of Fill on the property (see Figure 2). The first area is around the house footprint and is most likely from when they excavated the basement for the house. The second area of Fill is located close to the entrance to the properties, downslope of the access road (see Figure 2). The fill is most likely from when they graded the road.

PROJECT DESCRIPTION

TDC understands that you are planning to build six (6) townhomes on the property (see Figure 3). The proposed lots for the townhomes will range from 4,036 square feet (sf) to 5,073 sf. The buildings be supported on shallow foundations and isolated footings.

GEOLOGIC CONDITIONS

Geologic maps of the area indicate that the site is underlain with volcanic rocks (Oligocene). The volcanic rocks are typically olive-brown, mafic tuff breccia, lapilli tuff, and minor tuff; and have distinct decimeter-scale stratification defined by gradational variations in grain size; moderately well sorted to poorly sorted; composed largely of angular fragments as large as 60 cm across of texturally variable, basalt and basaltic andesite. Unit locally contains rounded lithic clasts and blackened wood fragments; one exposure displays matrix-poor, talus-like deposit of angular blocks to 2 meters across; cemented by clay, zeolites, and calcite.

GEOLOGIC HAZARDS CONDITIONS

Review of the Clark County Online Environmental maps indicate that the refenced property is located within a Potential Area of Slope Instability. The property is underlain with volcanic rock and appears to be stable. There were no signs of slope instability on the property during our field investigation.

FIELD INVESTIGATION

On August 28, 2018, TDC conducted a site investigation for the reference project. The borings were drilled with a solid-stem auger drill rig. The borings were drilled to 5 feet below ground surface (bgs) (see Figures 2 and 3, and Attached Borings). The shallow boring depths were due to the shallow bedrock.

Soil samples were taken in 2.5-foot intervals to the bottom of the borings. Samples were collected using Standard Penetration Test method (ASTM D 1586). The method includes driving an 18-inch-long split-spoon sampler with a 140-pound hammer. The number of blows required to drive the sampler 18 inches were recorded in three (3) 6-inch intervals. The number of blows for the last two intervals were added together to determine the blow count (N) or blows per foot (bpf), which are used to estimate the in-place consistency of the soil. The soil types and blow counts were documented on boring logs (see Attached Boring Logs).

Surface Conditions.

The site is developed with a one-story house with a basement and attic and a detached garage. The house and garage sit downslope of the gravel driveway that provides access for both the referenced site and the adjacent property to the west (see Figure 2). Downslope of the structures, the property slopes towards the southeast, where it abuts the railroad tracks.

There are two areas of Fill on the property (see Figures 2 and 3). The Fill is most likely from the excavation of the basement and of the graveled driveway. The Fill appears to be isolated and was not encountered in the borings.

There are large trees in the area of the proposed lots. These trees would either be worked around or removed as the site is developed.

Subsurface Conditions

The following subsurface conditions were encountered at the site:

Silty Topsoil (ML). Up to 4 inches of Silty Topsoil was encountered across the site. The Topsoil is not appropriate for bearing surface and will need to be stripped from the site. It can be, however, stored onsite and used for non-structural general fill in landscape areas.

Silt (ML). Silt, up to 1 to 2 feet deep, was encountered across the site. The Silt was brown, moist, and medium stiff.

Volcanic Bedrock. Volcanic Bedrock was encountered directly under the Silt. The bedrock was hard to very hard, and will provide a good bearing surface.

Groundwater

No groundwater was observed on the property.

GEOLOGIC HAZARDS

The Clark County Geo

SEISMIC CONSIDERATION

The site is located in southwest of Camas, Washington. The site is at latitude 45.5779 and longitude -122.4439, respectively. The seismically induced acceleration values at the rock interface, and the coefficients used to estimate ground surface response adjusted for Site Class B (rock), for the MCE at the site are presented below:

Seismic Parameters	Value
Mapped Peak Ground Acceleration, ASCE7-10, Fig. 22-7, PGA	0.405g
Peak Ground Acceleration adjusted for site effects, PGA_M	0.405g
MCE Bedrock Spectral Acceleration, 0.2 second period, S_S	0.938g
MCE Bedrock Spectral Acceleration, 1.0 second period, S_1	0.386g
Short-Period Site Factor, F_a	1.0
Long-Period Site Factor, F_v	1.0
Soil MCE Spectral Acceleration, 0.2 second period, Site Class D, S_{MS}	0.938g
Soil Design Spectral Acceleration, 1.0 second period, Site Class D, S_{M1}	0.386g
Soil Design Spectral Acceleration, 0.2 second period, Site Class D, S_{DS}	0.625g
Soil Design Spectral Acceleration, 1.0 second period, Site Class D, S_{D1}	0.257g

CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations in this report are based on the information provided to us, results of the site investigation, and professional judgment. We have observed only a small portion of the pertinent soil and groundwater conditions. The recommendations are based on the assumptions that the soil conditions do not deviate appreciably for those encountered during our site visit.

Conclusions

It is our opinion that the property is geotechnically sound for the project. Our opinion assumes that the recommendations provided below are followed.

Recommendations

Site Preparation.

TDC recommends that once the house and the garage are demolished, the foundation, and other construction debris be overexcavated and removed from the site. The basement walls and floors shall be removed and the area backfilled with Structural Fill, as described below. If underground storage tanks or cisterns are encountered, then they should be removed and appropriately backfilled.

Wet Weather or Wet Soil Construction

During wet weather or soil conditions, the exposed soils may be disturbed with construction traffic. Such disturbance will structurally weaken the soil and render it unsuitable for uses in foundation bearing.

If construction occurs during wet weather, the exposed soils should be protected with at least non-woven geofabric and 12 inches of rock with less than 6 percent fines. In addition, care should be taken to minimize disturbance of native Silty soil, which may become "pumped" and weakened by repeated loading and vibratory compaction and wheeled equipment. Should soils become disturbed, the soils should be removed to firm native subgrade and replaced with compacted ¾-inch-minus gravel structural fill placed in accordance with the above recommendations.

Excavation

No deep excavations are anticipated for the project. Within 3 feet of the surface is volcanic bedrock. Excavation into the bedrock may require additional effort.

Several large trees are located within the area of the proposed townhomes. If the trees are within 5 feet of the foundation, then the trees and rootballs shall be removed. The rootball and roots over 4 inches shall be overexcavated and replaced with Structural Fill.

Fill Areas.

As noted above, there are two area of Fill that will need to be removed. The first area surrounds the footprint of the existing house and the second is just downslope of the gravel driveway near the entrance to the property (see Figures 2 and 3). These areas will need to be overexcavated and removed from the site. The Fill is not appropriate as Structural Fill. If require, this material shall be replaced with Structural Fill, as described below.

Structural Fill

Structural Fill may be required in the areas that the Undocumented Fill has been removed. The Structural Fill shall consist of 1 ½ inch to ¾-inch crushed rock with 10 percent passing No 200 sieve. The Structural Fill shall have little to no organics or other deleterious materials. The Structural Fill shall be placed in 12-inch-thick lifts and compacted to 95 percent of the maximum dry density as determined by standard Proctor (ASTM D698). At the time of placement, moisture content of the Structural Fill shall be within 5 percent of the Optimum Moisture Content. The subgrade of the Structural Fill shall be firm, non-yielding, native soil that is neat cut.

All Structural Fills over 2 feet thick shall be tested by a Materials Testing company, such as ACS Testing or Carlson.

Shallow Foundation Recommendations

TDC recommends that continuous footings and individual spread footings should be embedded at least 18 inches into the native Volcanic Rock. Subgrades for the shallow foundations should be firm and free of organics and deleterious debris as determined by the geotechnical engineer. Soft soils or undocumented fills encountered during excavation of the footings should be removed to firm soils and backfilled with imported granular structural fill, as described above.

Lateral loads on the building foundations may be resisted using an allowable frictional coefficient of 0.35. In addition, passive resistance may be considered using an allowable equivalent fluid weight of 300 pound per cubic foot (pcf). For consideration of passive resistance, the upper 1 foot of embedment should be disregarded.

Allowable Bearing Capacity

TDC recommends an allowable bearing capacity of 3,500 psf for the native, non-yielding Volcanic Rock subgrade, as recommended below. The allowable bearing capacity can be increased by one-third to account for seismic and other transitory live loads.

Estimated Total and Differential Settlements

With the foundation bearing on rock, the total and differential settlements are not applicable.

Slab-on-Grade Recommendations

The slab-on-grade should be designed for an allowable subgrade reaction modulus of approximately 150 pounds per cubic inch (pci). The subgrade soil shall be firm, non-yielding condition at the time of slab construction. Soft areas encountered during the preparation of the slab subgrade should be overexcavated and replaced with structural fill.

For wet weather conditions, care must be taken to reduce the potential of rainwater ponding on the slab-on-grade rock section. In the areas where covered with moisture-sensitive flooring, an additional 4-inch thick lift of ¼-inch to ¾-inch, open graded, angular drain rock placed below the capillary break.

It is our experience that concrete slab-on-grade commonly exhibit shrinkage cracks despite the presence of steel reinforcing or fiber strands. This cracking can be reduced by using a low-slump concrete, properly designed and constructed joints and by properly curing the concrete.

Surface Water Management.

The referenced property is underlain volcanic rock and cannot percolate surface water. Therefore, TDC recommends that the stormwater be managed with onsite facilities, such as Flow-Through'' planters and allowed to discharge offsite.

REVIEW AND CONSTRUCTION MONITORING

TDC shall review final plans and specifications for the new tasting room and, if required, the access road. This review will allow us to examine the documents to determine whether the intent of our recommendations presented in this report was incorporated into the report.

TDC should provide construction monitoring during the foundation construction activities. The purpose of our field monitoring services is to confirm that the site conditions are as anticipated and to provide field recommendations as required based on the conditions encountered. TDC should observe the following:

- Foundation Subgrade Conditions;
- If required, a material testing firm, such as ACS Testing shall be hired for laboratory and field density testing of the Structural Fill.

LIMITATIONS

Geotechnical review is of paramount importance in engineering practice. The poor performance of many foundations has been attributed to inadequate construction review. On-site grading and earthwork should be observed and, where necessary, tested by a qualified engineering firm to verify the compliance with the recommendations contained in this report. Foundation excavation should also be observed to compare the generalized site conditions assumed in this report with those found on the site at the time of construction. If the plans for site development are changed, or if various or undesirable geotechnical conditions are encountered during construction, the geotechnical engineer should be consulted for further recommendations.

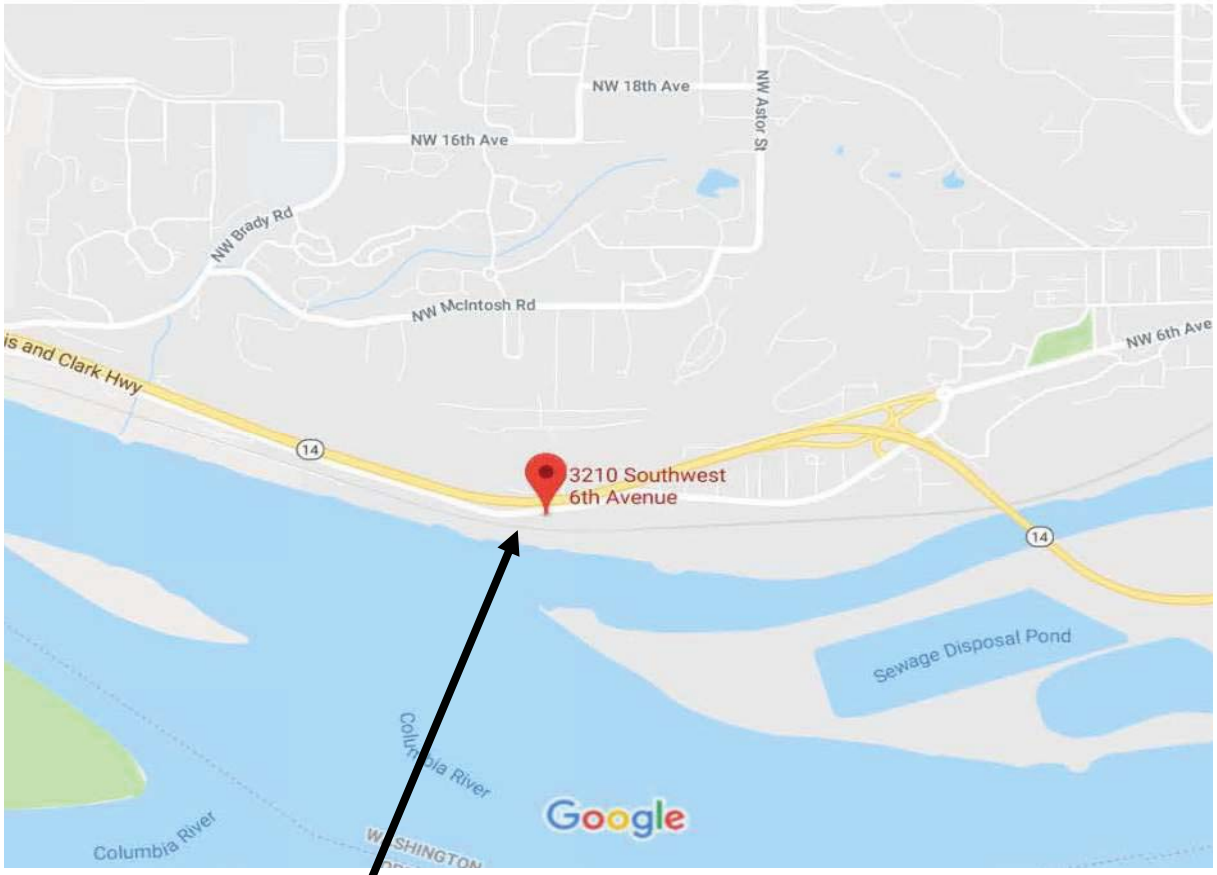
This report is issued with the understanding that it is the responsibility of the Client to ensure that the recommendations are incorporated in the plans and the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field. Geotechnical engineering is characterized by a certain degree of uncertainty. Professional judgments presented are based partly on our understanding of the proposed construction and partly on our general experience. Our engineering work and judgments rendered meet current professional standards; no other warranties, either expressed or implied are made. This report is subject to review and should not be relied upon after a period of 3 years.

It has been a pleasure providing you the geotechnical services for this project. If you have any questions, please call at 503.502.5114.

Sincerely,
Terra Dolce Consultants, Inc.

Cynthia L. Hovind, P.E., G.E.
Professional Geotechnical Engineer, OR-**17857PE**

Attachments
Figure 1 – Vicinity Map
Figure 2 – Site Plan
Figure 3 – Proposed Development
Boring Logs



Site

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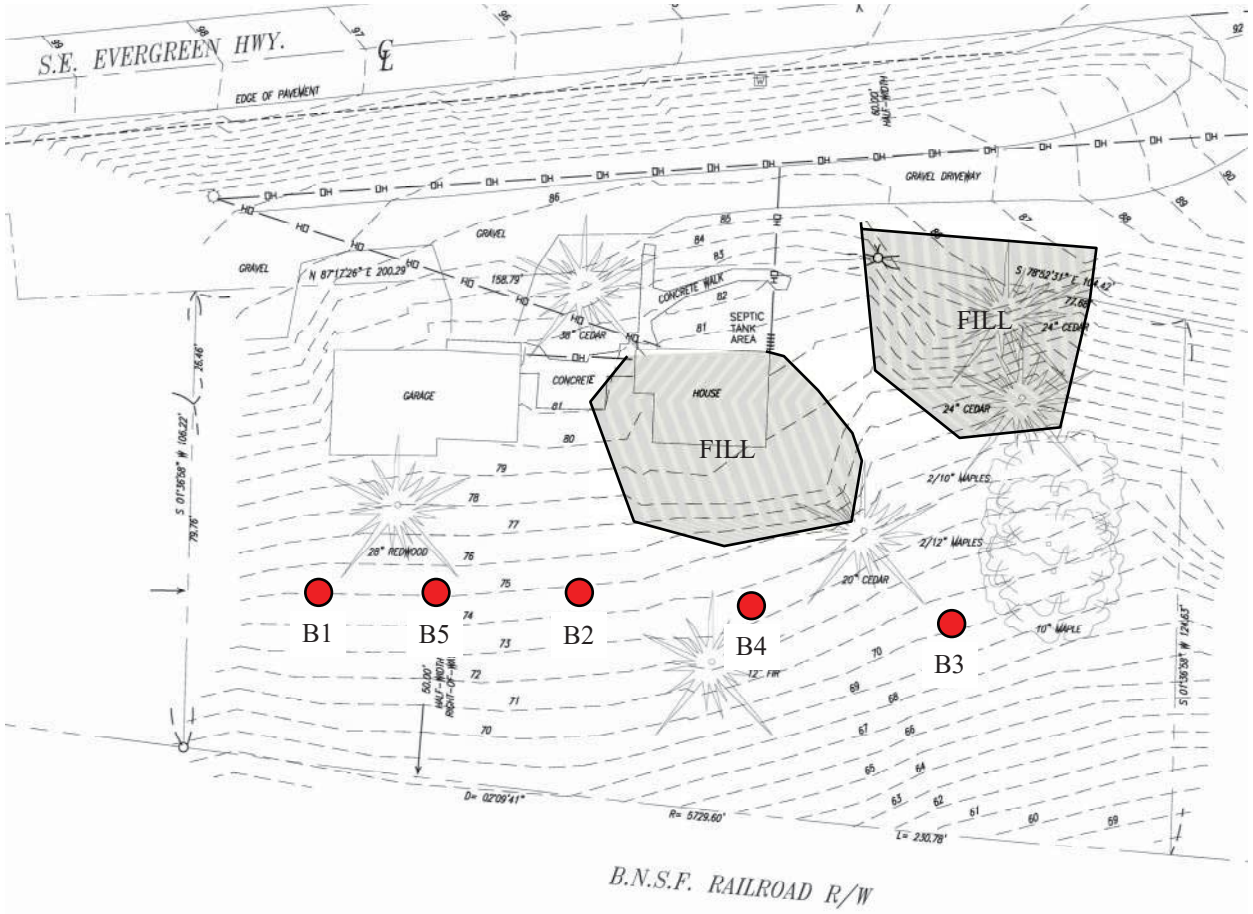
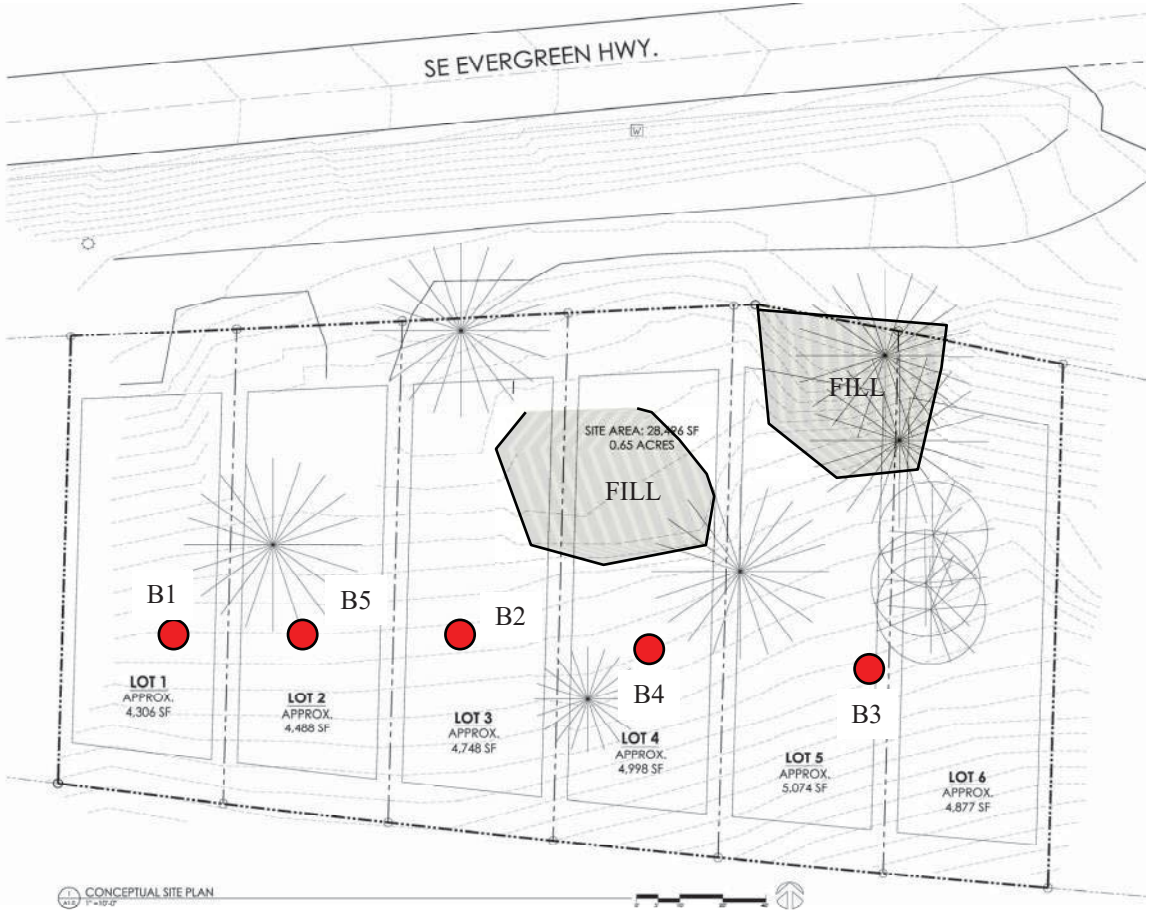
GOOGLE MAP, 2018

Terra Dolce Consultants, Inc. 4706 NE 75th Ave Portland, Oregon 97218 Phone 503.502.5114 Fax 503.206-5114	Terrie Cox Living Trust 3210 SW 6th Ave. Camas, WA

Project No. 839-001	**October 8, 2018**	**Vicinity Map**	**Figure 1**



Terra Dolce Consultants, Inc. 4706 NE 75th Ave Portland, Oregon 97218 Phone 503.502.5114 Fax 503.206-5114		Terrie Cox Living Trust Proposed Camas Riverfront Townhomes 3210 SW 6th Ave. Camas, WA	
Project No. 839-001	**October 8, 2018**	**Site Map**	**Figure 2**



Terra Dolce Consultants, Inc. 4706 NE 75th Ave Portland, Oregon 97218 Phone 503.502.5114 Fax 503.206-5114	Terrie Cox Living Trust Proposed Camas Riverfront Townhomes 3210 SW 6th Ave. Camas, WA

Project No. 839-001	**October 5, 2018**	**Proposed Development**	**Figure 3**

BORING LOGS

Terra Dolce Consultants, Inc

Boring Log No. B-1
Camas Riverfront Townhomes

Location: 3210 SW 6th Ave. Camas, WA			**WO#: 839-001**
Method: Solid Stem Auger 4"			**Ground EL: N/A**
Hammer: Safety Hammer		**Hammer weight (lb): 140**	**Hole depth (ft): 2**
Sampler: Split Spoon 2"	**Drop (in): 30**	**G.W.T. @ Drilling (ft): N/A**	**Sampled by: AS**
Driller: Dan J. Fischer Excavating		**Drill Date: 8/28/18**	**Logged by: AS**

Depth	Strata	GWT	No.	Type	Blows Per 6"	USCS	Soil Description	Notes
0		GWT not encountered				ML	Silt (ML), brown, moist, medium stiff (Silt)	
1							Basalt Bedrock, light grey-brown, dry, hard (Basalt Bedrock)	
2			1		10-10-43		Boring completed at depth of 2 feet	Refusal in bedrock
3								
4								
5								
6								
7								

■ SPT. blow/ft ○ Moisture %

0 20 40 60

Remarks:

Terra Dolce Consultants, Inc

Boring Log No. B-2
Camas Riverfront Townhomes

Location: 3210 SW 6th Ave. Camas, WA			**WO#: 839-001**
Method: Solid Stem Auger 4"			**Ground EL: N/A**
Hammer: Safety Hammer		**Hammer weight (lb): 140**	**Hole depth (ft): 5**
Sampler: Split Spoon 2"	**Drop (in): 30**	**G.W.T. @ Drilling (ft): N/A**	**Sampled by: AS**
Driller: Dan J. Fischer Excavating		**Drill Date: 8/28/18**	**Logged by: AS**

Depth	Strata	GWT	No.	Type	Blows Per 6"	USCS	Soil Description	SPT. blow/ft ○ Moisture % (0 20 40 60)	Notes
0		GWT not encountered				ML	Silt (ML), brown, moist, medium stiff (Silt)		
2							Basalt Bedrock, red-brown, dry, hard (Basalt Bedrock)		
3			1		22-50/4"				Refusal in basalt bedrock
5							Boring completed at depth of 5 feet		
6			2		50/1.5"				Refusal in basalt bedrock
7									

Remarks:

Plate 2

Terra Dolce Consultants, Inc

Boring Log No. B-3
Camas Riverfront Townhomes

Location: 3210 SW 6th Ave. Camas, WA			**WO#: 839-001**
Method: Solid Stem Auger 4"			**Ground EL: N/A**
Hammer: Safety Hammer		**Hammer weight (lb): 140**	**Hole depth (ft): 1.5**
Sampler: Split Spoon 2"	**Drop (in): 30**	**G.W.T. @ Drilling (ft): N/A**	**Sampled by: AS**
Driller: Dan J. Fischer Excavating		**Drill Date: 8/28/18**	**Logged by: AS**

Depth	Strata	GWT	No.	Type	Blows Per 6"	USCS	Soil Description	Notes
0		GWT not encountered				ML	Silt (ML), brown, moist, medium stiff (Silt)	
1							Basalt Bedrock, light grey-brown, dry, hard (Basalt Bedrock)	
							Boring completed at depth of 1.5	
2			1		50/3.5"			Refusal in basalt bedrock
3								
4								
5								
6								
7								

■ SPT. blow/ft
○ Moisture %
0 20 40 60

Remarks:

Plate 3

Terra Dolce Consultants, Inc

Boring Log No. B-4
Camas Riverfront Townhomes

Location: 3210 SW 6th Ave. Camas, WA			**WO#: 839-001**
Method: Solid Stem Auger 4"			**Ground EL: N/A**
Hammer: Safety Hammer		**Hammer weight (lb): 140**	**Hole depth (ft): 4**
Sampler: Split Spoon 2"	**Drop (in): 30**	**G.W.T. @ Drilling (ft): N/A**	**Sampled by: AS**
Driller: Dan J. Fischer Excavating		**Drill Date: 8/28/18**	**Logged by: AS**

Depth	Strata	GWT	No.	Type	Blows Per 6"	USCS	Soil Description	SPT. blow/ft ○ Moisture % (0 20 40 60)	Notes
0		GWT not encountered				ML	Silt (ML), brown, moist, medium stiff (Silt)		
1							Basalt Bedrock, purple-grey, dry, hard (Basalt Bedrock)		
2									
3			1		50/1.5"				Refusal in basalt bedrock
4							Boring completed at depth of 4 feet		
5			2		36-50/4"				Refusal in basalt bedrock
6									
7									

Remarks:

Terra Dolce Consultants, Inc

Boring Log No. B-5
Camas Riverfront Townhomes

Location: 3210 SW 6th Ave. Camas, WA			**WO#: 839-001**
Method: Solid Stem Auger 4"			**Ground EL: N/A**
Hammer: Safety Hammer		**Hammer weight (lb): 140**	**Hole depth (ft): 2**
Sampler: Split Spoon 2"	**Drop (in): 30**	**G.W.T. @ Drilling (ft): N/A**	**Sampled by: AS**
Driller: Dan J. Fischer Excavating		**Drill Date: 8/28/18**	**Logged by: AS**

Depth	Strata	GWT	No.	Type	Blows Per 6"	USCS	Soil Description	Notes
0		GWT not encountered				ML	Silt (ML), brown, moist, medium stiff (Silt)	
1							Basalt Bedrock, light grey-brown, dry, hard (Basalt Bedrock)	
2							Boring completed at depth of 2 feet	
			1		50/4"			Refusal in basalt bedrock
3								
4								
5								
6								
7								

■ SPT. blow/ft ○ Moisture %

0 20 40 60

Remarks:

Plate 5