# Preliminary Technical Information Report

DSHS Clark County
2020-473 48 Bed Community RTF

16015 NE 50th Ave.
Vancouver, WA 98686

Prepared by BCRA

**June 2021**

bcra
2106 Pacific Avenue, Suite 300
Tacoma, WA 98402

# PRELIMINARY TECHNICAL INFORMATION REPORT

June 2021

**PROJECT:**
DSHS Clark County:
202-473 48 Bed Community RTF
16015 NE 50th Ave.
Vancouver, WA 98686

**OWNER:**
DSHS Office of Capital Programs
PO Box 45848
Olympia, WA 98504

**ENGINEER:**
BCRA Civil Engineering
2106 Pacific Avenue, Suite 300
Tacoma, WA 98402

**PREPARED BY:**
Shannon Podgorski, PE
SPodgorski@bcradesign.com

**REVIEWED BY:**
Zachary Crum, PE
ZCrum@bcradesign.com

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I hereby state that this preliminary report for the DSHS Clark County: 2020-473 48 Bed Community RTF project has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. Based upon the preliminary calculations presented in this report and the supporting information provided by others, the proposed stormwater facilities are feasible and will function as designed to meet the requirements of Clark County Code section 40.386 and the 2015 Clark County Stormwater Manual.


06/18/2021

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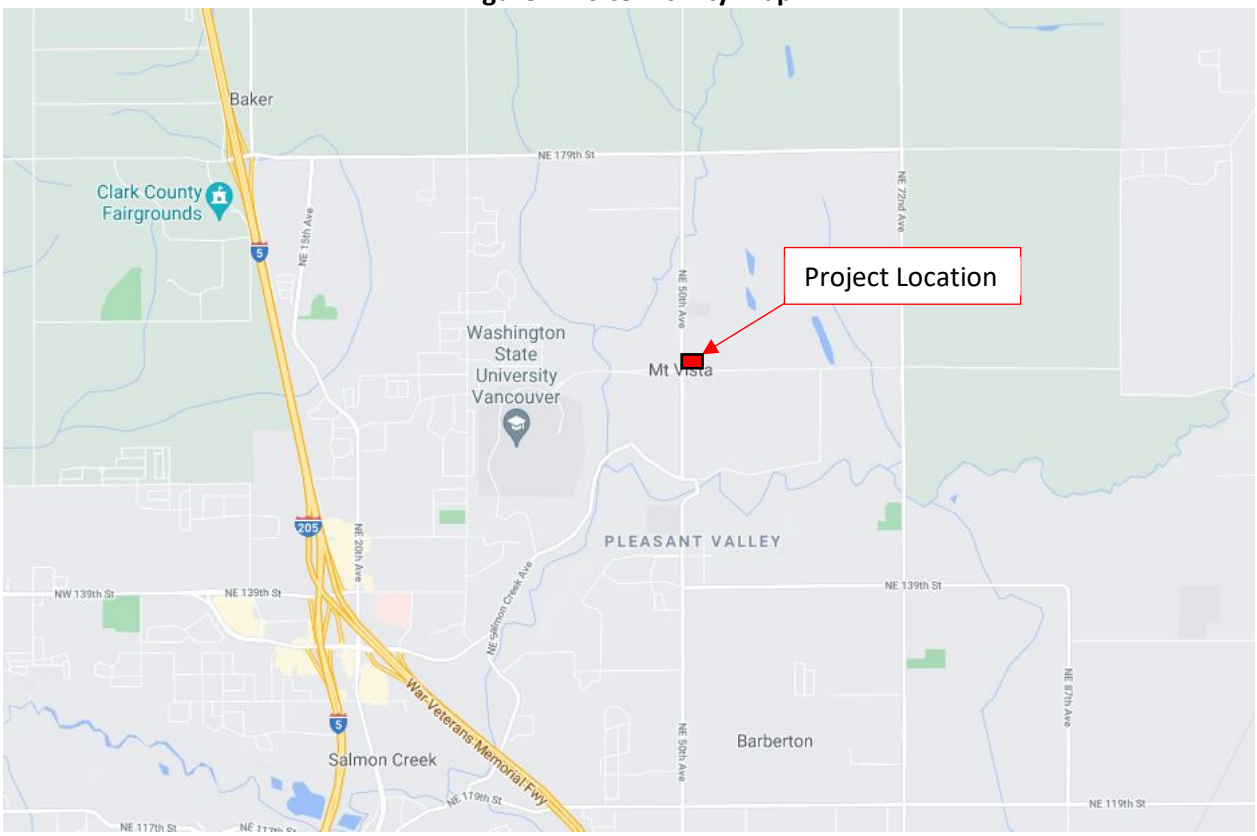
# Section A – Project Overview

## A.1 Site Information

The DSHS project consists of three buildings associated with civil commitment and nursing programs as well as one smaller maintenance facility building. The project is located at 16015 NE 50th Ave, Vancouver, WA and is bounded by NE 50th Ave to the west, NE 159th St to the south, and single-family residences to the north and east. The parcel number is 195925000. The just under 20-acre parcel is split between two lots, west and east. The west lot is about 7.5 acres and the east about 11.6 acres. This project develops approximately 8.1 acres of the east lot as Wetland C and its buffer will not be altered by the project. The parcel is zoned Business Park (BP). Zoning to the north is Business Park (BP), east and south are Rural-5 (R-5) with Urban Reserve -10 (UR-10) overlay, and west is University (U).

**Figure 1 – Site Vicinity Map**




The majority of the existing site is covered by grasses which have been mowed or hayed a couple times a year. There are a few trees and shrubs on the northeastern end of the parcel around the perimeter of Wetland C and in the areas surrounding the existing residence and barn within the west lot. Existing site grades are flat and generally slope from the north-northwest corner of the parcel to the south-southeast with onsite wetlands acting as local depressions.

The project site is not within a flood hazard area. Refer to the FEMA FIRMette in Appendix B.

The only critical areas on site are five wetlands located on the site: Wetlands A, B, C, D, and E. All the wetlands have a Type III Category rating. Wetlands A and B are classified as palustrine, emergent and depressional. Wetland C is classified as palustrine, forested and depressional. Due to their small size and

not having hydrologic connectivity to other wetlands, Wetlands D and E are considered exempt and are not regulated by the County Wetland Protection Ordinance. Wetland C will be the only wetland preserved in the developed condition and the remainder of the other wetlands will be filled.

High groundwater has been observed at the site. The Geotechnical Engineering Report by PBS, dated June 16, 2021, states that groundwater was found to be as shallow as 1.2 feet below existing grades.

The are no existing on-site stormwater facilities. Stormwater runoff from the site overland flows to either one of the wetlands onsite or to a roadside ditch along NE 159th St. There is some run-on from the adjacent property to the north. Refer to the Existing Basin Map at the end of this section for extents of run-on. Once entering the roadside ditch, stormwater runoff is either infiltrated or conveyed to the east through a series of ditches for over ¼ mile. Runoff within this region is eventually tributary to Salmon Creek.

On-site improvements will include buildings, drive aisles, parking, curbs, and sidewalks. The preliminary stormwater concept for both lots proposes infiltrating all runoff onsite. This will be achieved through a network of shallow infiltration basins. Treatment will be provided for runoff from pollution generating surfaces through infiltration into native soils.

Off-site improvements include a sanitary sewer main extension, a water main extension, and half-road improvements (road widening, curb and gutter, sidewalk) for the full frontage of the east lot. Runoff from off-site areas subject to the Minimum Requirements, as discussed in the following section, will be treated with a proprietary treatment facility and then conveyed to the existing roadside ditch.

### A.2 Determination of Applicable Minimum Requirements

Permanent on-site stormwater facilities described in this report will be designed to comply with the minimum requirements of the 2015 Clark County Stormwater Manual (CCSM). The existing impervious coverage on-site is less than 35%, therefore this project is considered a new development. Since the project will result in greater than 5,000 sf of new plus replaced hard surfaces all minimum requirements apply to the new and replaced hard surfaces and converted vegetation areas. Refer to the New Development flowchart from the CCSM in Appendix C of this report.

Per Book 1, Section 1.2.3 of the CCSM, utility work that replaces the ground surface with in-kind material or materials with similar runoff characteristics are subject only to Minimum Requirement #2, Construction Stormwater Pollution Prevention. Therefore, the only work within the right-of-way (ROW) that is subject to the minimum requirements would be the half-road improvements along the lot frontage. The project area takeoffs below reflect areas that are subject to all of the Minimum Requirements.

**Table 1: Project Area Takeoffs**

| | On-Site (sf) | Off-Site (sf) | Total (sf) |
|---|---|---|---|
| Existing Hard Surface | 0 | 8,411 | 8,411 |
| New + Replaced Hard Surface | 133,914 | 22,982 | 156,896 |
| Total Land-Disturbing Activity | 352,969 | 29,361 | 382,330 |
| Total Proposed PGHS | 63,577 | 19,173 | 82,750 |
| Total Proposed PGPS | 0 | 0 | 0 |

## Section B – Minimum Requirements

### Minimum Requirement #1: Preparation of Stormwater Site Plans

A full stormwater site plan will be included with the final submittal.

### Minimum Requirement #2: Construction Stormwater Pollution Prevention Plan (SWPPP)

The Construction SWPPP will be provided with the final submittal of this report.

### Minimum Requirement #3: Source Control of Pollution

During construction, the contractor shall implement the applicable source control BMPs as outlined in the SWPPP (included with final submittal). Post construction maintenance shall implement the applicable source control BMPs as outline in the Operation and Maintenance Manual (included with final submittal). The BMPs include, but are not limited to, S411 BMPs for Landscaping and Lawn/Vegetation Management, S417 BMPs for Maintenance of Stormwater Drainage and Treatment Systems, and S450 BMPs for Irrigation.

### Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

Stormwater runoff will be designed to fully infiltrate, mimicking the natural site hydrology.

### Minimum Requirement #5: On-Site Stormwater Management

The project development will meet the LID Performance Standard through fully infiltrating runoff on-site. Refer to the Minimum Requirement #7 section for a further discussion of the design of the stormwater facilities. All lawn and landscaped areas on-site will meet the requirements BMP T5.13, Post-Construction Soil Quality and Depth. Refer to the WWHM Modeling Report in Appendix G which shows that the LID Performance Standard is met.

### Minimum Requirement #6: Runoff Treatment

This project is subject to enhanced treatment for all new and replaced pollution generating surfaces. An oil control facility is not required because the project is not a “high-use site”. Infiltration for pollutant removal into the native soils is practicable and will be utilized to the maximum extent feasible. Phosphorus control is not required because the project is not within the Lacamas Watershed.

Stormwater runoff from pollution-generating surfaces will be conveyed via curb and gutter to presettling basins that discharge to infiltrating basins. These basins will utilize the native soils for treatment. The Geotechnical Engineering Report discusses the testing performed and the results which verified the suitability of the native soils for stormwater treatment. The infiltration facilities will be designed to infiltrate 100% of stormwater runoff using the 2012 Western Washington Hydrology Model (WWHM), a continuous simulation hydrologic model. See discussion under Minimum Requirement #7 below for sizing of the infiltration facilities. Refer to the Preliminary Development Plan in Appendix E for facility locations and approximate sizing.

### Minimum Requirement #7: Flow Control

Flow control requirements will be met by fully infiltrating stormwater runoff onsite. Preliminary measured infiltration rates within the project site range from 0.84 in/hr to 1.0 in/hr. Using the appropriate factors given in the CCSM, this brings the design rate to 0.21 in/hr to 0.24 in/hr. Although

rates are low, infiltration is feasible for the site based on geotechnical recommendations. As a conservative measure for this preliminary analysis, the infiltration facilities were modeled with a 0.20 in/hr infiltration rate.

Stormwater runoff will be routed to a series of connected infiltration basins across the site. The basins within the west half of the site are designed to have a minimum ponding depth of 6”, a minimum freeboard of 6”, and have maximum 3:1 side slopes. The basins within the east half of the site are designed to have a minimum ponding depth of 9” and minimum freeboard of 6”. All basins are sized to infiltrate 100% of influent runoff. Multiple infiltration areas will be hydraulically connected with 12” ductile iron pipes in order to adequately utilize all areas available for infiltration. Refer to the Preliminary Development Plan in Appendix E for preliminary layout and sizing for the infiltration basins.

Due to the high groundwater condition, as discussed in the Site Overview section, a groundwater mounding analysis will be performed in accordance with Book 2, Section 5.1.1.2 of the CCSM in order to show that the proposed facilities will not have negative impacts to the site or adjacent properties. The analysis will be included with the final engineering submittal. Since groundwater will be within 5 feet of the bottom of the infiltration facilities, a stormwater variance will also be submitted for this project.

For this preliminary design, the west infiltration basins and east infiltration basins were each modeled as a single basin. Due to grading constraints, stormwater runoff from frontage improvements cannot be gravity conveyed to the on-site infiltration facilities. In addition, due to the high groundwater condition, it is not feasible to infiltrate stormwater runoff within the ROW. Therefore, runoff from the frontage improvements was modeled as bypass. The takeoffs for the impervious areas tributary to the infiltration basins were increased by 5% to provide a factor of safety in accordance with the preliminary nature of the design. See the following pages for screenshots of the WWHM modeling which shows that the infiltration basins provide adequate area to infiltrate 100% of stormwater runoff and that the flow control standard is met when compared to a predeveloped forested condition. Refer to Appendix G for the full modeling report.

**Figure 2 – WWHM Model Layout**

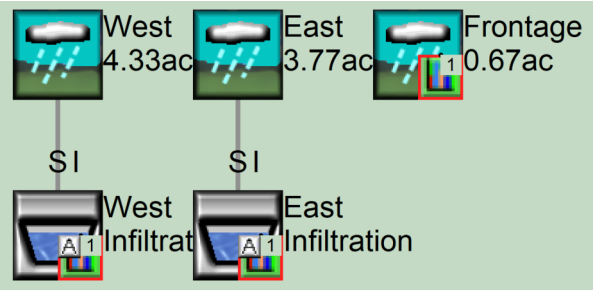



**Figure 3 – West Infiltration Basin**

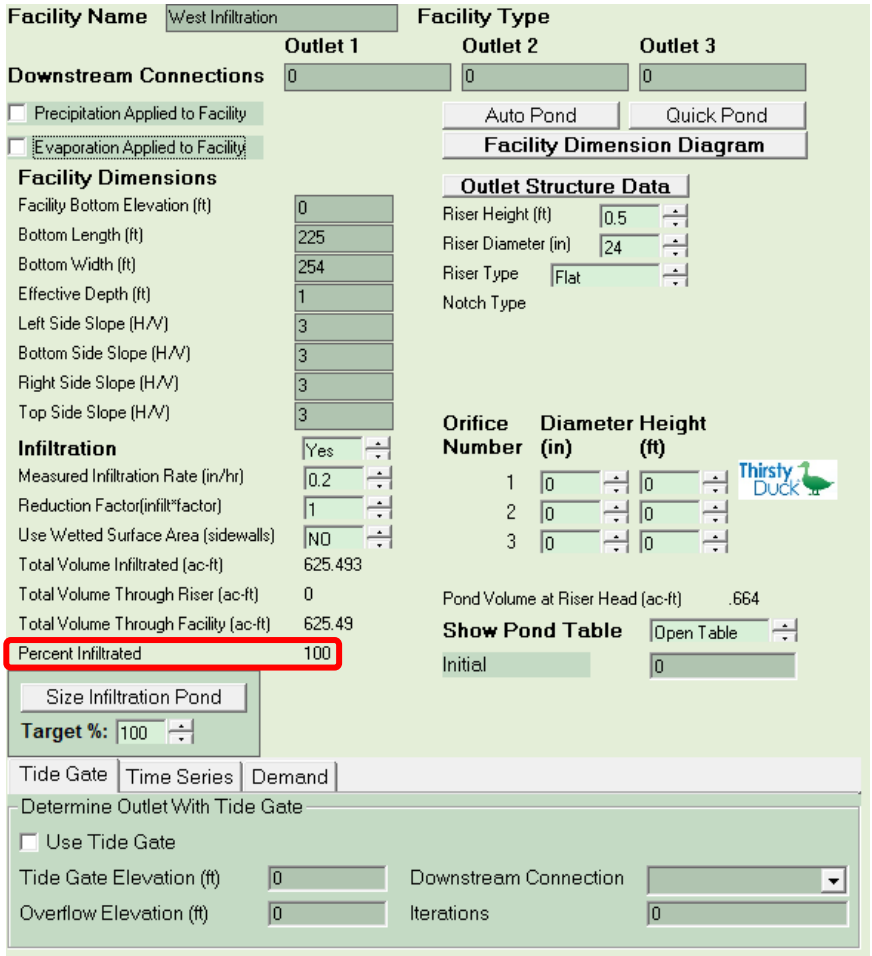


**Figure 4 – East Infiltration Basin**

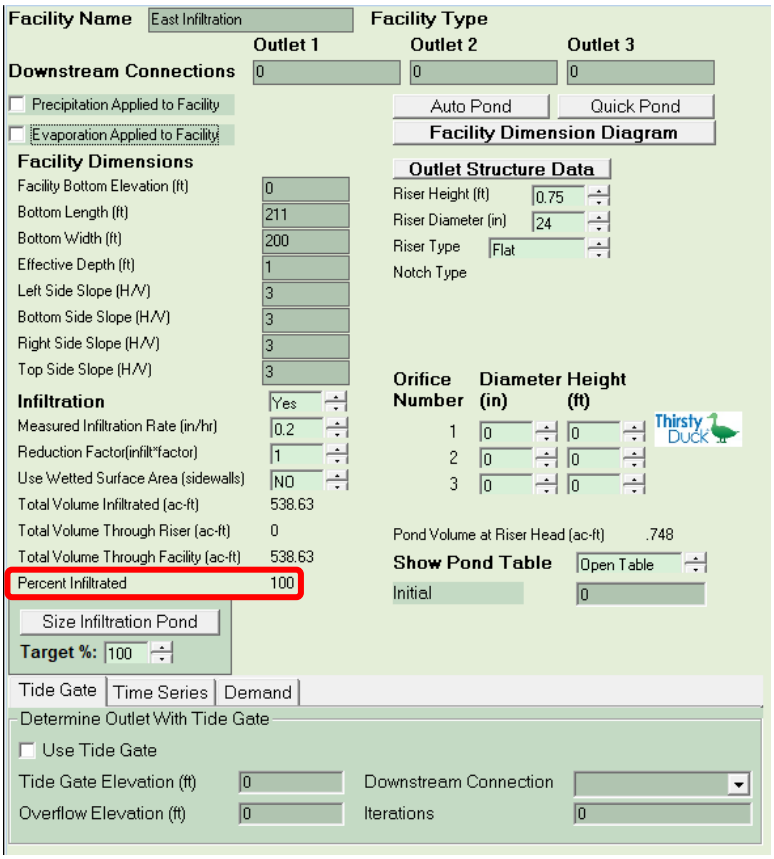
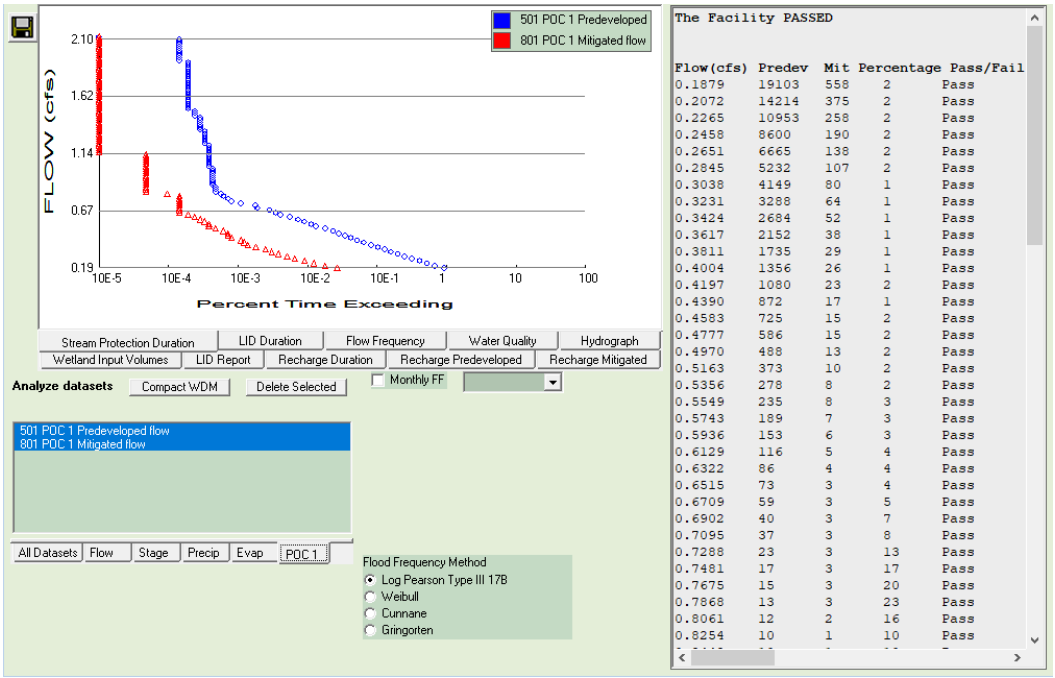



**Figure 5 – Flow Control Analysis Results**



### Minimum Requirement #8: Wetlands Protection

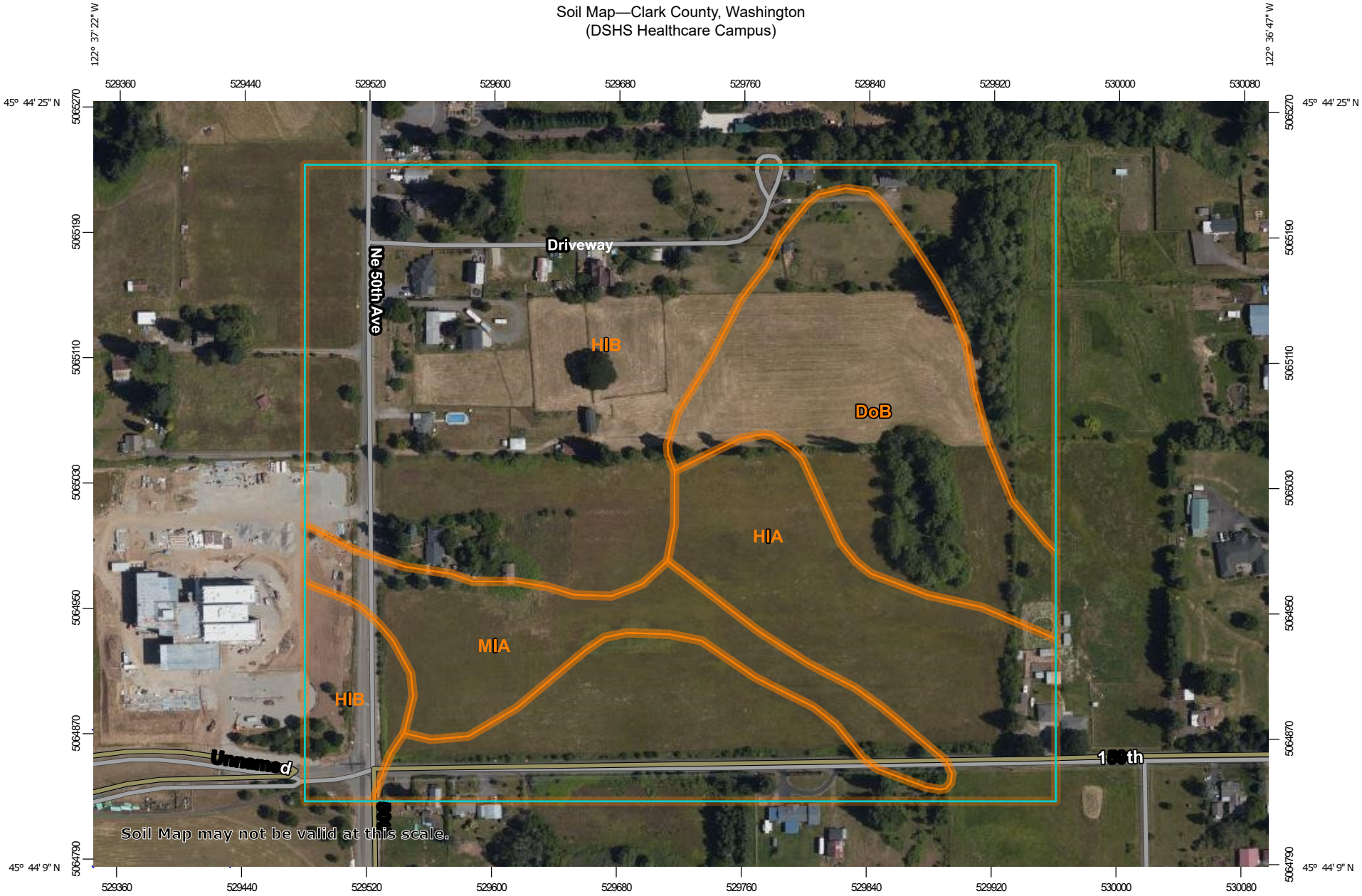
As mentioned in the Project Overview, only one of the five wetlands on-site will be preserved. No work will be done within Wetland C or its buffer. No stormwater runoff will directly or indirectly discharge to the wetland from the developed site. Therefore, per the CCSM Minimum Requirement #8 Review Checklist, Minimum Requirement #8 is not applicable to this project. The wetland will be protected per the requirements of Clark County Code section 40.450. Refer to Appendix F for the Review Checklist.

### Minimum Requirement #9: Operations and Maintenance

An Operations and Maintenance Manual will be provided with the final submittal of this report.

# APPENDIX A –
# NRCS SOILS MAP

Soil Map—Clark County, Washington
(DSHS Healthcare Campus)




Map Scale: 1:3,440 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

## MAP LEGEND

**Area of Interest (AOI)**
- Area of Interest (AOI)

**Soils**
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

**Special Point Features**
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

**Water Features**
- Streams and Canals

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

**Background**
- Aerial Photography

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

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

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

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

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

Soil Survey Area: Clark County, Washington
Survey Area Data: Version 18, Jun 4, 2020

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

Date(s) aerial images were photographed: Jun 13, 2019—Jul 25, 2019

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

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| DoB | Dollar loam, 0 to 5 percent slopes | 8.6 | 17.8% |
| HlA | Hillsboro loam, 0 to 3 percent slopes | 12.1 | 24.9% |
| HlB | Hillsboro loam, 3 to 8 percent slopes | 23.0 | 47.3% |
| MlA | McBee silt loam, coarse variant, 0 to 3 percent slopes | 4.9 | 10.0% |
| **Totals for Area of Interest** | | **48.5** | **100.0%** |

# Clark County, Washington

## DoB—Dollar loam, 0 to 5 percent slopes

### Map Unit Setting

*National map unit symbol:* 2dx1
*Elevation:* 50 to 390 feet
*Mean annual precipitation:* 50 inches
*Mean annual air temperature:* 50 degrees F
*Frost-free period:* 170 to 210 days
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Dollar and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Dollar

#### Setting

*Landform:* Terraces
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 6 inches:* loam
*H2 - 6 to 32 inches:* loam
*H2 - 32 to 60 inches:* loam

#### Properties and qualities

*Slope:* 0 to 5 percent
*Depth to restrictive feature:* 20 to 40 inches to fragipan
*Drainage class:* Moderately well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 18 to 36 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Low (about 5.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3w
*Hydrologic Soil Group:* C
*Forage suitability group:* Seasonally Wet Soils (G002XV202WA)
*Other vegetative classification:* Seasonally Wet Soils (G002XV202WA)

*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Clark County, Washington
Survey Area Data: Version 18, Jun 4, 2020

# Clark County, Washington

## HlA—Hillsboro loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 2dxh
*Elevation:* 100 to 390 feet
*Mean annual precipitation:* 40 to 50 inches
*Mean annual air temperature:* 54 degrees F
*Frost-free period:* 170 to 210 days
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Hillsboro and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Hillsboro

#### Setting

*Landform:* Terraces
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 7 inches:* loam
*H2 - 7 to 36 inches:* loam
*H3 - 36 to 48 inches:* sandy loam
*H4 - 48 to 60 inches:* sand

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* 40 to 59 inches to strongly contrasting textural stratification
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 8.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 1
*Hydrologic Soil Group:* B
*Forage suitability group:* Soils with Few Limitations (G002XV502WA)
*Other vegetative classification:* Soils with Few Limitations (G002XV502WA)

*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Clark County, Washington
Survey Area Data: Version 18, Jun 4, 2020

# Clark County, Washington

## HlB—Hillsboro loam, 3 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* 2dxj
*Elevation:* 100 to 390 feet
*Mean annual precipitation:* 40 to 50 inches
*Mean annual air temperature:* 54 degrees F
*Frost-free period:* 170 to 210 days
*Farmland classification:* All areas are prime farmland

### Map Unit Composition

*Hillsboro and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Hillsboro

#### Setting

*Landform:* Terraces
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 7 inches:* loam
*H2 - 7 to 36 inches:* loam
*H3 - 36 to 48 inches:* sandy loam
*H4 - 48 to 60 inches:* sand

#### Properties and qualities

*Slope:* 3 to 8 percent
*Depth to restrictive feature:* 40 to 59 inches to strongly contrasting textural stratification
*Drainage class:* Well drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 8.6 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2e
*Hydrologic Soil Group:* B
*Forage suitability group:* Soils with Few Limitations (G002XV502WA)
*Other vegetative classification:* Soils with Few Limitations (G002XV502WA)

*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Clark County, Washington
Survey Area Data: Version 18, Jun 4, 2020

# Clark County, Washington

## MIA—McBee silt loam, coarse variant, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* 2dyj
*Elevation:* 100 to 390 feet
*Mean annual precipitation:* 50 inches
*Mean annual air temperature:* 50 to 54 degrees F
*Frost-free period:* 170 to 210 days
*Farmland classification:* Prime farmland if drained

### Map Unit Composition

*Mcbee variant and similar soils:* 100 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Mcbee Variant

#### Setting

*Landform:* Drainageways, depressions
*Parent material:* Alluvium

#### Typical profile

*H1 - 0 to 11 inches:* silt loam
*H2 - 11 to 19 inches:* loam
*H3 - 19 to 44 inches:* gravelly fine sandy loam
*H4 - 44 to 62 inches:* very gravelly loamy sand

#### Properties and qualities

*Slope:* 0 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
*Depth to water table:* About 0 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water capacity:* Moderate (about 6.7 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 6w
*Hydrologic Soil Group:* B/D
*Forage suitability group:* Wet Soils (G002XV102WA)
*Other vegetative classification:* Wet Soils (G002XV102WA)

*Hydric soil rating:* Yes

## Data Source Information

Soil Survey Area: Clark County, Washington
Survey Area Data: Version 18, Jun 4, 2020

# APPENDIX B –
# FEMA FIRMETTE

# National Flood Hazard Layer FIRMette

FEMA

122°37'23"W 45°44'25"N


122°36'46"W 45°44'N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

*Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020*

## Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

**SPECIAL FLOOD HAZARD AREAS**
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

**OTHER AREAS OF FLOOD HAZARD**
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

**OTHER AREAS**
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

**GENERAL STRUCTURES**
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

**OTHER FEATURES**
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

**MAP PANELS**
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/2/2021 at 8:54 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

# APPENDIX C –
# NEW DEVELOPMENT FLOW CHART

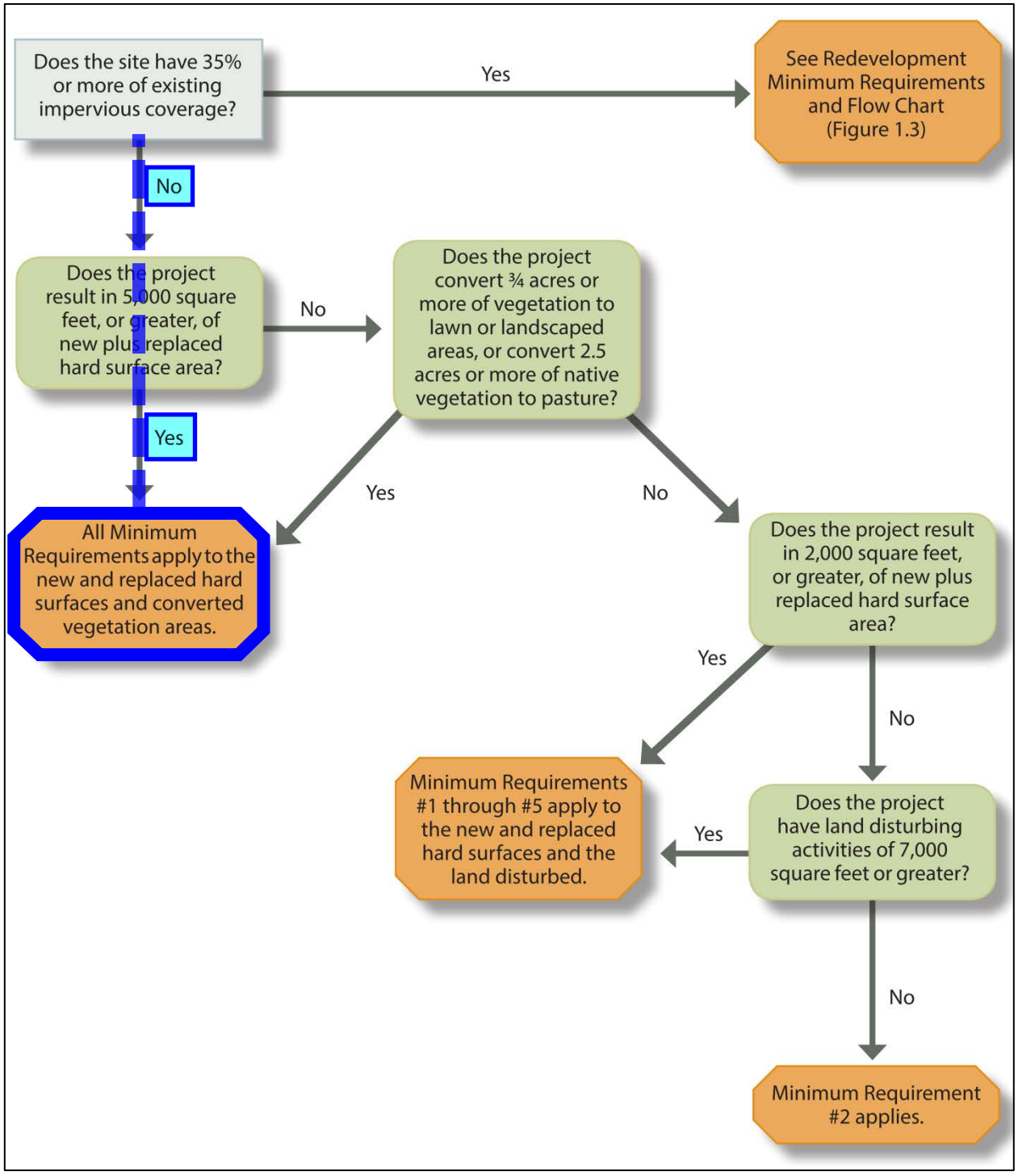
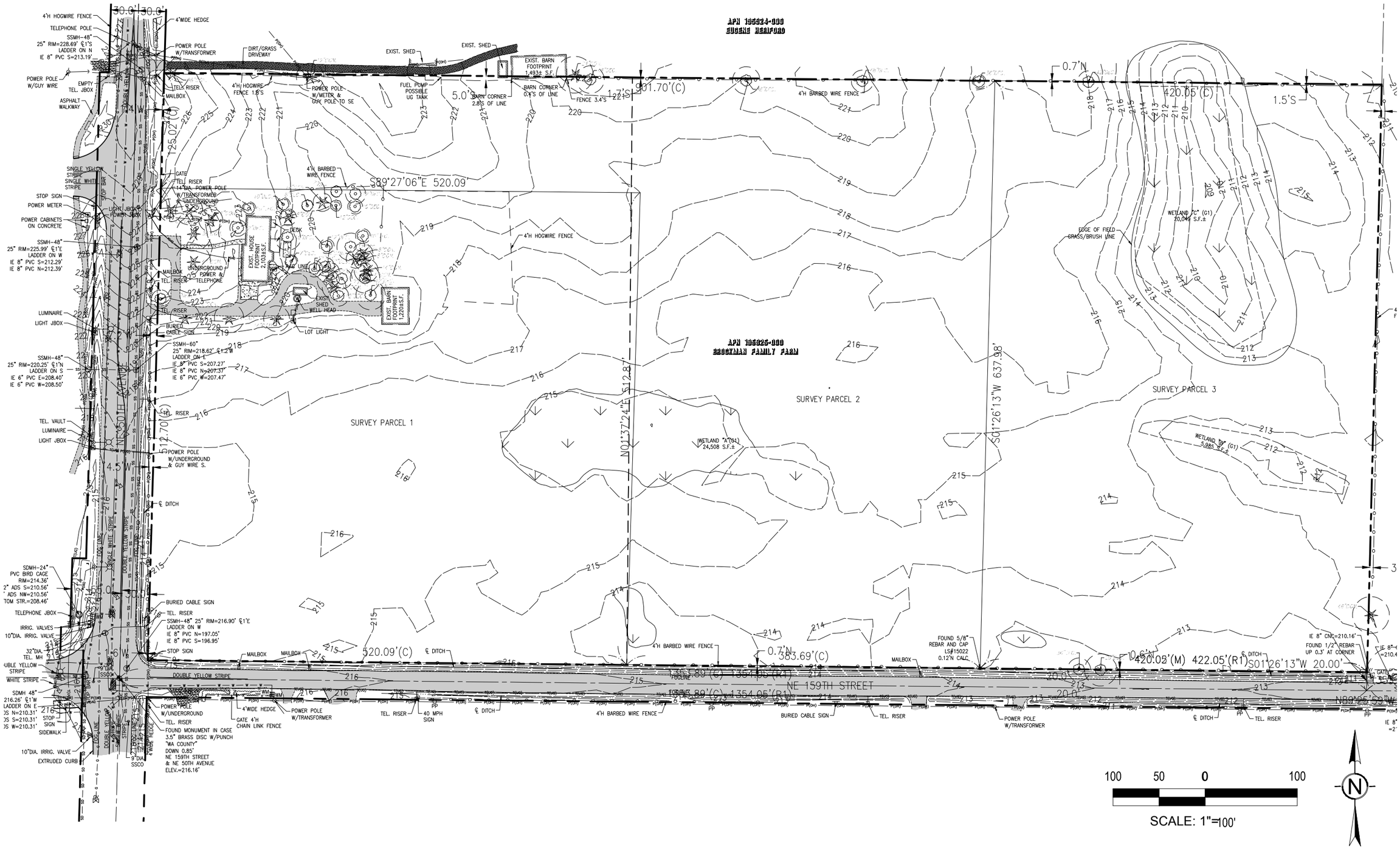



**Figure 1.2: New Development Flow Chart**

# APPENDIX D –
# EXISTING CONDITIONS PLAN

# Existing Conditions Plan

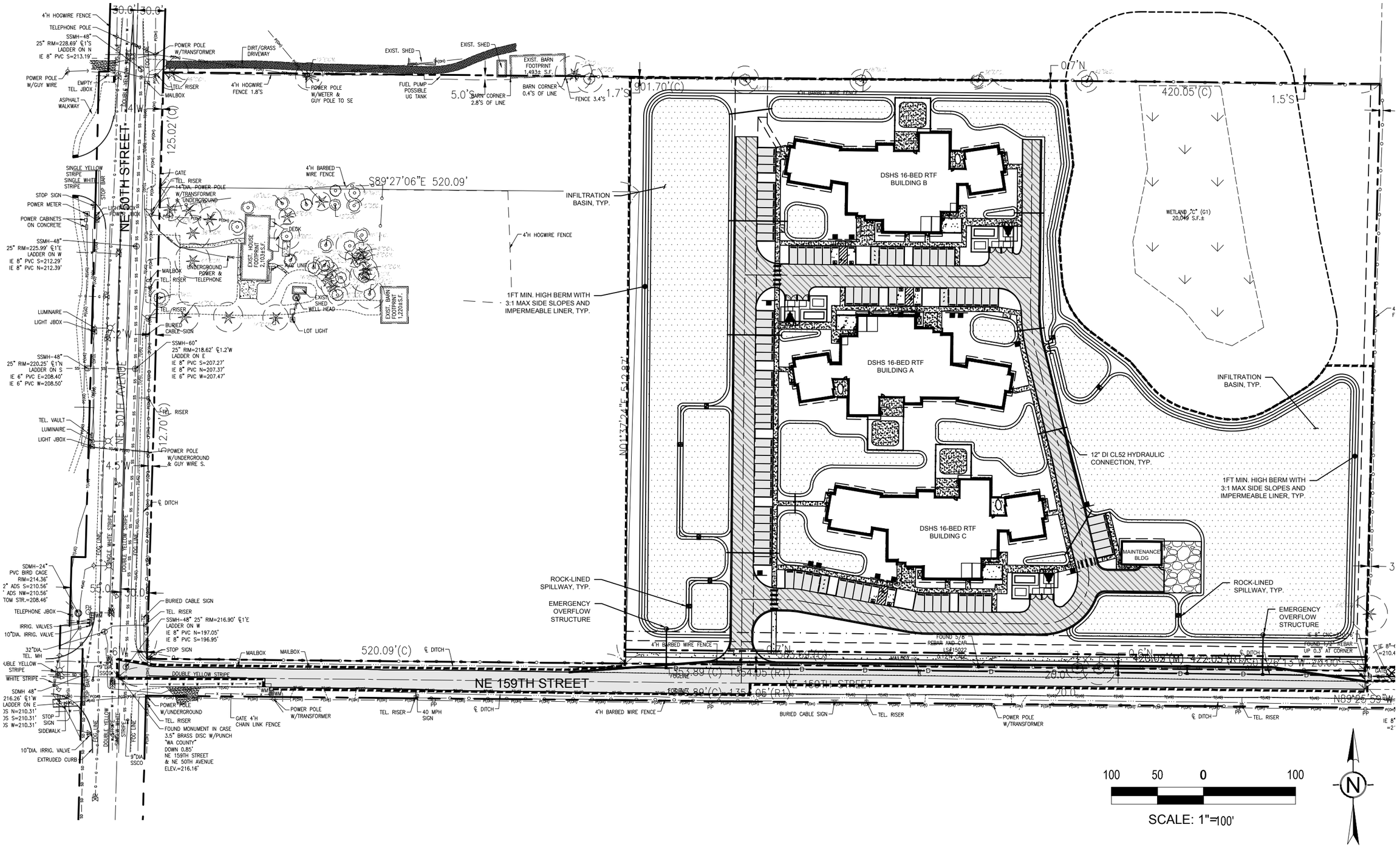
bcra



# APPENDIX E –
# PRELIMINARY DEVELOPMENT PLAN

# Preliminary Development Plan

bcra



# APPENDIX F –
# MINIMUM REQUIREMENT #8 REVIEW CHECKLIST

## Minimum Requirement 8 Review Checklist

**Minimum Requirement 8 Checklist**

Note: An additional Wetland Determination maybe required for wetlands that are not located on the project site.

A. Is there a direct or indirect stormwater discharge to a wetland?

- ☐ Yes **– Go on to Question B**
- ☑ No **–Stop**

B. Is the wetland being included in a treatment or flow control BMP/Facility?

- ☐ Yes – Comply with Guide Sheets 1 and 2 in Appendix 1-~~K~~H. **Stop**
- ☐ No **– Go on to Question C.**

C. Complete a Wetland Rating Form for the receiving wetland using the Washington State Wetland Rating System for Western Washington. Is the wetland classified by the rating form as Category I or Category II?

- ☐ Yes **– Complete the checklist below**
- ☐ No **–Stop**

~~D~~E. Hydroperiod Analysis per Section 1.5.8

- ☐ Monthly change in total discharge volume is 15% or less (per the WWHM); and
- ☐ Change in total discharge volume from any single precipitation event is 20% or less (per the WWHM). **–Stop**
- ☐ Either discharge threshold exceeded. **– Go on to Section E**

~~E~~F. Minimum Requirement 8 is not met

D. Does the wetland provide habitat for threatened or endangered species?
If yes **complete the checklist below**.
If No **Stop**.

# APPENDIX G –
# WWHM MODELING REPORT

# WWHM2012

# PROJECT REPORT

# General Model Information

| | |
|---|---|
| Project Name: | 19093-CUP |
| Site Name: | |
| Site Address: | |
| City: | |
| Report Date: | 6/18/2021 |
| Gage: | Salmon Creek @ 156th |
| Data Start: | 1948/10/01 |
| Data End: | 2008/09/30 |
| Timestep: | 15 Minute |
| Precip Scale: | 1.310 |
| Version Date: | 2019/09/13 |
| Version: | 4.2.17 |

## 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, Forest, Flat | 8.777 |
| Pervious Total | 8.777 |
| Impervious Land Use | acre |
| Impervious Total | 0 |
| Basin Total | 8.777 |

Element Flows To:

| Surface | Interflow | Groundwater |
|---|---|---|

## *Mitigated Land Use*

### West

| | |
|---|---|
| Bypass: | No |
| GroundWater: | No |
| Pervious Land Use | acre |
| C, Lawn, Flat | 2.5747 |
| Pervious Total | 2.5747 |
| Impervious Land Use | acre |
| ROADS FLAT | 1.7581 |
| Impervious Total | 1.7581 |
| Basin Total | 4.3328 |

Element Flows To:

| Surface | Interflow | Groundwater |
|---|---|---|
| West Infiltration | West Infiltration | |

## East

| | |
|---|---|
| Bypass: | No |
| GroundWater: | No |

| Pervious Land Use | acre |
|---|---|
| C, Lawn, Flat | 2.3004 |
| Pervious Total | 2.3004 |

| Impervious Land Use | acre |
|---|---|
| ROADS FLAT | 1.4699 |
| Impervious Total | 1.4699 |
| Basin Total | 3.7703 |

Element Flows To:

| Surface | Interflow | Groundwater |
|---|---|---|
| East Infiltration | East Infiltration | |

## Frontage

| | |
|---|---|
| Bypass: | Yes |
| GroundWater: | No |

| Pervious Land Use | acre |
|---|---|
| C, Lawn, Flat | 0.1461 |
| Pervious Total | 0.1461 |

| Impervious Land Use | acre |
|---|---|
| ROADS FLAT | 0.5279 |
| Impervious Total | 0.5279 |
| Basin Total | 0.674 |

Element Flows To:

| Surface | Interflow | Groundwater |
|---|---|---|

# Routing Elements
## Predeveloped Routing

## *Mitigated Routing*

### West Infiltration

| | | |
|---|---|---|
| Bottom Length: | 225.00 ft. | |
| Bottom Width: | 254.00 ft. | |
| Depth: | 1 ft. | |
| Volume at riser head: | 0.6643 acre-feet. | |
| Infiltration On | | |
| Infiltration rate: | 0.2 | |
| Infiltration safety factor: | 1 | |
| Total Volume Infiltrated (ac-ft.): | | 625.493 |
| Total Volume Through Riser (ac-ft.): | | 0 |
| Total Volume Through Facility (ac-ft.): | | 625.493 |
| Percent Infiltrated: | | 100 |
| Total Precip Applied to Facility: | | 0 |
| Total Evap From Facility: | | 0 |
| Side slope 1: | 3 To 1 | |
| Side slope 2: | 3 To 1 | |
| Side slope 3: | 3 To 1 | |
| Side slope 4: | 3 To 1 | |
| Discharge Structure | | |
| Riser Height: | 0.5 ft. | |
| Riser Diameter: | 24 in. | |
| Element Flows To: | | |
| Outlet 1 | Outlet 2 | |

Pond Hydraulic Table

| Stage(feet) | Area(ac.) | Volume(ac-ft.) | Discharge(cfs) | Infilt(cfs) |
|---|---|---|---|---|
| 0.0000 | 1.312 | 0.000 | 0.000 | 0.000 |
| 0.0111 | 1.312 | 0.014 | 0.000 | 0.264 |
| 0.0222 | 1.313 | 0.029 | 0.000 | 0.264 |
| 0.0333 | 1.314 | 0.043 | 0.000 | 0.264 |
| 0.0444 | 1.314 | 0.058 | 0.000 | 0.264 |
| 0.0556 | 1.315 | 0.073 | 0.000 | 0.264 |
| 0.0667 | 1.316 | 0.087 | 0.000 | 0.264 |
| 0.0778 | 1.317 | 0.102 | 0.000 | 0.264 |
| 0.0889 | 1.317 | 0.116 | 0.000 | 0.264 |
| 0.1000 | 1.318 | 0.131 | 0.000 | 0.264 |
| 0.1111 | 1.319 | 0.146 | 0.000 | 0.264 |
| 0.1222 | 1.320 | 0.160 | 0.000 | 0.264 |
| 0.1333 | 1.320 | 0.175 | 0.000 | 0.264 |
| 0.1444 | 1.321 | 0.190 | 0.000 | 0.264 |
| 0.1556 | 1.322 | 0.204 | 0.000 | 0.264 |
| 0.1667 | 1.323 | 0.219 | 0.000 | 0.264 |
| 0.1778 | 1.323 | 0.234 | 0.000 | 0.264 |
| 0.1889 | 1.324 | 0.249 | 0.000 | 0.264 |
| 0.2000 | 1.325 | 0.263 | 0.000 | 0.264 |
| 0.2111 | 1.325 | 0.278 | 0.000 | 0.264 |
| 0.2222 | 1.326 | 0.293 | 0.000 | 0.264 |
| 0.2333 | 1.327 | 0.307 | 0.000 | 0.264 |
| 0.2444 | 1.328 | 0.322 | 0.000 | 0.264 |
| 0.2556 | 1.328 | 0.337 | 0.000 | 0.264 |
| 0.2667 | 1.329 | 0.352 | 0.000 | 0.264 |
| 0.2778 | 1.330 | 0.367 | 0.000 | 0.264 |
| 0.2889 | 1.331 | 0.381 | 0.000 | 0.264 |

| | | | | |
|---|---|---|---|---|
| 0.3000 | 1.331 | 0.396 | 0.000 | 0.264 |
| 0.3111 | 1.332 | 0.411 | 0.000 | 0.264 |
| 0.3222 | 1.333 | 0.426 | 0.000 | 0.264 |
| 0.3333 | 1.334 | 0.441 | 0.000 | 0.264 |
| 0.3444 | 1.334 | 0.455 | 0.000 | 0.264 |
| 0.3556 | 1.335 | 0.470 | 0.000 | 0.264 |
| 0.3667 | 1.336 | 0.485 | 0.000 | 0.264 |
| 0.3778 | 1.337 | 0.500 | 0.000 | 0.264 |
| 0.3889 | 1.337 | 0.515 | 0.000 | 0.264 |
| 0.4000 | 1.338 | 0.530 | 0.000 | 0.264 |
| 0.4111 | 1.339 | 0.545 | 0.000 | 0.264 |
| 0.4222 | 1.340 | 0.559 | 0.000 | 0.264 |
| 0.4333 | 1.340 | 0.574 | 0.000 | 0.264 |
| 0.4444 | 1.341 | 0.589 | 0.000 | 0.264 |
| 0.4556 | 1.342 | 0.604 | 0.000 | 0.264 |
| 0.4667 | 1.343 | 0.619 | 0.000 | 0.264 |
| 0.4778 | 1.343 | 0.634 | 0.000 | 0.264 |
| 0.4889 | 1.344 | 0.649 | 0.000 | 0.264 |
| 0.5000 | 1.345 | 0.664 | 0.000 | 0.264 |
| 0.5111 | 1.345 | 0.679 | 0.024 | 0.264 |
| 0.5222 | 1.346 | 0.694 | 0.070 | 0.264 |
| 0.5333 | 1.347 | 0.709 | 0.129 | 0.264 |
| 0.5444 | 1.348 | 0.724 | 0.198 | 0.264 |
| 0.5556 | 1.348 | 0.739 | 0.277 | 0.264 |
| 0.5667 | 1.349 | 0.754 | 0.365 | 0.264 |
| 0.5778 | 1.350 | 0.769 | 0.460 | 0.264 |
| 0.5889 | 1.351 | 0.784 | 0.561 | 0.264 |
| 0.6000 | 1.351 | 0.799 | 0.670 | 0.264 |
| 0.6111 | 1.352 | 0.814 | 0.784 | 0.264 |
| 0.6222 | 1.353 | 0.829 | 0.905 | 0.264 |
| 0.6333 | 1.354 | 0.844 | 1.030 | 0.264 |
| 0.6444 | 1.354 | 0.859 | 1.161 | 0.264 |
| 0.6556 | 1.355 | 0.874 | 1.297 | 0.264 |
| 0.6667 | 1.356 | 0.889 | 1.438 | 0.264 |
| 0.6778 | 1.357 | 0.904 | 1.583 | 0.264 |
| 0.6889 | 1.357 | 0.919 | 1.733 | 0.264 |
| 0.7000 | 1.358 | 0.934 | 1.886 | 0.264 |
| 0.7111 | 1.359 | 0.949 | 2.044 | 0.264 |
| 0.7222 | 1.360 | 0.964 | 2.205 | 0.264 |
| 0.7333 | 1.360 | 0.980 | 2.369 | 0.264 |
| 0.7444 | 1.361 | 0.995 | 2.537 | 0.264 |
| 0.7556 | 1.362 | 1.010 | 2.709 | 0.264 |
| 0.7667 | 1.363 | 1.025 | 2.883 | 0.264 |
| 0.7778 | 1.363 | 1.040 | 3.059 | 0.264 |
| 0.7889 | 1.364 | 1.055 | 3.239 | 0.264 |
| 0.8000 | 1.365 | 1.070 | 3.421 | 0.264 |
| 0.8111 | 1.366 | 1.086 | 3.605 | 0.264 |
| 0.8222 | 1.366 | 1.101 | 3.791 | 0.264 |
| 0.8333 | 1.367 | 1.116 | 3.979 | 0.264 |
| 0.8444 | 1.368 | 1.131 | 4.168 | 0.264 |
| 0.8556 | 1.369 | 1.146 | 4.359 | 0.264 |
| 0.8667 | 1.369 | 1.162 | 4.552 | 0.264 |
| 0.8778 | 1.370 | 1.177 | 4.745 | 0.264 |
| 0.8889 | 1.371 | 1.192 | 4.939 | 0.264 |
| 0.9000 | 1.372 | 1.207 | 5.134 | 0.264 |
| 0.9111 | 1.372 | 1.223 | 5.330 | 0.264 |
| 0.9222 | 1.373 | 1.238 | 5.525 | 0.264 |
| 0.9333 | 1.374 | 1.253 | 5.721 | 0.264 |

| | | | | |
|---|---|---|---|---|
| 0.9444 | 1.375 | 1.268 | 5.917 | 0.264 |
| 0.9556 | 1.375 | 1.284 | 6.112 | 0.264 |
| 0.9667 | 1.376 | 1.299 | 6.307 | 0.264 |
| 0.9778 | 1.377 | 1.314 | 6.501 | 0.264 |
| 0.9889 | 1.378 | 1.329 | 6.695 | 0.264 |
| 1.0000 | 1.378 | 1.345 | 6.887 | 0.264 |
| 1.0111 | 1.379 | 1.360 | 7.078 | 0.264 |

## East Infiltration

| | | |
|---|---|---|
| Bottom Length: | 211.00 ft. | |
| Bottom Width: | 200.00 ft. | |
| Depth: | 1 ft. | |
| Volume at riser head: | 0.7482 acre-feet. | |
| Infiltration On | | |
| Infiltration rate: | 0.2 | |
| Infiltration safety factor: | 1 | |
| Total Volume Infiltrated (ac-ft.): | | 538.63 |
| Total Volume Through Riser (ac-ft.): | | 0 |
| Total Volume Through Facility (ac-ft.): | | 538.63 |
| Percent Infiltrated: | | 100 |
| Total Precip Applied to Facility: | | 0 |
| Total Evap From Facility: | | 0 |
| Side slope 1: | 3 To 1 | |
| Side slope 2: | 3 To 1 | |
| Side slope 3: | 3 To 1 | |
| Side slope 4: | 3 To 1 | |
| Discharge Structure | | |
| Riser Height: | 0.75 ft. | |
| Riser Diameter: | 24 in. | |
| Element Flows To: | | |
| Outlet 1 | Outlet 2 | |

Pond Hydraulic Table

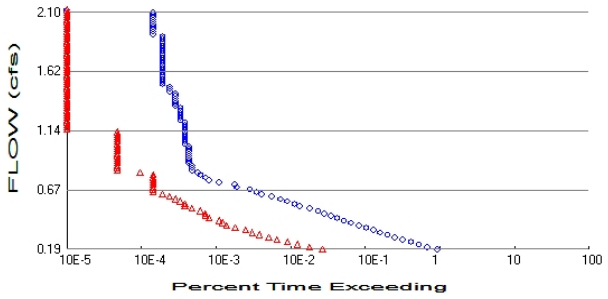
| Stage(feet) | Area(ac.) | Volume(ac-ft.) | Discharge(cfs) | Infilt(cfs) |
|---|---|---|---|---|
| 0.0000 | 0.968 | 0.000 | 0.000 | 0.000 |
| 0.0111 | 0.969 | 0.010 | 0.000 | 0.195 |
| 0.0222 | 0.970 | 0.021 | 0.000 | 0.195 |
| 0.0333 | 0.970 | 0.032 | 0.000 | 0.195 |
| 0.0444 | 0.971 | 0.043 | 0.000 | 0.195 |
| 0.0556 | 0.971 | 0.053 | 0.000 | 0.195 |
| 0.0667 | 0.972 | 0.064 | 0.000 | 0.195 |
| 0.0778 | 0.973 | 0.075 | 0.000 | 0.195 |
| 0.0889 | 0.973 | 0.086 | 0.000 | 0.195 |
| 0.1000 | 0.974 | 0.097 | 0.000 | 0.195 |
| 0.1111 | 0.975 | 0.108 | 0.000 | 0.195 |
| 0.1222 | 0.975 | 0.118 | 0.000 | 0.195 |
| 0.1333 | 0.976 | 0.129 | 0.000 | 0.195 |
| 0.1444 | 0.977 | 0.140 | 0.000 | 0.195 |
| 0.1556 | 0.977 | 0.151 | 0.000 | 0.195 |
| 0.1667 | 0.978 | 0.162 | 0.000 | 0.195 |
| 0.1778 | 0.978 | 0.173 | 0.000 | 0.195 |
| 0.1889 | 0.979 | 0.184 | 0.000 | 0.195 |
| 0.2000 | 0.980 | 0.194 | 0.000 | 0.195 |
| 0.2111 | 0.980 | 0.205 | 0.000 | 0.195 |
| 0.2222 | 0.981 | 0.216 | 0.000 | 0.195 |
| 0.2333 | 0.982 | 0.227 | 0.000 | 0.195 |
| 0.2444 | 0.982 | 0.238 | 0.000 | 0.195 |
| 0.2556 | 0.983 | 0.249 | 0.000 | 0.195 |
| 0.2667 | 0.983 | 0.260 | 0.000 | 0.195 |
| 0.2778 | 0.984 | 0.271 | 0.000 | 0.195 |
| 0.2889 | 0.985 | 0.282 | 0.000 | 0.195 |
| 0.3000 | 0.985 | 0.293 | 0.000 | 0.195 |
| 0.3111 | 0.986 | 0.304 | 0.000 | 0.195 |

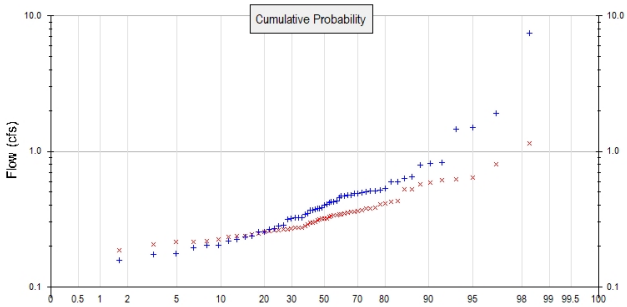
| | | | | |
|---|---|---|---|---|
| 0.3222 | 0.987 | 0.315 | 0.000 | 0.195 |
| 0.3333 | 0.987 | 0.326 | 0.000 | 0.195 |
| 0.3444 | 0.988 | 0.337 | 0.000 | 0.195 |
| 0.3556 | 0.989 | 0.348 | 0.000 | 0.195 |
| 0.3667 | 0.989 | 0.359 | 0.000 | 0.195 |
| 0.3778 | 0.990 | 0.370 | 0.000 | 0.195 |
| 0.3889 | 0.990 | 0.381 | 0.000 | 0.195 |
| 0.4000 | 0.991 | 0.392 | 0.000 | 0.195 |
| 0.4111 | 0.992 | 0.403 | 0.000 | 0.195 |
| 0.4222 | 0.992 | 0.414 | 0.000 | 0.195 |
| 0.4333 | 0.993 | 0.425 | 0.000 | 0.195 |
| 0.4444 | 0.994 | 0.436 | 0.000 | 0.195 |
| 0.4556 | 0.994 | 0.447 | 0.000 | 0.195 |
| 0.4667 | 0.995 | 0.458 | 0.000 | 0.195 |
| 0.4778 | 0.996 | 0.469 | 0.000 | 0.195 |
| 0.4889 | 0.996 | 0.480 | 0.000 | 0.195 |
| 0.5000 | 0.997 | 0.491 | 0.000 | 0.195 |
| 0.5111 | 0.997 | 0.502 | 0.000 | 0.195 |
| 0.5222 | 0.998 | 0.513 | 0.000 | 0.195 |
| 0.5333 | 0.999 | 0.524 | 0.000 | 0.195 |
| 0.5444 | 0.999 | 0.535 | 0.000 | 0.195 |
| 0.5556 | 1.000 | 0.547 | 0.000 | 0.195 |
| 0.5667 | 1.001 | 0.558 | 0.000 | 0.195 |
| 0.5778 | 1.001 | 0.569 | 0.000 | 0.195 |
| 0.5889 | 1.002 | 0.580 | 0.000 | 0.195 |
| 0.6000 | 1.003 | 0.591 | 0.000 | 0.195 |
| 0.6111 | 1.003 | 0.602 | 0.000 | 0.195 |
| 0.6222 | 1.004 | 0.613 | 0.000 | 0.195 |
| 0.6333 | 1.005 | 0.625 | 0.000 | 0.195 |
| 0.6444 | 1.005 | 0.636 | 0.000 | 0.195 |
| 0.6556 | 1.006 | 0.647 | 0.000 | 0.195 |
| 0.6667 | 1.006 | 0.658 | 0.000 | 0.195 |
| 0.6778 | 1.007 | 0.669 | 0.000 | 0.195 |
| 0.6889 | 1.008 | 0.680 | 0.000 | 0.195 |
| 0.7000 | 1.008 | 0.692 | 0.000 | 0.195 |
| 0.7111 | 1.009 | 0.703 | 0.000 | 0.195 |
| 0.7222 | 1.010 | 0.714 | 0.000 | 0.195 |
| 0.7333 | 1.010 | 0.725 | 0.000 | 0.195 |
| 0.7444 | 1.011 | 0.737 | 0.000 | 0.195 |
| 0.7556 | 1.012 | 0.748 | 0.008 | 0.195 |
| 0.7667 | 1.012 | 0.759 | 0.045 | 0.195 |
| 0.7778 | 1.013 | 0.770 | 0.098 | 0.195 |
| 0.7889 | 1.014 | 0.782 | 0.162 | 0.195 |
| 0.8000 | 1.014 | 0.793 | 0.237 | 0.195 |
| 0.8111 | 1.015 | 0.804 | 0.320 | 0.195 |
| 0.8222 | 1.015 | 0.815 | 0.411 | 0.195 |
| 0.8333 | 1.016 | 0.827 | 0.510 | 0.195 |
| 0.8444 | 1.017 | 0.838 | 0.615 | 0.195 |
| 0.8556 | 1.017 | 0.849 | 0.726 | 0.195 |
| 0.8667 | 1.018 | 0.861 | 0.844 | 0.195 |
| 0.8778 | 1.019 | 0.872 | 0.967 | 0.195 |
| 0.8889 | 1.019 | 0.883 | 1.095 | 0.195 |
| 0.9000 | 1.020 | 0.895 | 1.229 | 0.195 |
| 0.9111 | 1.021 | 0.906 | 1.367 | 0.195 |
| 0.9222 | 1.021 | 0.917 | 1.510 | 0.195 |
| 0.9333 | 1.022 | 0.929 | 1.657 | 0.195 |
| 0.9444 | 1.023 | 0.940 | 1.809 | 0.195 |
| 0.9556 | 1.023 | 0.951 | 1.964 | 0.195 |

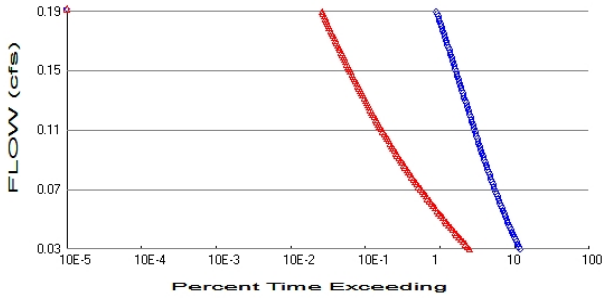
| | | | | |
|---|---|---|---|---|
| 0.9667 | 1.024 | 0.963 | 2.124 | 0.195 |
| 0.9778 | 1.024 | 0.974 | 2.287 | 0.195 |
| 0.9889 | 1.025 | 0.986 | 2.453 | 0.195 |
| 1.0000 | 1.026 | 0.997 | 2.623 | 0.195 |
| 1.0111 | 1.026 | 1.008 | 2.795 | 0.195 |

# *Analysis Results*

## *POC 1*




\+ Predeveloped  x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 8.777
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 5.0212
Total Impervious Area: 3.7559

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

| **Return Period** | **Flow(cfs)** |
|---|---|
| 2 year | 0.375709 |
| 5 year | 0.704922 |
| 10 year | 1.020852 |
| 25 year | 1.565124 |
| 50 year | 2.100582 |
| 100 year | 2.771252 |

Flow Frequency Return Periods for Mitigated. POC #1

| **Return Period** | **Flow(cfs)** |
|---|---|
| 2 year | 0.317781 |
| 5 year | 0.439773 |
| 10 year | 0.534321 |
| 25 year | 0.670673 |
| 50 year | 0.785357 |
| 100 year | 0.912028 |

## Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

| Year | Predeveloped | Mitigated |
|---|---|---|
| 1949 | 0.488 | 0.609 |
| 1950 | 0.401 | 0.261 |
| 1951 | 0.487 | 0.298 |
| 1952 | 0.422 | 0.361 |
| 1953 | 0.345 | 0.219 |
| 1954 | 0.599 | 0.344 |
| 1955 | 0.253 | 0.215 |
| 1956 | 0.811 | 0.352 |
| 1957 | 0.498 | 0.342 |
| 1958 | 0.465 | 0.386 |
| 1959 | 0.237 | 0.206 |
| 1960 | 0.202 | 0.262 |
| 1961 | 0.475 | 0.273 |
| 1962 | 0.318 | 0.280 |
| 1963 | 0.280 | 0.289 |
| 1964 | 0.385 | 0.274 |
| 1965 | 0.477 | 0.242 |
| 1966 | 0.366 | 0.233 |
| 1967 | 0.324 | 0.337 |
| 1968 | 0.500 | 0.642 |
| 1969 | 0.418 | 0.621 |
| 1970 | 7.410 | 1.138 |
| 1971 | 0.264 | 0.429 |
| 1972 | 0.519 | 0.265 |
| 1973 | 0.317 | 0.316 |
| 1974 | 1.456 | 0.528 |
| 1975 | 0.348 | 0.186 |
| 1976 | 0.408 | 0.267 |
| 1977 | 0.039 | 0.185 |
| 1978 | 0.508 | 0.321 |
| 1979 | 0.203 | 0.378 |
| 1980 | 0.372 | 0.236 |
| 1981 | 0.598 | 0.370 |
| 1982 | 0.648 | 0.425 |
| 1983 | 0.512 | 0.413 |
| 1984 | 0.284 | 0.225 |
| 1985 | 0.323 | 0.273 |
| 1986 | 0.255 | 0.355 |
| 1987 | 0.472 | 0.304 |
| 1988 | 0.270 | 0.359 |
| 1989 | 0.156 | 0.318 |
| 1990 | 0.235 | 0.299 |
| 1991 | 0.368 | 0.336 |
| 1992 | 0.219 | 0.236 |
| 1993 | 0.456 | 0.408 |
| 1994 | 0.422 | 0.258 |
| 1995 | 0.378 | 0.332 |
| 1996 | 0.792 | 0.528 |
| 1997 | 1.908 | 0.570 |
| 1998 | 1.503 | 0.585 |
| 1999 | 0.530 | 0.271 |
| 2000 | 0.177 | 0.247 |
| 2001 | 0.173 | 0.216 |
| 2002 | 0.824 | 0.348 |
| 2003 | 0.634 | 0.311 |
| 2004 | 0.224 | 0.255 |

| | | |
|---|---|---|
| 2005 | 0.194 | 0.376 |
| 2006 | 0.429 | 0.319 |
| 2007 | 0.378 | 0.327 |
| 2008 | 0.324 | 0.803 |

## Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

| Rank | Predeveloped | Mitigated |
|---|---|---|
| 1 | 7.4101 | 1.1383 |
| 2 | 1.9078 | 0.8025 |
| 3 | 1.5025 | 0.6424 |
| 4 | 1.4562 | 0.6210 |
| 5 | 0.8241 | 0.6089 |
| 6 | 0.8111 | 0.5849 |
| 7 | 0.7920 | 0.5704 |
| 8 | 0.6482 | 0.5280 |
| 9 | 0.6339 | 0.5279 |
| 10 | 0.5987 | 0.4291 |
| 11 | 0.5984 | 0.4251 |
| 12 | 0.5303 | 0.4128 |
| 13 | 0.5194 | 0.4082 |
| 14 | 0.5119 | 0.3858 |
| 15 | 0.5080 | 0.3777 |
| 16 | 0.5000 | 0.3761 |
| 17 | 0.4976 | 0.3704 |
| 18 | 0.4876 | 0.3614 |
| 19 | 0.4868 | 0.3590 |
| 20 | 0.4772 | 0.3552 |
| 21 | 0.4747 | 0.3524 |
| 22 | 0.4716 | 0.3484 |
| 23 | 0.4652 | 0.3444 |
| 24 | 0.4561 | 0.3421 |
| 25 | 0.4289 | 0.3370 |
| 26 | 0.4225 | 0.3359 |
| 27 | 0.4222 | 0.3316 |
| 28 | 0.4184 | 0.3267 |
| 29 | 0.4080 | 0.3206 |
| 30 | 0.4009 | 0.3186 |
| 31 | 0.3845 | 0.3176 |
| 32 | 0.3783 | 0.3157 |
| 33 | 0.3780 | 0.3112 |
| 34 | 0.3718 | 0.3038 |
| 35 | 0.3678 | 0.2992 |
| 36 | 0.3664 | 0.2984 |
| 37 | 0.3479 | 0.2886 |
| 38 | 0.3448 | 0.2800 |
| 39 | 0.3239 | 0.2736 |
| 40 | 0.3238 | 0.2731 |
| 41 | 0.3225 | 0.2731 |
| 42 | 0.3177 | 0.2706 |
| 43 | 0.3170 | 0.2671 |
| 44 | 0.2840 | 0.2652 |
| 45 | 0.2805 | 0.2620 |
| 46 | 0.2699 | 0.2608 |
| 47 | 0.2639 | 0.2583 |
| 48 | 0.2553 | 0.2550 |
| 49 | 0.2535 | 0.2468 |
| 50 | 0.2373 | 0.2422 |

| | | |
|---|---|---|
| 51 | 0.2350 | 0.2358 |
| 52 | 0.2243 | 0.2357 |
| 53 | 0.2188 | 0.2329 |
| 54 | 0.2027 | 0.2249 |
| 55 | 0.2018 | 0.2187 |
| 56 | 0.1939 | 0.2161 |
| 57 | 0.1767 | 0.2146 |
| 58 | 0.1732 | 0.2062 |
| 59 | 0.1564 | 0.1857 |
| 60 | 0.0388 | 0.1851 |

## LID Duration Flows

The Facility PASSED

| Flow(cfs) | Predev | Mit | Percentage | Pass/Fail |
|---|---|---|---|---|
| 0.0301 | 247412 | 52470 | 21 | Pass |
| 0.0317 | 238575 | 48977 | 20 | Pass |
| 0.0332 | 230160 | 45822 | 19 | Pass |
| 0.0348 | 222376 | 42981 | 19 | Pass |
| 0.0364 | 215012 | 40267 | 18 | Pass |
| 0.0380 | 207965 | 37806 | 18 | Pass |
| 0.0396 | 201253 | 35429 | 17 | Pass |
| 0.0412 | 194774 | 33262 | 17 | Pass |
| 0.0428 | 188588 | 31200 | 16 | Pass |
| 0.0444 | 182592 | 29264 | 16 | Pass |
| 0.0460 | 176975 | 27539 | 15 | Pass |
| 0.0476 | 171463 | 25856 | 15 | Pass |
| 0.0492 | 166203 | 24362 | 14 | Pass |
| 0.0508 | 161154 | 22974 | 14 | Pass |
| 0.0524 | 156294 | 21691 | 13 | Pass |
| 0.0540 | 151603 | 20426 | 13 | Pass |
| 0.0556 | 147143 | 19223 | 13 | Pass |
| 0.0572 | 142830 | 18173 | 12 | Pass |
| 0.0587 | 138643 | 17123 | 12 | Pass |
| 0.0603 | 134583 | 16212 | 12 | Pass |
| 0.0619 | 130670 | 15287 | 11 | Pass |
| 0.0635 | 126946 | 14447 | 11 | Pass |
| 0.0651 | 123369 | 13673 | 11 | Pass |
| 0.0667 | 120024 | 12983 | 10 | Pass |
| 0.0683 | 116763 | 12255 | 10 | Pass |
| 0.0699 | 113607 | 11582 | 10 | Pass |
| 0.0715 | 110599 | 10938 | 9 | Pass |
| 0.0731 | 107611 | 10345 | 9 | Pass |
| 0.0747 | 104750 | 9819 | 9 | Pass |
| 0.0763 | 101952 | 9316 | 9 | Pass |
| 0.0779 | 99301 | 8842 | 8 | Pass |
| 0.0795 | 96798 | 8411 | 8 | Pass |
| 0.0811 | 94378 | 7990 | 8 | Pass |
| 0.0827 | 91959 | 7603 | 8 | Pass |
| 0.0842 | 89582 | 7204 | 8 | Pass |
| 0.0858 | 87267 | 6854 | 7 | Pass |
| 0.0874 | 85100 | 6516 | 7 | Pass |
| 0.0890 | 82912 | 6194 | 7 | Pass |
| 0.0906 | 80808 | 5916 | 7 | Pass |
| 0.0922 | 78810 | 5655 | 7 | Pass |
| 0.0938 | 76853 | 5396 | 7 | Pass |
| 0.0954 | 74876 | 5173 | 6 | Pass |
| 0.0970 | 73087 | 4940 | 6 | Pass |
| 0.0986 | 71299 | 4721 | 6 | Pass |
| 0.1002 | 69700 | 4519 | 6 | Pass |
| 0.1018 | 68059 | 4334 | 6 | Pass |
| 0.1034 | 66460 | 4147 | 6 | Pass |
| 0.1050 | 64967 | 3972 | 6 | Pass |
| 0.1066 | 63410 | 3770 | 5 | Pass |
| 0.1082 | 61916 | 3595 | 5 | Pass |
| 0.1098 | 60506 | 3429 | 5 | Pass |
| 0.1113 | 59118 | 3274 | 5 | Pass |
| 0.1129 | 57750 | 3156 | 5 | Pass |

| | | | | |
|---|---|---|---|---|
| 0.1145 | 56383 | 3025 | 5 | Pass |
| 0.1161 | 55057 | 2901 | 5 | Pass |
| 0.1177 | 53774 | 2773 | 5 | Pass |
| 0.1193 | 52512 | 2659 | 5 | Pass |
| 0.1209 | 51355 | 2556 | 4 | Pass |
| 0.1225 | 50219 | 2459 | 4 | Pass |
| 0.1241 | 49125 | 2371 | 4 | Pass |
| 0.1257 | 47989 | 2287 | 4 | Pass |
| 0.1273 | 46853 | 2209 | 4 | Pass |
| 0.1289 | 45737 | 2133 | 4 | Pass |
| 0.1305 | 44643 | 2033 | 4 | Pass |
| 0.1321 | 43613 | 1952 | 4 | Pass |
| 0.1337 | 42582 | 1883 | 4 | Pass |
| 0.1353 | 41614 | 1808 | 4 | Pass |
| 0.1368 | 40604 | 1745 | 4 | Pass |
| 0.1384 | 39657 | 1676 | 4 | Pass |
| 0.1400 | 38753 | 1609 | 4 | Pass |
| 0.1416 | 37869 | 1545 | 4 | Pass |
| 0.1432 | 37028 | 1489 | 4 | Pass |
| 0.1448 | 36123 | 1436 | 3 | Pass |
| 0.1464 | 35260 | 1387 | 3 | Pass |
| 0.1480 | 34440 | 1334 | 3 | Pass |
| 0.1496 | 33704 | 1276 | 3 | Pass |
| 0.1512 | 32946 | 1235 | 3 | Pass |
| 0.1528 | 32210 | 1193 | 3 | Pass |
| 0.1544 | 31431 | 1147 | 3 | Pass |
| 0.1560 | 30695 | 1105 | 3 | Pass |
| 0.1576 | 29959 | 1073 | 3 | Pass |
| 0.1592 | 29264 | 1030 | 3 | Pass |
| 0.1608 | 28591 | 996 | 3 | Pass |
| 0.1624 | 27897 | 956 | 3 | Pass |
| 0.1639 | 27266 | 927 | 3 | Pass |
| 0.1655 | 26614 | 901 | 3 | Pass |
| 0.1671 | 25982 | 864 | 3 | Pass |
| 0.1687 | 25372 | 838 | 3 | Pass |
| 0.1703 | 24762 | 808 | 3 | Pass |
| 0.1719 | 24152 | 769 | 3 | Pass |
| 0.1735 | 23542 | 749 | 3 | Pass |
| 0.1751 | 22953 | 718 | 3 | Pass |
| 0.1767 | 22427 | 685 | 3 | Pass |
| 0.1783 | 21859 | 672 | 3 | Pass |
| 0.1799 | 21312 | 649 | 3 | Pass |
| 0.1815 | 20786 | 635 | 3 | Pass |
| 0.1831 | 20306 | 615 | 3 | Pass |
| 0.1847 | 19822 | 590 | 2 | Pass |
| 0.1863 | 19336 | 566 | 2 | Pass |
| 0.1879 | 18853 | 551 | 2 | Pass |

## Duration Flows

The Facility PASSED

| Flow(cfs) | Predev | Mit | Percentage | Pass/Fail |
|---|---|---|---|---|
| 0.1879 | 19103 | 558 | 2 | Pass |
| 0.2072 | 14214 | 375 | 2 | Pass |
| 0.2265 | 10953 | 258 | 2 | Pass |
| 0.2458 | 8600 | 190 | 2 | Pass |
| 0.2651 | 6665 | 138 | 2 | Pass |
| 0.2845 | 5232 | 107 | 2 | Pass |
| 0.3038 | 4149 | 80 | 1 | Pass |
| 0.3231 | 3288 | 64 | 1 | Pass |
| 0.3424 | 2684 | 52 | 1 | Pass |
| 0.3617 | 2152 | 38 | 1 | Pass |
| 0.3811 | 1735 | 29 | 1 | Pass |
| 0.4004 | 1356 | 26 | 1 | Pass |
| 0.4197 | 1080 | 23 | 2 | Pass |
| 0.4390 | 872 | 17 | 1 | Pass |
| 0.4583 | 725 | 15 | 2 | Pass |
| 0.4777 | 586 | 15 | 2 | Pass |
| 0.4970 | 488 | 13 | 2 | Pass |
| 0.5163 | 373 | 10 | 2 | Pass |
| 0.5356 | 278 | 8 | 2 | Pass |
| 0.5549 | 235 | 8 | 3 | Pass |
| 0.5743 | 189 | 7 | 3 | Pass |
| 0.5936 | 153 | 6 | 3 | Pass |
| 0.6129 | 116 | 5 | 4 | Pass |
| 0.6322 | 86 | 4 | 4 | Pass |
| 0.6515 | 73 | 3 | 4 | Pass |
| 0.6709 | 59 | 3 | 5 | Pass |
| 0.6902 | 40 | 3 | 7 | Pass |
| 0.7095 | 37 | 3 | 8 | Pass |
| 0.7288 | 23 | 3 | 13 | Pass |
| 0.7481 | 17 | 3 | 17 | Pass |
| 0.7675 | 15 | 3 | 20 | Pass |
| 0.7868 | 13 | 3 | 23 | Pass |
| 0.8061 | 12 | 2 | 16 | Pass |
| 0.8254 | 10 | 1 | 10 | Pass |
| 0.8448 | 10 | 1 | 10 | Pass |
| 0.8641 | 10 | 1 | 10 | Pass |
| 0.8834 | 9 | 1 | 11 | Pass |
| 0.9027 | 9 | 1 | 11 | Pass |
| 0.9220 | 9 | 1 | 11 | Pass |
| 0.9414 | 9 | 1 | 11 | Pass |
| 0.9607 | 9 | 1 | 11 | Pass |
| 0.9800 | 9 | 1 | 11 | Pass |
| 0.9993 | 9 | 1 | 11 | Pass |
| 1.0186 | 9 | 1 | 11 | Pass |
| 1.0380 | 8 | 1 | 12 | Pass |
| 1.0573 | 8 | 1 | 12 | Pass |
| 1.0766 | 8 | 1 | 12 | Pass |
| 1.0959 | 8 | 1 | 12 | Pass |
| 1.1152 | 8 | 1 | 12 | Pass |
| 1.1346 | 8 | 1 | 12 | Pass |
| 1.1539 | 8 | 0 | 0 | Pass |
| 1.1732 | 8 | 0 | 0 | Pass |
| 1.1925 | 8 | 0 | 0 | Pass |

| | | | | |
|---|---|---|---|---|
| 1.2118 | 8 | 0 | 0 | Pass |
| 1.2312 | 7 | 0 | 0 | Pass |
| 1.2505 | 7 | 0 | 0 | Pass |
| 1.2698 | 7 | 0 | 0 | Pass |
| 1.2891 | 7 | 0 | 0 | Pass |
| 1.3084 | 7 | 0 | 0 | Pass |
| 1.3278 | 7 | 0 | 0 | Pass |
| 1.3471 | 6 | 0 | 0 | Pass |
| 1.3664 | 6 | 0 | 0 | Pass |
| 1.3857 | 6 | 0 | 0 | Pass |
| 1.4050 | 6 | 0 | 0 | Pass |
| 1.4244 | 6 | 0 | 0 | Pass |
| 1.4437 | 6 | 0 | 0 | Pass |
| 1.4630 | 5 | 0 | 0 | Pass |
| 1.4823 | 5 | 0 | 0 | Pass |
| 1.5016 | 5 | 0 | 0 | Pass |
| 1.5210 | 4 | 0 | 0 | Pass |
| 1.5403 | 4 | 0 | 0 | Pass |
| 1.5596 | 4 | 0 | 0 | Pass |
| 1.5789 | 4 | 0 | 0 | Pass |
| 1.5982 | 4 | 0 | 0 | Pass |
| 1.6176 | 4 | 0 | 0 | Pass |
| 1.6369 | 4 | 0 | 0 | Pass |
| 1.6562 | 4 | 0 | 0 | Pass |
| 1.6755 | 4 | 0 | 0 | Pass |
| 1.6949 | 4 | 0 | 0 | Pass |
| 1.7142 | 4 | 0 | 0 | Pass |
| 1.7335 | 4 | 0 | 0 | Pass |
| 1.7528 | 4 | 0 | 0 | Pass |
| 1.7721 | 4 | 0 | 0 | Pass |
| 1.7915 | 4 | 0 | 0 | Pass |
| 1.8108 | 4 | 0 | 0 | Pass |
| 1.8301 | 4 | 0 | 0 | Pass |
| 1.8494 | 4 | 0 | 0 | Pass |
| 1.8687 | 4 | 0 | 0 | Pass |
| 1.8881 | 4 | 0 | 0 | Pass |
| 1.9074 | 4 | 0 | 0 | Pass |
| 1.9267 | 3 | 0 | 0 | Pass |
| 1.9460 | 3 | 0 | 0 | Pass |
| 1.9653 | 3 | 0 | 0 | Pass |
| 1.9847 | 3 | 0 | 0 | Pass |
| 2.0040 | 3 | 0 | 0 | Pass |
| 2.0233 | 3 | 0 | 0 | Pass |
| 2.0426 | 3 | 0 | 0 | Pass |
| 2.0619 | 3 | 0 | 0 | Pass |
| 2.0813 | 3 | 0 | 0 | Pass |
| 2.1006 | 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 |
|---|---|---|---|---|---|---|---|---|---|
| West Infiltration POC | ☐ | 569.20 | | | ☐ | 100.00 | | | |
| East Infiltration POC | ☐ | 490.15 | | | ☐ | 100.00 | | | |
| Total Volume Infiltrated | | 1059.35 | 0.00 | 0.00 | | 100.00 | 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.

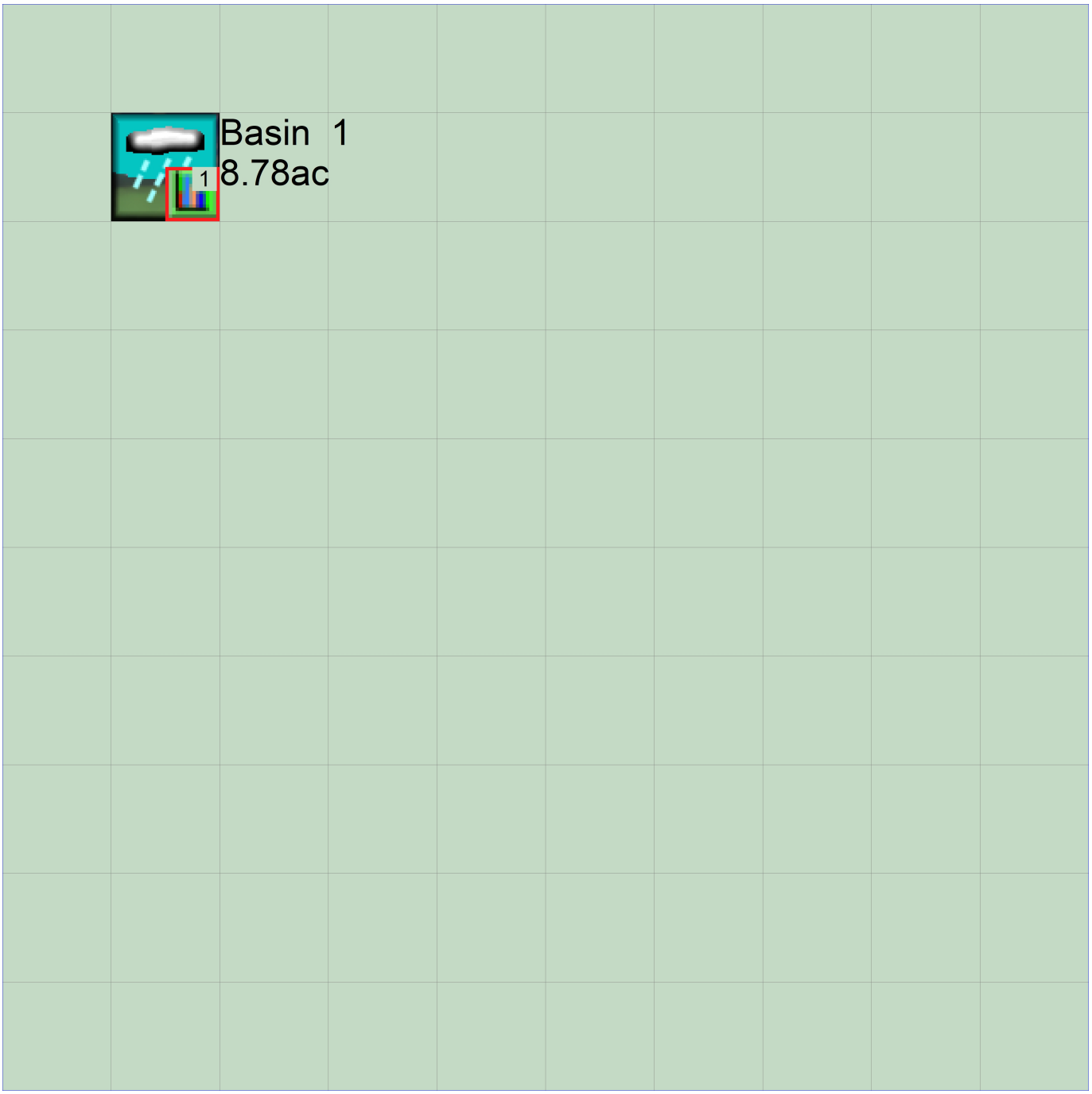
## PERLND Changes

No PERLND changes have been made.

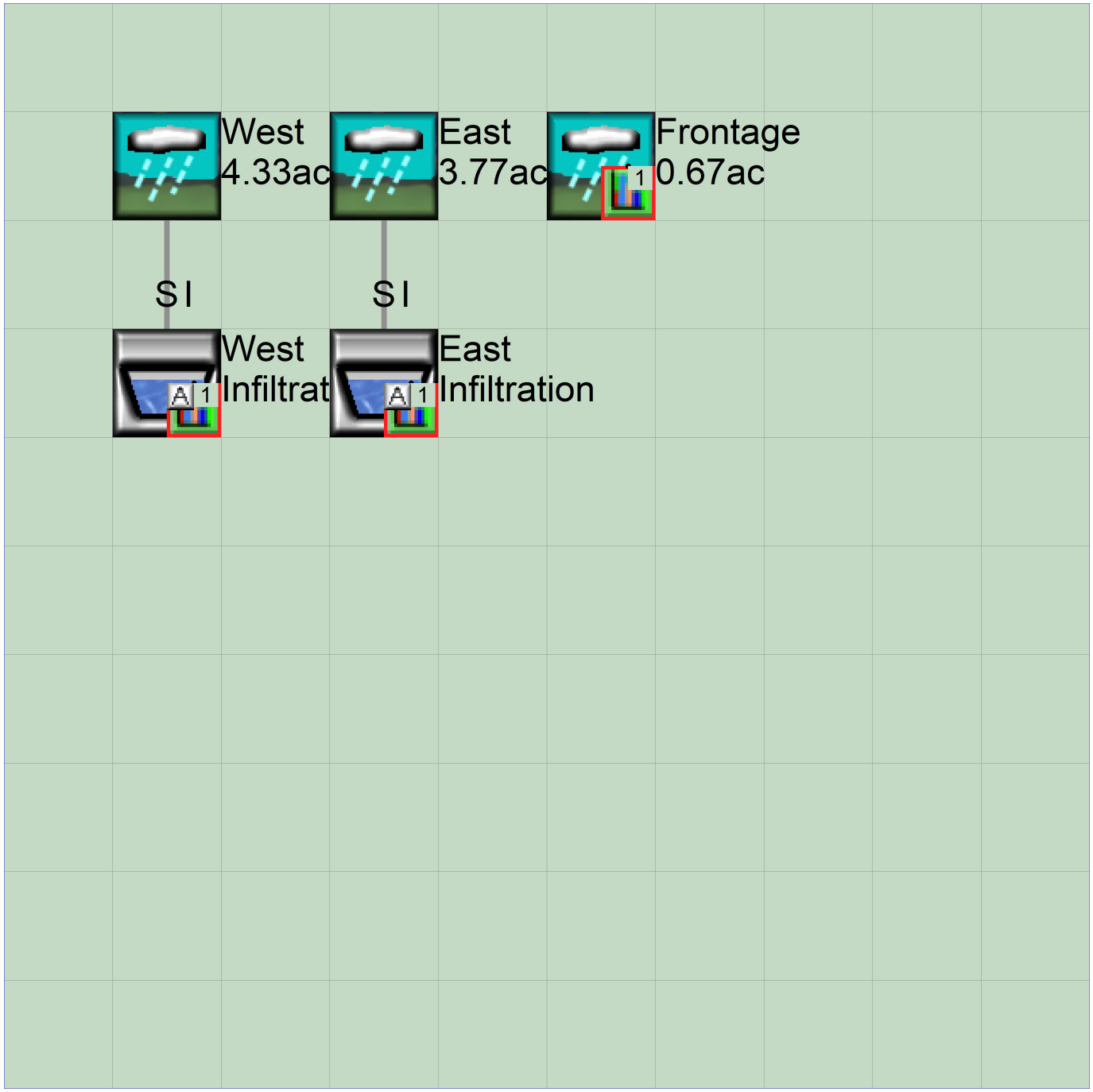
## IMPLND Changes

No IMPLND changes have been made.

# *Appendix*
## *Predeveloped Schematic*



## *Mitigated Schematic*



## *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   19093-CUP.wdm
MESSU       25   Pre19093-CUP.MES
            27   Pre19093-CUP.L61
            28   Pre19093-CUP.L62
            30   POC19093-CUP1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      10
      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           ***
   10     C, Forest, Flat         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 ***
   10         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  *********
   10         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 ***
   10         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
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  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
   10             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  10                       8.777     COPY   501     12
PERLND  10                       8.777     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    1.31           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.31           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   19093-CUP.wdm
MESSU       25   Mit19093-CUP.MES
            27   Mit19093-CUP.L61
            28   Mit19093-CUP.L62
            30   POC19093-CUP1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      16
      IMPLND       1
      RCHRES       1
      RCHRES       2
      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        West Infiltration           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 ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   16     C, Lawn, Flat           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 ***
   16         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  *********
   16         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 ***
   16         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
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                 ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16            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
   16              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
  END GEN-INFO
  *** Section IWATER***

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

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    1         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
  END IWAT-PARM2
```

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

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

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
West***
PERLND  16                      2.5747     RCHRES   1      2
PERLND  16                      2.5747     RCHRES   1      3
IMPLND   1                      1.7581     RCHRES   1      5
East***
PERLND  16                      2.3004     RCHRES   2      2
PERLND  16                      2.3004     RCHRES   2      3
IMPLND   1                      1.4699     RCHRES   2      5
Frontage***
PERLND  16                      0.1461     COPY   501     12
PERLND  16                      0.1461     COPY   601     12
PERLND  16                      0.1461     COPY   501     13
PERLND  16                      0.1461     COPY   601     13
IMPLND   1                      0.5279     COPY   501     15
IMPLND   1                      0.5279     COPY   601     15

******Routing******
PERLND  16                      2.5747     COPY     1     12
IMPLND   1                      1.7581     COPY     1     15
PERLND  16                      2.5747     COPY     1     13
PERLND  16                      2.3004     COPY     1     12
IMPLND   1                      1.4699     COPY     1     15
PERLND  16                      2.3004     COPY     1     13
RCHRES   1                           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



<-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     West Infiltratio-005    2    1    1    1   28    0    1
    2     East Infiltratio-009    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
  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
  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  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      0.04       0.0       0.0       0.5       0.0
    2              2      0.04       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  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   91    5
     Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)     (cfs)   (ft/sec)    (Minutes)***
  0.000000  1.311983  0.000000  0.000000  0.000000
  0.011111  1.312717  0.014582  0.000000  0.264583
  0.022222  1.313450  0.029171  0.000000  0.264583
  0.033333  1.314184  0.043769  0.000000  0.264583
  0.044444  1.314917  0.058376  0.000000  0.264583
  0.055556  1.315651  0.072990  0.000000  0.264583
  0.066667  1.316386  0.087612  0.000000  0.264583
  0.077778  1.317120  0.102243  0.000000  0.264583
  0.088889  1.317855  0.116882  0.000000  0.264583
  0.100000  1.318590  0.131529  0.000000  0.264583
  0.111111  1.319325  0.146184  0.000000  0.264583
  0.122222  1.320060  0.160847  0.000000  0.264583
  0.133333  1.320795  0.175518  0.000000  0.264583
  0.144444  1.321531  0.190198  0.000000  0.264583
  0.155556  1.322267  0.204886  0.000000  0.264583
  0.166667  1.323003  0.219582  0.000000  0.264583
  0.177778  1.323739  0.234286  0.000000  0.264583
  0.188889  1.324475  0.248998  0.000000  0.264583
  0.200000  1.325212  0.263718  0.000000  0.264583
  0.211111  1.325949  0.278447  0.000000  0.264583
  0.222222  1.326686  0.293184  0.000000  0.264583
  0.233333  1.327423  0.307929  0.000000  0.264583
  0.244444  1.328161  0.322682  0.000000  0.264583
  0.255556  1.328898  0.337444  0.000000  0.264583
  0.266667  1.329636  0.352213  0.000000  0.264583
  0.277778  1.330374  0.366991  0.000000  0.264583
  0.288889  1.331113  0.381777  0.000000  0.264583
  0.300000  1.331851  0.396571  0.000000  0.264583
```

```
0.311111  1.332590  0.411374  0.000000  0.264583
0.322222  1.333329  0.426185  0.000000  0.264583
0.333333  1.334068  0.441003  0.000000  0.264583
0.344444  1.334807  0.455831  0.000000  0.264583
0.355556  1.335547  0.470666  0.000000  0.264583
0.366667  1.336287  0.485509  0.000000  0.264583
0.377778  1.337026  0.500361  0.000000  0.264583
0.388889  1.337767  0.515221  0.000000  0.264583
0.400000  1.338507  0.530089  0.000000  0.264583
0.411111  1.339247  0.544966  0.000000  0.264583
0.422222  1.339988  0.559850  0.000000  0.264583
0.433333  1.340729  0.574743  0.000000  0.264583
0.444444  1.341470  0.589644  0.000000  0.264583
0.455556  1.342212  0.604554  0.000000  0.264583
0.466667  1.342953  0.619471  0.000000  0.264583
0.477778  1.343695  0.634397  0.000000  0.264583
0.488889  1.344437  0.649331  0.000000  0.264583
0.500000  1.345179  0.664273  0.000000  0.264583
0.511111  1.345921  0.679224  0.024873  0.264583
0.522222  1.346664  0.694183  0.070329  0.264583
0.533333  1.347407  0.709150  0.129168  0.264583
0.544444  1.348150  0.724125  0.198819  0.264583
0.555556  1.348893  0.739109  0.277796  0.264583
0.566667  1.349636  0.754101  0.365093  0.264583
0.577778  1.350380  0.769101  0.459969  0.264583
0.588889  1.351124  0.784109  0.561842  0.264583
0.600000  1.351868  0.799126  0.670242  0.264583
0.611111  1.352612  0.814151  0.784769  0.264583
0.622222  1.353356  0.829184  0.905080  0.264583
0.633333  1.354101  0.844225  1.030872  0.264583
0.644444  1.354846  0.859275  1.161868  0.264583
0.655556  1.355591  0.874333  1.297820  0.264583
0.666667  1.356336  0.889399  1.438492  0.264583
0.677778  1.357082  0.904474  1.583664  0.264583
0.688889  1.357827  0.919556  1.733126  0.264583
0.700000  1.358573  0.934648  1.886677  0.264583
0.711111  1.359319  0.949747  2.044119  0.264583
0.722222  1.360065  0.964855  2.205262  0.264583
0.733333  1.360812  0.979971  2.369915  0.264583
0.744444  1.361558  0.995095  2.537894  0.264583
0.755556  1.362305  1.010227  2.709012  0.264583
0.766667  1.363052  1.025368  2.883085  0.264583
0.777778  1.363800  1.040518  3.059929  0.264583
0.788889  1.364547  1.055675  3.239358  0.264583
0.800000  1.365295  1.070841  3.421187  0.264583
0.811111  1.366043  1.086015  3.605231  0.264583
0.822222  1.366791  1.101197  3.791302  0.264583
0.833333  1.367539  1.116388  3.979211  0.264583
0.844444  1.368288  1.131587  4.168770  0.264583
0.855556  1.369036  1.146794  4.359787  0.264583
0.866667  1.369785  1.162010  4.552071  0.264583
0.877778  1.370534  1.177234  4.745429  0.264583
0.888889  1.371284  1.192466  4.939668  0.264583
0.900000  1.372033  1.207707  5.134592  0.264583
0.911111  1.372783  1.222956  5.330007  0.264583
0.922222  1.373533  1.238213  5.525717  0.264583
0.933333  1.374283  1.253479  5.721526  0.264583
0.944444  1.375033  1.268753  5.917238  0.264583
0.955556  1.375784  1.284035  6.112659  0.264583
0.966667  1.376534  1.299326  6.307592  0.264583
0.977778  1.377285  1.314625  6.501843  0.264583
0.988889  1.378037  1.329932  6.695220  0.264583
1.000000  1.378788  1.345248  6.887532  0.264583
END FTABLE  1
FTABLE      2
 91    5
   Depth      Area    Volume  Outflow1  Outflow2  Velocity  Travel Time***
    (ft)   (acres) (acre-ft)   (cfs)      (cfs)   (ft/sec)    (Minutes)***
0.000000  0.968779  0.000000  0.000000  0.000000
0.011111  0.969408  0.010768  0.000000  0.195370
```

| | | | | |
|---|---|---|---|---|
| 0.022222 | 0.970037 | 0.021542 | 0.000000 | 0.195370 |
| 0.033333 | 0.970667 | 0.032324 | 0.000000 | 0.195370 |
| 0.044444 | 0.971296 | 0.043113 | 0.000000 | 0.195370 |
| 0.055556 | 0.971926 | 0.053908 | 0.000000 | 0.195370 |
| 0.066667 | 0.972556 | 0.064711 | 0.000000 | 0.195370 |
| 0.077778 | 0.973187 | 0.075521 | 0.000000 | 0.195370 |
| 0.088889 | 0.973817 | 0.086338 | 0.000000 | 0.195370 |
| 0.100000 | 0.974448 | 0.097161 | 0.000000 | 0.195370 |
| 0.111111 | 0.975079 | 0.107992 | 0.000000 | 0.195370 |
| 0.122222 | 0.975710 | 0.118830 | 0.000000 | 0.195370 |
| 0.133333 | 0.976342 | 0.129674 | 0.000000 | 0.195370 |
| 0.144444 | 0.976973 | 0.140526 | 0.000000 | 0.195370 |
| 0.155556 | 0.977605 | 0.151385 | 0.000000 | 0.195370 |
| 0.166667 | 0.978237 | 0.162251 | 0.000000 | 0.195370 |
| 0.177778 | 0.978869 | 0.173123 | 0.000000 | 0.195370 |
| 0.188889 | 0.979501 | 0.184003 | 0.000000 | 0.195370 |
| 0.200000 | 0.980134 | 0.194890 | 0.000000 | 0.195370 |
| 0.211111 | 0.980767 | 0.205784 | 0.000000 | 0.195370 |
| 0.222222 | 0.981400 | 0.216685 | 0.000000 | 0.195370 |
| 0.233333 | 0.982033 | 0.227593 | 0.000000 | 0.195370 |
| 0.244444 | 0.982666 | 0.238508 | 0.000000 | 0.195370 |
| 0.255556 | 0.983300 | 0.249430 | 0.000000 | 0.195370 |
| 0.266667 | 0.983934 | 0.260359 | 0.000000 | 0.195370 |
| 0.277778 | 0.984568 | 0.271295 | 0.000000 | 0.195370 |
| 0.288889 | 0.985202 | 0.282238 | 0.000000 | 0.195370 |
| 0.300000 | 0.985837 | 0.293189 | 0.000000 | 0.195370 |
| 0.311111 | 0.986471 | 0.304146 | 0.000000 | 0.195370 |
| 0.322222 | 0.987106 | 0.315110 | 0.000000 | 0.195370 |
| 0.333333 | 0.987741 | 0.326082 | 0.000000 | 0.195370 |
| 0.344444 | 0.988376 | 0.337060 | 0.000000 | 0.195370 |
| 0.355556 | 0.989012 | 0.348045 | 0.000000 | 0.195370 |
| 0.366667 | 0.989647 | 0.359038 | 0.000000 | 0.195370 |
| 0.377778 | 0.990283 | 0.370038 | 0.000000 | 0.195370 |
| 0.388889 | 0.990919 | 0.381044 | 0.000000 | 0.195370 |
| 0.400000 | 0.991556 | 0.392058 | 0.000000 | 0.195370 |
| 0.411111 | 0.992192 | 0.403079 | 0.000000 | 0.195370 |
| 0.422222 | 0.992829 | 0.414107 | 0.000000 | 0.195370 |
| 0.433333 | 0.993466 | 0.425142 | 0.000000 | 0.195370 |
| 0.444444 | 0.994103 | 0.436184 | 0.000000 | 0.195370 |
| 0.455556 | 0.994740 | 0.447233 | 0.000000 | 0.195370 |
| 0.466667 | 0.995377 | 0.458289 | 0.000000 | 0.195370 |
| 0.477778 | 0.996015 | 0.469352 | 0.000000 | 0.195370 |
| 0.488889 | 0.996653 | 0.480423 | 0.000000 | 0.195370 |
| 0.500000 | 0.997291 | 0.491500 | 0.000000 | 0.195370 |
| 0.511111 | 0.997929 | 0.502585 | 0.000000 | 0.195370 |
| 0.522222 | 0.998568 | 0.513676 | 0.000000 | 0.195370 |
| 0.533333 | 0.999207 | 0.524775 | 0.000000 | 0.195370 |
| 0.544444 | 0.999846 | 0.535881 | 0.000000 | 0.195370 |
| 0.555556 | 1.000485 | 0.546994 | 0.000000 | 0.195370 |
| 0.566667 | 1.001124 | 0.558114 | 0.000000 | 0.195370 |
| 0.577778 | 1.001763 | 0.569241 | 0.000000 | 0.195370 |
| 0.588889 | 1.002403 | 0.580375 | 0.000000 | 0.195370 |
| 0.600000 | 1.003043 | 0.591517 | 0.000000 | 0.195370 |
| 0.611111 | 1.003683 | 0.602665 | 0.000000 | 0.195370 |
| 0.622222 | 1.004324 | 0.613821 | 0.000000 | 0.195370 |
| 0.633333 | 1.004964 | 0.624984 | 0.000000 | 0.195370 |
| 0.644444 | 1.005605 | 0.636153 | 0.000000 | 0.195370 |
| 0.655556 | 1.006246 | 0.647330 | 0.000000 | 0.195370 |
| 0.666667 | 1.006887 | 0.658514 | 0.000000 | 0.195370 |
| 0.677778 | 1.007528 | 0.669706 | 0.000000 | 0.195370 |
| 0.688889 | 1.008170 | 0.680904 | 0.000000 | 0.195370 |
| 0.700000 | 1.008812 | 0.692109 | 0.000000 | 0.195370 |
| 0.711111 | 1.009454 | 0.703322 | 0.000000 | 0.195370 |
| 0.722222 | 1.010096 | 0.714542 | 0.000000 | 0.195370 |
| 0.733333 | 1.010738 | 0.725769 | 0.000000 | 0.195370 |
| 0.744444 | 1.011381 | 0.737003 | 0.000000 | 0.195370 |
| 0.755556 | 1.012024 | 0.748244 | 0.008795 | 0.195370 |
| 0.766667 | 1.012667 | 0.759492 | 0.045687 | 0.195370 |
| 0.777778 | 1.013310 | 0.770747 | 0.098274 | 0.195370 |
| 0.788889 | 1.013953 | 0.782010 | 0.162750 | 0.195370 |

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  0.800000  1.014597  0.793280  0.237213  0.195370
  0.811111  1.015241  0.804557  0.320456  0.195370
  0.822222  1.015885  0.815841  0.411623  0.195370
  0.833333  1.016529  0.827132  0.510062  0.195370
  0.844444  1.017173  0.838430  0.615253  0.195370
  0.855556  1.017818  0.849736  0.726762  0.195370
  0.866667  1.018463  0.861048  0.844221  0.195370
  0.877778  1.019108  0.872368  0.967309  0.195370
  0.888889  1.019753  0.883695  1.095735  0.195370
  0.900000  1.020399  0.895029  1.229240  0.195370
  0.911111  1.021044  0.906371  1.367580  0.195370
  0.922222  1.021690  0.917719  1.510529  0.195370
  0.933333  1.022336  0.929075  1.657872  0.195370
  0.944444  1.022982  0.940438  1.809403  0.195370
  0.955556  1.023629  0.951808  1.964924  0.195370
  0.966667  1.024275  0.963185  2.124240  0.195370
  0.977778  1.024922  0.974570  2.287161  0.195370
  0.988889  1.025569  0.985961  2.453501  0.195370
  1.000000  1.026217  0.997360  2.623072  0.195370
  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    1.31           PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1.31           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***
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
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   2 HYDR   RO     1 1         1      WDM   1004 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      1 1         1      WDM   1005 FLOW     ENGL      REPL
RCHRES   2 HYDR   O      2 1         1      WDM   1006 FLOW     ENGL      REPL
RCHRES   2 HYDR   STAGE  1 1         1      WDM   1007 STAG     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>             <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        2
PERLND     PWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    2

  MASS-LINK        3
PERLND     PWATER IFWO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    3

  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  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
```

## *Predeveloped HSPF Message File*

## *Mitigated HSPF Message File*

# *Disclaimer*

## *Legal Notice*

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