Madrona Ridge PUD

Stormwater Site Plan Report

March 22, 2022

Prepared for

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Submitted by

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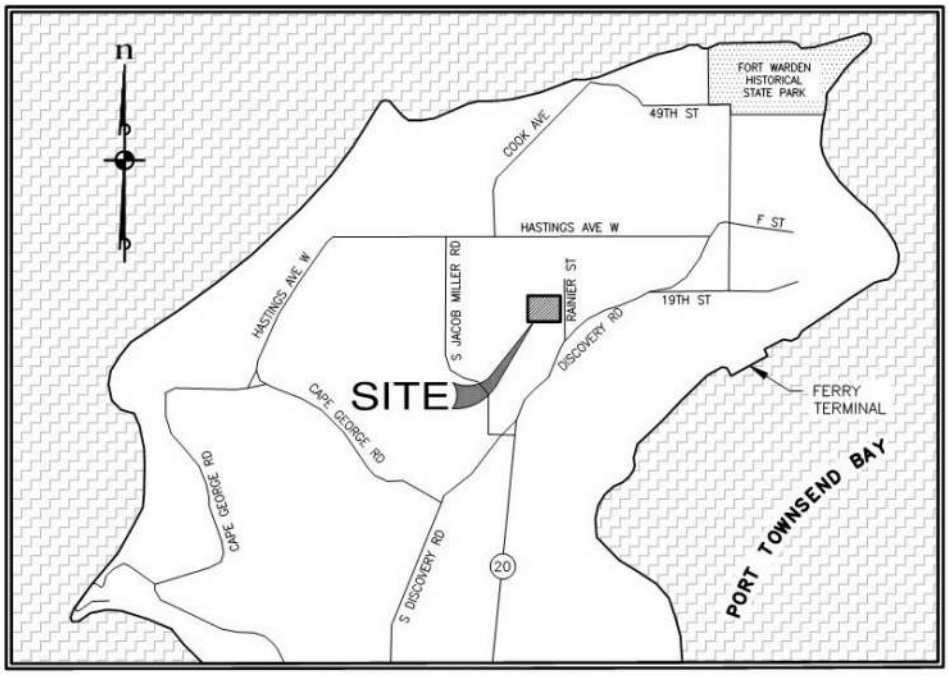
1. PROJECT OVERVIEW

The proposed Madrona Ridge PUD project is located on the west side of Rainier Street, north of the intersection of Rainier Street & Discovery Road within Section 09, Township 30 North, Range 01 West, W.M., City of Port Townsend, WA 98368. The project site is comprised of four parcels, 00109-1002 (20.73 Acres, Zoned R-II), 00109-2005 (6.27 Acres, Zoned R-II), 00109-2006 (7.40 Acres, Zoned R-III) and 93780-0301 (2.62 Acres, Zoned R-II), where R-II is Medium Density Single-Family and R-III is Medium Density Multifamily. Of the 37.02 Acre total area, approximately 27.36 acres will be disturbed.

The proposed project will create 167 lots upon which single-family residences will be constructed. Interior roads will be either 40-foot local access or 50-foot collector designation with curb, gutter, planter, sidewalk, as well as parking and multi-use pathway (50-foot section). The project will also extend Rainier Street approximately 1,900 feet from the Discovery Road roundabout to the North property line of Madrona Ridge

Any existing site improvements within the clearing limits are proposed to be demolished and the remainder of the area will be cleared and grubbed with the exception of an existing fiber optic telecommunication line that runs north-south through the project. The proposed stormwater conveyance system will collect and convey runoff within each of the four developed drainage basins to a combined detention / wetpool facility (1 per basin) for runoff treatment and flow control. See Section 10 of this report for detailed discussion. See Figures 1.1 and 1.2 for a Vicinity Map and Developed Conditions Map.

Figure 1.1: Vicinity Map



A PORTION OF THE NE 1/4 OF SECTION 9, TWP 30 N, RGE 1 W, WM

n

SCALE: 1" = 60'

60 30 0 60 120

CONTOUR INTERVAL = 2'

Know what's below. Call before you dig.

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DAT

FIGURE 1.2 - DEVELOPED CONDITIONS MAP

REVISIONS		
NO.	DESCRIPTION/DATE	BY

TREVOR L. STIFF — STATE OF WASHINGTON — 42334 — REGISTERED PROFESSIONAL ENGINEER

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MADRONA RIDGE PUD

SITE PLAN

PORT TOWNSEND WASHINGTON

JOB NO.:	2090-003-021
DWG. NAME:	ST-01
DESIGNED BY:	TLS
DRAWN BY:	CLR
CHECKED BY:	
DATE:	3/18/2022
DATE OF PRINT:	

ST-01

4 OF 77 SHEETS

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Plotted By: Connie Garrett

Stormwater design for the project is in accordance with the 2012 Washington State Department of Ecology Stormwater Management Manual for Western Washington as Amended in December 2014 (herein referred to as the "Manual"), the Washington State Department of Transportation Hydraulics Manual and Port Townsend Municipal Code Titles 13 (Water, Sewer and Stormwater) and 17 (Zoning), which set the methodology and design criteria for the project. A Geotechnical Report and Critical Area Report have been prepared for this project and are included by reference.

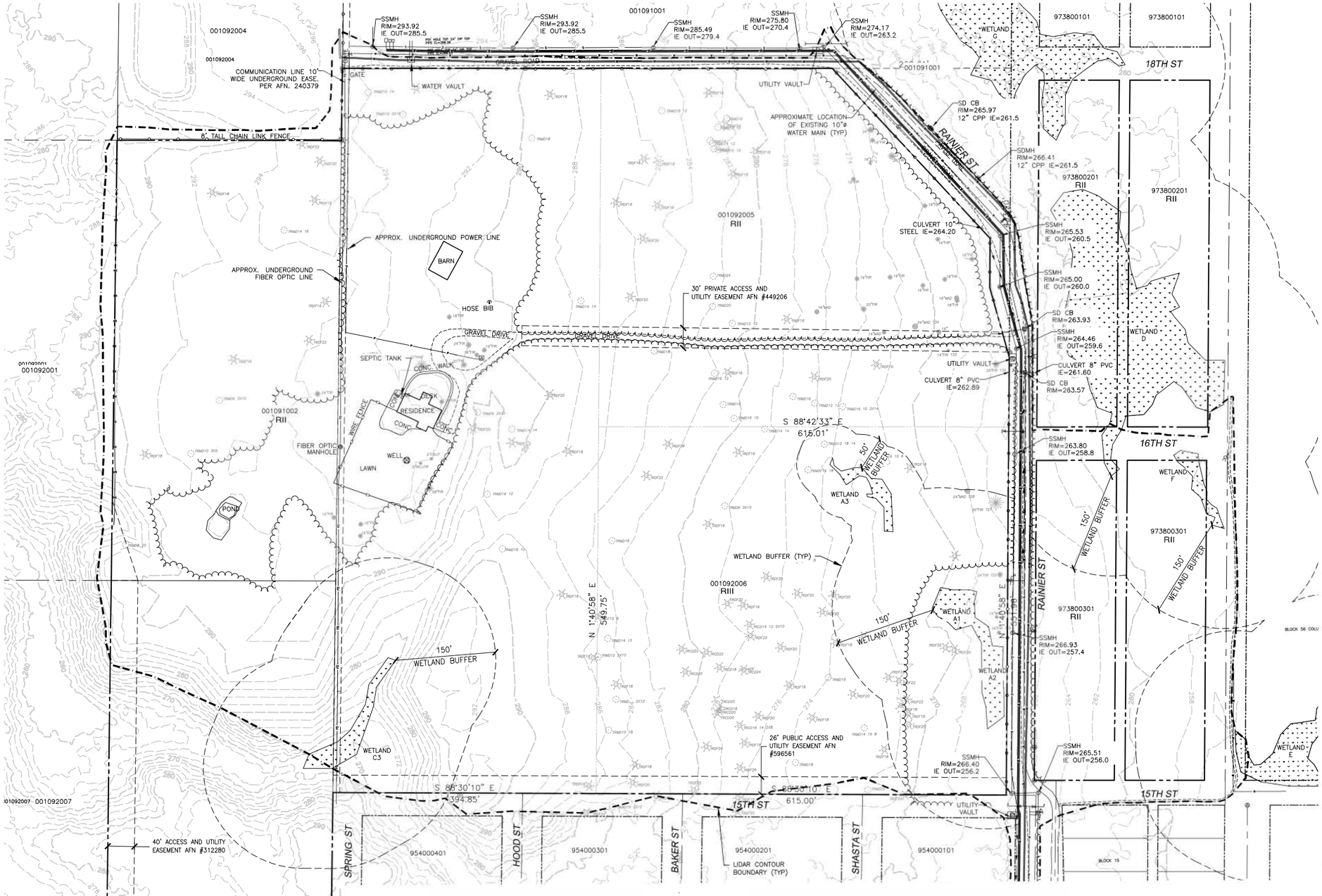
2. EXISTING CONDITIONS SUMMARY

The project site is comprised of four parcels as described in Section 1. Taken together, the parcels form a rectangular shape measuring approximately 1,060 feet in the north-south direction and 1,640-feet in the east-west direction. The project site has a local "flat" area near an existing residence in the middle of the site From there, the site generally slopes east & west into two separate wetland basins.

The area around the existing residence and associated outbuildings has been cleared and is vegetated with grass. Other areas of the site are vegetated with young to mature evergreens and deciduous trees with understory of ferns, shrubs and blackberries.

There are Category III and IV wetlands located within the parcel boundaries, which are discussed in detail within the Critical Area Report Supplement and Buffer Averaging Plan by Wetland Resources.

A PORTION OF THE NE 1/4 OF SECTION 9, TWP 30 N, RGE 1 W, WM



SCALE: 1" = 80'

80 40 0 80 160

CONTOUR INTERVAL = 2'

NOTE:
MAPPING AND WETLAND INFORMATION FROM VAN ALLER SURVEYING. LIDAR CONTOURS OUTSIDE SOURCE CONTOURS ALSO UTILIZED. SEE DRAWING FOR LIDAR LIMITS.

PARCEL INFORMATION

PARCEL #	AREA	ZONING
001091002	20.73 AC	RII (SF)
001092005	6.27 AC	RII (SF)
001092006	7.40 AC	RIII (MF)
973800201	2.81 AC	RII (SF)
973800201	2.81 AC	RII (SF)
973800301	2.62 AC	RII (SF)
973800301	2.62 AC	RII (SF)
TOTAL AREA:	45.26 AC	

HORIZONTAL DATUM

WASHINGTON COORDINATE SYSTEM OF 1983, ADJUSTMENT 1991, NORTH ZONE (NAD 83/91) PER FIELD TIES TO CITY OF PORT TOWNSEND GEODETIC MONUMENT # 9 (0010951) AND #709 (0010953) AS SHOWN ON THE CITY OF PORT TOWNSEND GEODETIC CONTROL MAP, FILED UNDER VOLUME 19 OF SURVEYS, PAGES 61 – 70.
ALL BEARINGS ARE RELATIVE TO SAID GRID. DISTANCES REDUCED TO GRID ARE 0.999933 OF HORIZONTAL DISTANCE.

VERTICAL DATUM

NAVD 88 PER FIELD TIES TO ABOVE MENTIONED MONUMENTS.

LEGEND

- COS — SANITARY SEWER CLEANOUT
- (S) — SANITARY SEWER MANHOLE
- STORM CATCH BASIN
- (D) — STORM MANHOLE
- POWER TRANSFORMER
- (T) — TELEPHONE MANHOLE
- POWER VAULT
- BLOW OFF VALVE
- AIR VAC. ASS'Y
- FIRE HYDRANT
- HOSE BIB
- WATER VALVE
- WELL
- C–CEDAR, F–FIR, P–PINE, S–SPRUCE
- A–ALDER, B–BIRCH, M–MAPLE, MAD–MADRONE, O–OAK, U–UNKNOWN
- STORM LINE
- WATER LINE
- FENCE
- RIGHT–OF–WAY
- BOUNDARY LINE
- EASEMENT LINE
- 300 — CONTOUR
- WETLAND BUFFER

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FIGURE 2.1 -
EXISTING CONDITIONS MAP

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MADRONA RIDGE PUD

EXISTING CONDITIONS

PORT TOWNSEND WASHINGTON

JOB NO.:	2090-003-021
DWG. NAME:	EX-01
DESIGNED BY:	TLS
DRAWN BY:	CLR
CHECKED BY:	
DATE:	3/18/2022
DATE OF PRINT:	

EX-01

3 OF 77 SHEETS

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3. INFILTRATION RATES / SOIL REPORTS

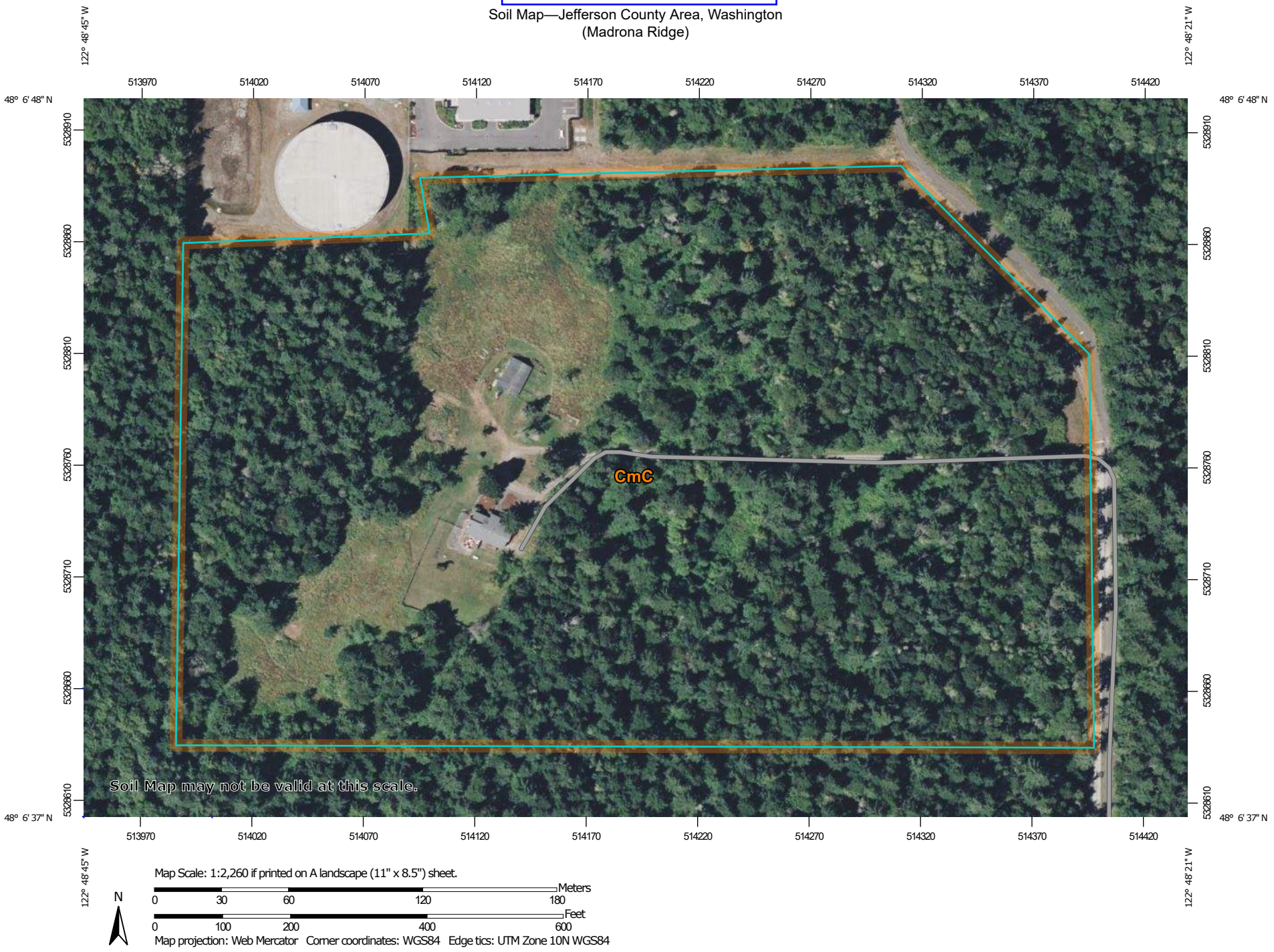
The Natural Resources Conservation Service (NRCS) describes on-site soils as Clallum Gravelly Sandy Loam, 0 to 15 Percent Slopes. See Figure 3.1 for NRCS Soil Map.

Aspect Consulting prepared a Geotechnical Report (incorporated by reference) in August, 2021. Fifteen test pits were excavated to depths of 6 to 12 feet below existing ground surface. Twelve of the test pits revealed topsoil varying from 6- to 12-inches thick, while three revealed fills varying 10- to 18-inches thick. Beneath the topsoil or fill, lodgement till extending to the maximum depth was encountered in all test pits. Groundwater was not observed at the project location.

Per the report, infiltration rates can be assumed to be less than 0.3 inches per hour, therefore infiltration of the stormwater runoff is not feasible.

FIGURE 3.1 - NRCS SOIL MAP

Soil Map—Jefferson County Area, Washington
(Madrona Ridge)



Map Scale: 1:2,260 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

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: Jefferson County Area, Washington
Survey Area Data: Version 20, Sep 1, 2021

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

Date(s) aerial images were photographed: Jul 25, 2020—Jul 28, 2020

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
CmC	Clallam gravelly sandy loam, 0 to 15 percent slopes	24.5	100.0%
Totals for Area of Interest		**24.5**	**100.0%**

4. WELLS AND SEPTIC TANKS

There is a well and septic system on the project site serving the existing residence. These will be decommissioned in accordance with Washington State Department of Ecology as well as any applicable City of Port Townsend and Jefferson County requirements.

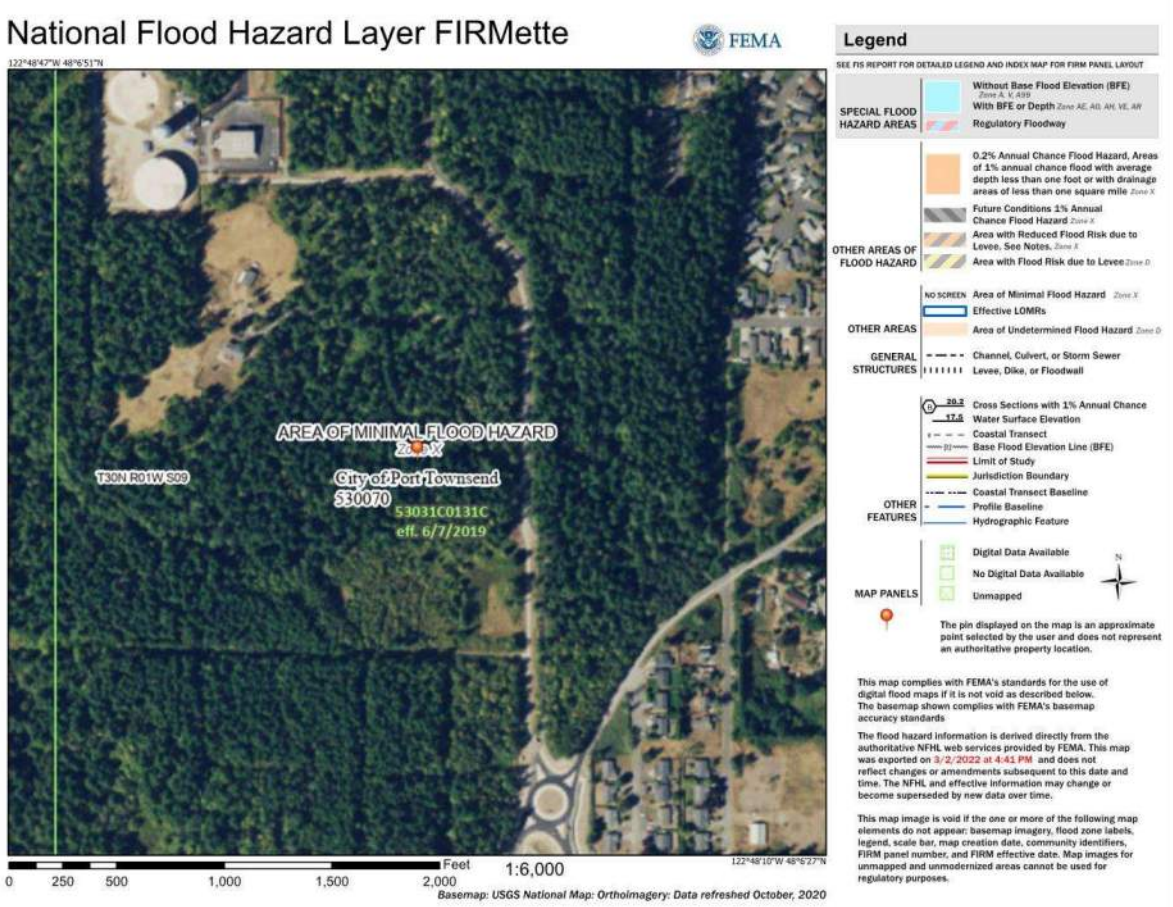
5. FUEL TANKS

There are no fuel tanks on the project site to the best of our knowledge.

6. FLOOD PLAIN ANALYSIS

According to Federal Emergency Management Program Flood Insurance Rate Map 53031C0131C, effective 2019-06-07, the project lies within Zone X, “Area of Minimal Zone Hazard”. A FirmETTE has been created for this project and is presented as Figure 6.1.

Figure 6.1: Federal Emergency Management Agency Flood Insurance Rate Panel

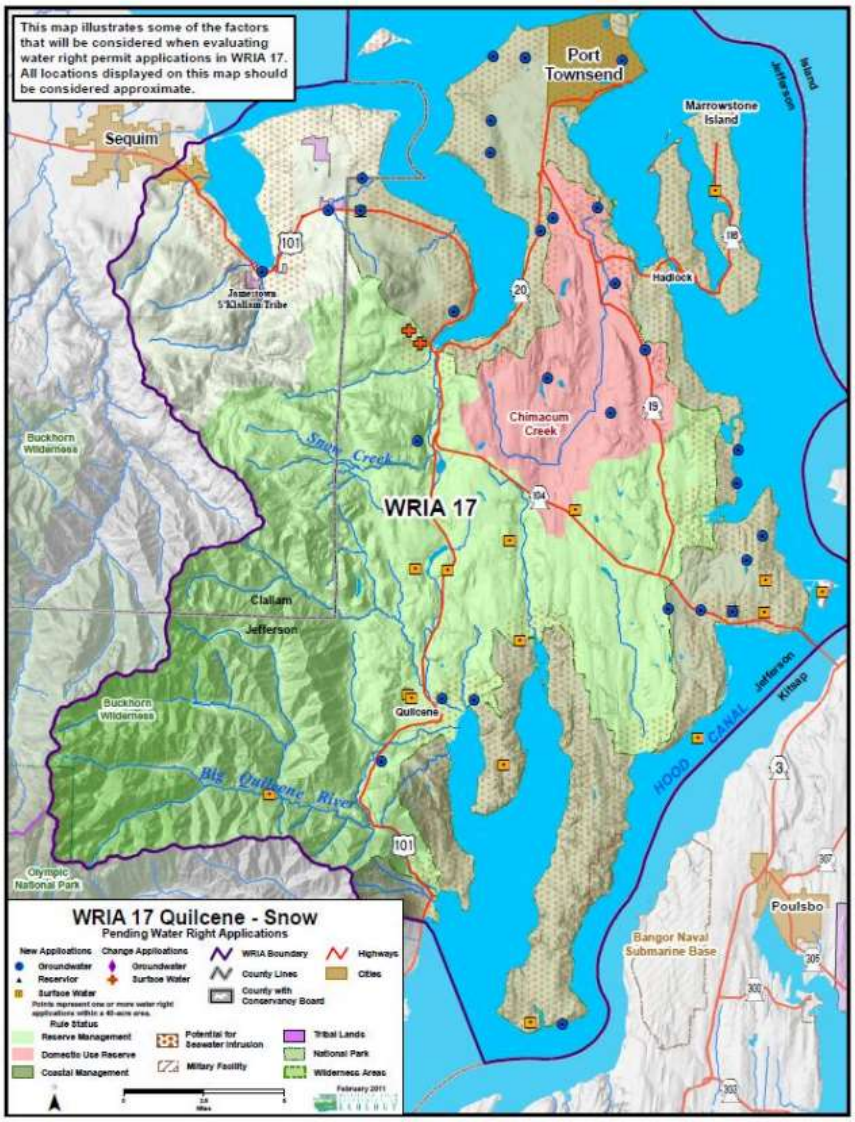


7. OFFSITE ANALYSIS

Study Area

The Madrona Ridge project is located within the Quilcene – Snow Watershed (WRIA #17). See Figure 7.1 for a map of the Quilcene – Snow Water Resource Inventory Area

Figure 7.1 – Quilcene – Snow Water Resource Inventory Area (WRIA #17)



Adopted Basin Plans

The WRIA 17 planning area includes Sequim Bay and Miller Peninsula portions of Clallam County. These areas have been incorporated into the planning area for Dungeness River Management Team WRIA-18. The Elwha-Dungeness/WRIA 18 Watershed Plan is incorporated into this document by reference.

Tributary Run-on

The site is a located at a topographic high point and, as such, there is no potential upstream run-on from adjacent parcels.

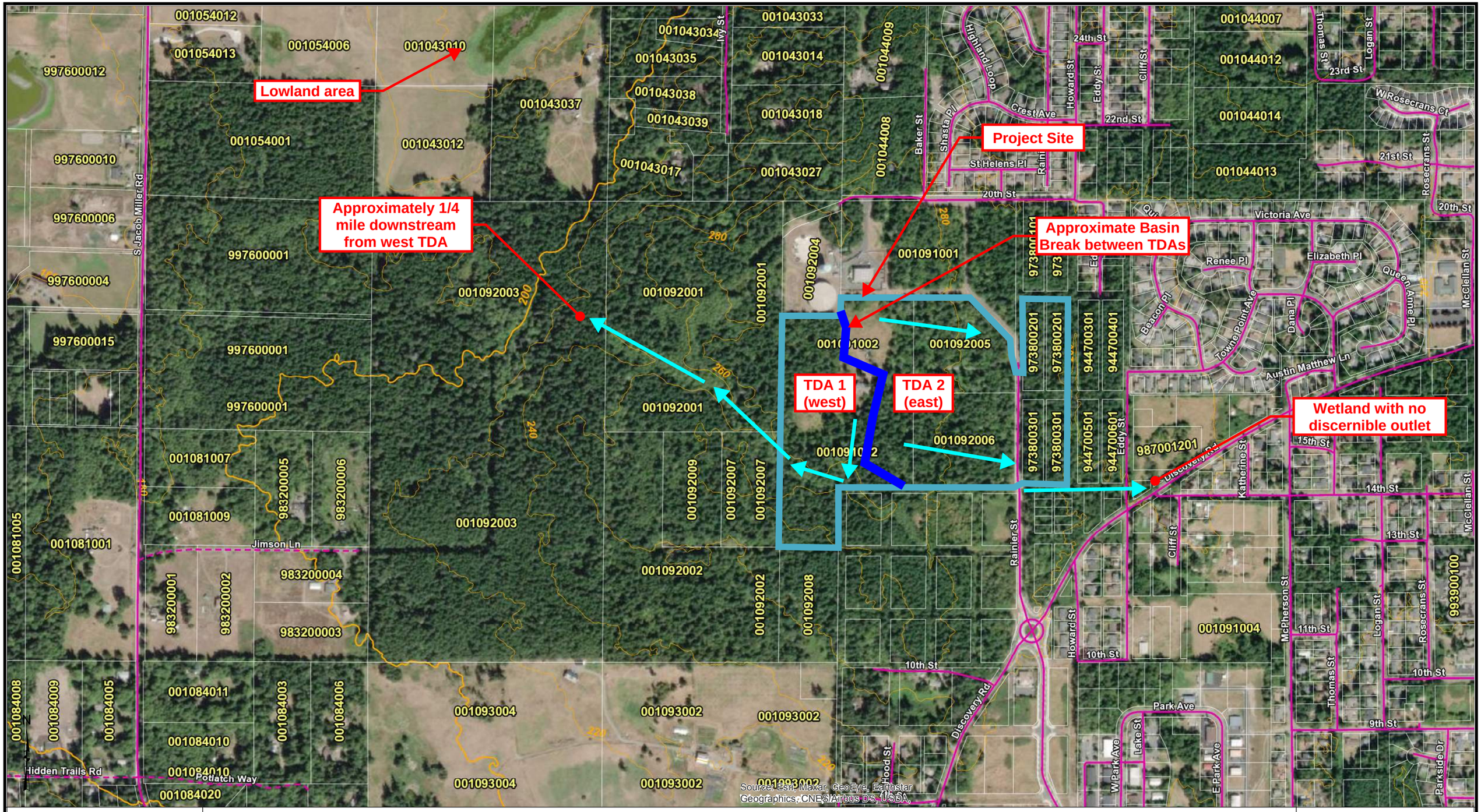
Downstream Analysis

The existing project site drains to 2 separate basins The western portion of the project site drains to the west, hydrates Wetland C3 and continues downstream across parcels 001092001 and 001092003, 001043012 and 001043037 to the lowland area within parcel 001043037.

The easterly portion of the project drains to the southeast and hydrates the various wetlands along that easterly parcel boundary.

The downstream area in both basins are comprised of natural features and appears to be adequate to convey the existing stormwater flows. During the investigation, there did not appear to be any existing or potential drainage problems that would be aggravated by the proposed development. There were no notable or applicable drainage complaints located for the project site.

See the Downstream Drainage Map presented as Figure 7.2.



These data are provided on an "AS-IS" basis, without warranty of any type, expressed or implied, including but not limited to any warranty as to their performance, merchantability, or fitness for any particular purpose.

Jefferson County, WA

FIGURE 7.2 - DOWNSTREAM DRAINAGE MAP

1:9,083

Date: 7/27/2021

This map is not a substitute for accurate field surveys or for locating actual property lines and any adjacent features.

Water Quality Assessment

The Department of Ecology Water Quality Atlas was reviewed to see if there are any known downstream water quality concerns. Waters whose beneficial uses are impaired by pollutants that require a water improvement project are placed in the polluted water category (Category 5) and put on the 303(d) list. The 305(b) list all waters and all categories. Pollutants of concerns could be Bacteria, Dissolved oxygen, temperature, metals, phosphorus, turbidity, or high pH.

The only downstream 303(d) listed water is the Port Townsend Bay (approx. 1 mile downstream) with various contaminants, refer to Appendix C for all 303(d) listings.

8. CRITICAL AREAS

The site and properties in the immediate vicinity were researched to determine the presence of any critical areas on-site such that any potential problems that may be created or aggravated by the proposed project can be identified and evaluated. The following items were investigated:

- Critical Areas Report..... None Mapped
- Seawater Intrusion Protection Zone: ..... None Mapped
- Streams ..... None Mapped
- Lakes..... None Mapped
- Potential Steep Slope Hazard ..... None Mapped
- Erosion Hazard Area ..... None Mapped
- Landslide Hazard Area ..... None Mapped
- Aquifer Recharge..... Mapped
- Seismic Hazard Area ..... None Mapped
- Coal Mine Hazard Area..... None Mapped
- FEMA Floodway or Floodplain ..... None Mapped
- Endangered Species ..... None Mapped
- Wetlands ..... Category III and IV
- Wellhead Protection Area ..... None Mapped

See Appendix B for a map of the critical areas noted above.

9. PERFORMANCE GOALS AND STANDARDS

Hydrology Model

The 2021 Western Washington Hydrology Model (WWHM) software was used to size the detention and water quality facilities for the project. WWHM incorporates all the methods

required for determining compliance with the flow control and water quality standards specified below.

Flow Control

The project site is required to release stormwater to the performance standards provided in the Manual. To meet the prescriptive performance standards, stormwater discharges shall match developed discharges to pre-developed durations for the range of pre-developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow. The pre-developed condition to be matched shall be a forested land cover unless:

- Reasonable, historic information is provided that indicates the site was prairie prior to settlement (modeled as pasture in the approved continuous simulation model); or
- The drainage area of the immediate stream and all subsequent downstream basins have had at least 40% total impervious area (TIA) since 1985. In this case, the pre-developed condition to be matched shall be the existing land cover condition.

This standard requirement is waived for sites that will reliably infiltrate all the runoff from hard surfaces and converted vegetation areas.

Flow control is discussed in detail within Section 10 of this report.

Runoff Treatment

The project is located within a Basic Water Quality Treatment area. The performance goal of Basic Water Quality Treatment is to achieve 80% removal of Total Suspended Solids for influent concentrations that are greater than 100 mg/l, but less than 200 mg/l. For influent concentrations less than 100 mg/l, the facilities are intended to achieve an effluent goal of 20 mg/l total suspended solids. The performance goal applies to the water quality design storm volume or flow rate, as defined below:

Water Quality Design Storm Volume:

- The volume of runoff predicted from a 24-hour storm with a 6-month return frequency (a.k.a., 6-month, 24-hour storm). Wetpool facilities are sized based upon the volume of runoff predicted through use of the Natural Resource Conservation Service curve number equations for the 6-month, 24-hour storm. Alternatively, when using an approved continuous runoff model, the water quality design storm volume shall be equal to the simulated daily volume that represents the upper limit of the range of daily volumes that accounts for 91% of the entire runoff volume over a multi-decade period of record.
- See Section 10 of this report for further discussion of Runoff Treatment.

Conveyance

- The Stormwater Management Manual for Western Washington does not provide specific guidance on conveyance analysis. As such, the proposed conveyance system is designed such that a 12- or 18-inch pipe laid at 0.50% can convey the full unmitigated flow from the four project drainage basins into the combined detention/wetpool facilities. Pipe Capacity Calculations are presented in Appendix A.

10. PERMANENT STORMWATER CONTROL PLAN

The site has a relatively flat area near the existing house. From there, the site generally slopes east & west into 2 separate basins Based on available topographical information, the site does not receive tributary run-on from upstream properties.

In the Developed condition, Madrona Ridge contains four drainage basins that flow to four detention / wetpool facilities for flow control and water quality treatment. Controlled discharge from the ponds are then dispersed into the wetland buffers.

Predeveloped Site Hydrology

The total parcel area is 37.02 acres; however, the project disturbance is limited to approximately 27.36 acres. In the existing condition, there are two basins. One that flows to the west and one that flows to the east. Refer to Table 10.1 and Figure 10.1 below for the pre-developed land use and associated areas.

Table 10.1: Pre-Developed Land Use & Area

Sub-Basin	C, Forest, Flat (ac)	C, Lawn, Flat (ac)	Rooftops, Flat (ac)	Roads, Flat (ac)	Total (ac)
West	8.363	-	-	-	8.363
East	18.993	-	-	-	18.993
TOTAL:	27.356	-	-	-	27.356

As previously stated, the two pre-developed basins were split in to four separate pond basins

Table 10.2: Adjusted Pre-Developed Land Use & Area

Sub-Basin	C, Forest, Flat (ac)	C, Lawn, Flat (ac)	Rooftops, Flat (ac)	Roads, Flat (ac)	Total (ac)
Ex-Pond 1	7.735	-	-	-	7.735
Ex-Pond 2	9.022	-	-	-	9.022
Ex-Pond 3	6.214				6.214
Ex-Pond 4	2.967				2.967
TOTAL:	25.938	-	-	-	25.938*

***NOTE: The 1.419-acre difference between the totals in Tables 10.1 and 10.2 is the area switched between basins**

Pre-Developed flows are presented in Table 10.4 and a Pre-Developed Basin Map is presented as Figure 10.2.

Developed Site Hydrology

In the developed condition, it is proposed that all building rooftops, driveways, sidewalks, yards and roadway areas will be collected in a closed conveyance system and directed to a detention / wetpool facility.

To determine land coverages for the individual lots, a lot coverage of 45% was utilized as well as the following assumptions:

- Driveway Area: 400 Square Feet / Lot

NOTE: Lot coverage is the total ground coverage of all buildings or structures on a site measured from the outside of external walls or supporting members.

Example Calculation for Roof and Driveway Areas :

Step 1: Lot Area = **4,076 Square Feet.**

Step 2: Maximum Allowable Coverage: **4,076 x 45% = 1,834 Sq. Ft.**

Step 3: Driveway Area = **400 Square Feet.**

Step 4: Lawn Area = 4,076 – 1,834 - 400 = **1,842 Square Feet**

Refer to Table 10.3 below for a summary of land use and areas for the developed condition. See Figure 10.3 for the Developed Basin Map.

A PORTION OF THE NE 1/4 OF SECTION 9, TWP. 30 N., RGE. 1 W., WM

SCALE: 1" = 80'

80 40 0 80 160

CONTOUR INTERVAL = 2'

n

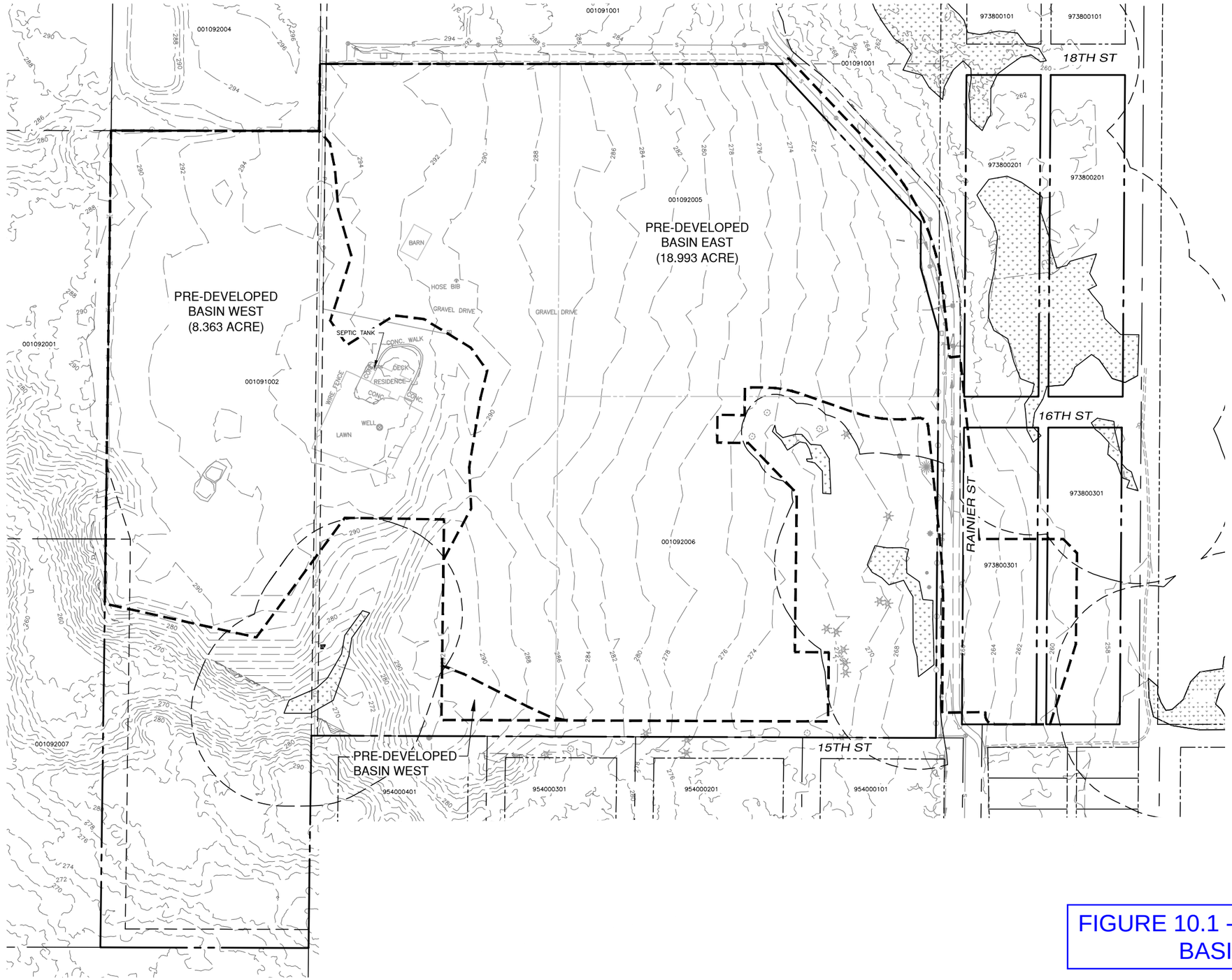


FIGURE 10.1 - PRE-DEVELOPED BASIN MAP #1

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NO.	DESCRIPTION/DATE	BY

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MONTEBANC MANAGEMENT, LLC

MADRONA RIDGE P.U.D.

CITY OF PORT TOWNSEND WASHINGTON

PRE-DEVELOPED BASIN MAP #1

JOB NO.:	2090-003-021
DWG. NAME:	PDEV-1
DESIGNED BY:	PDEV-1
DRAWN BY:	CG
CHECKED BY:	
DATE:	12/22/2021
DATE OF PRINT:	

PDEV-1

1 OF 1 SHEETS

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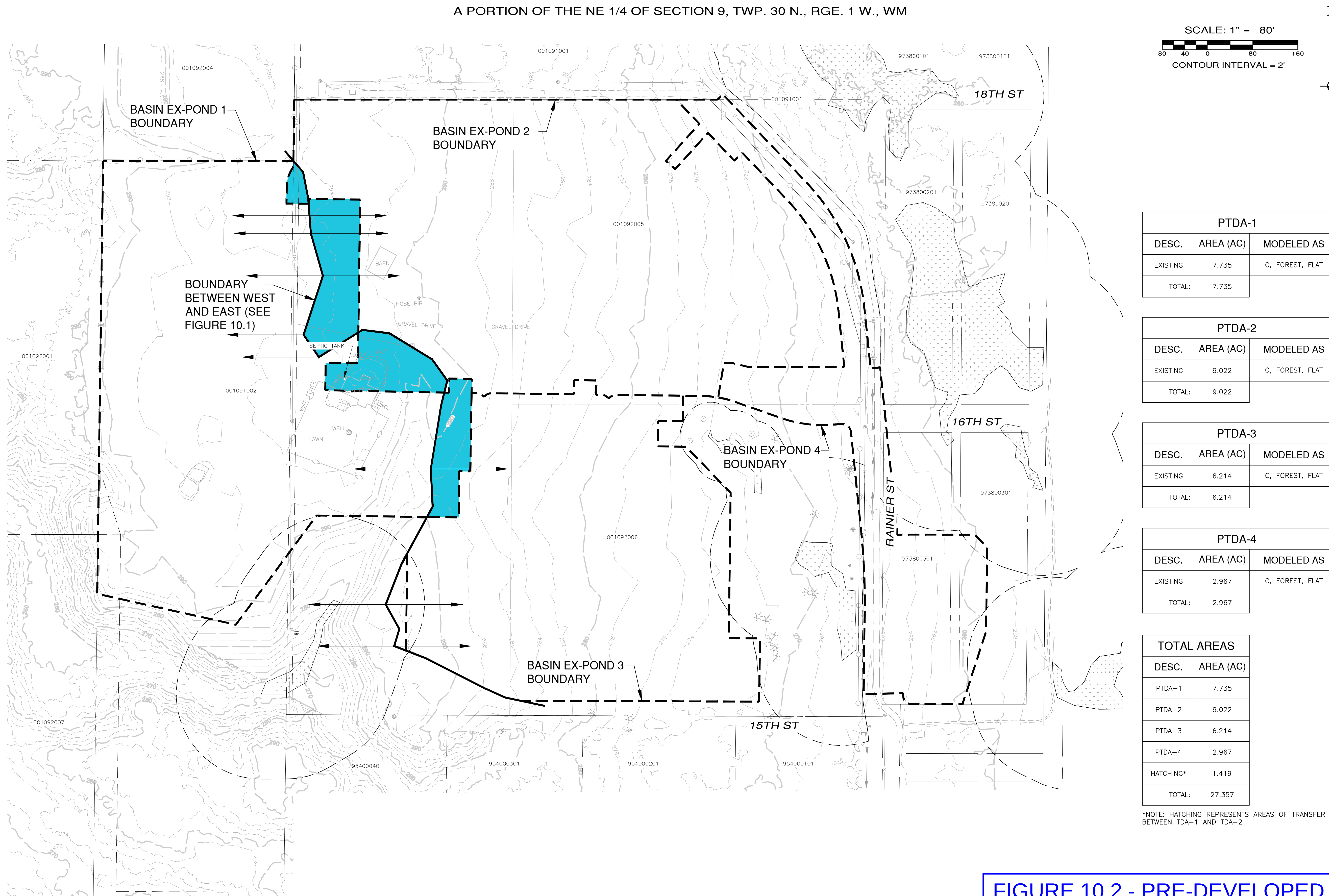
Plotted By: Michael Norton

A PORTION OF THE NE 1/4 OF SECTION 9, TWP. 30 N., RGE. 1 W., WM



PTDA-1		
DESC.	AREA (AC)	MODELED AS
EXISTING	7.735	C, FOREST, FLAT
TOTAL:	7.735	

PTDA-2		
DESC.	AREA (AC)	MODELED AS
EXISTING	9.022	C, FOREST, FLAT
TOTAL:	9.022	

PTDA-3		
DESC.	AREA (AC)	MODELED AS
EXISTING	6.214	C, FOREST, FLAT
TOTAL:	6.214	

PTDA-4		
DESC.	AREA (AC)	MODELED AS
EXISTING	2.967	C, FOREST, FLAT
TOTAL:	2.967	

TOTAL AREAS	
DESC.	AREA (AC)
PTDA-1	7.735
PTDA-2	9.022
PTDA-3	6.214
PTDA-4	2.967
HATCHING*	1.419
TOTAL:	27.357

*NOTE: HATCHING REPRESENTS AREAS OF TRANSFER BETWEEN TDA-1 AND TDA-2

FIGURE 10.2 - PRE-DEVELOPED BASIN MAP #2

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MONTEBANC MANAGEMENT, LLC
MADRONA RIDGE P.U.D.
PRE-DEVELOPED BASIN MAP #2
CITY OF PORT TOWNSEND WASHINGTON

JOB NO.:	2090-003-021
DWG. NAME:	PDEV-2
DESIGNED BY:	PDEV-2
DRAWN BY:	CG
CHECKED BY:	
DATE:	12/22/2021
DATE OF PRINT:	

PDEV-2
1 OF 1 SHEETS

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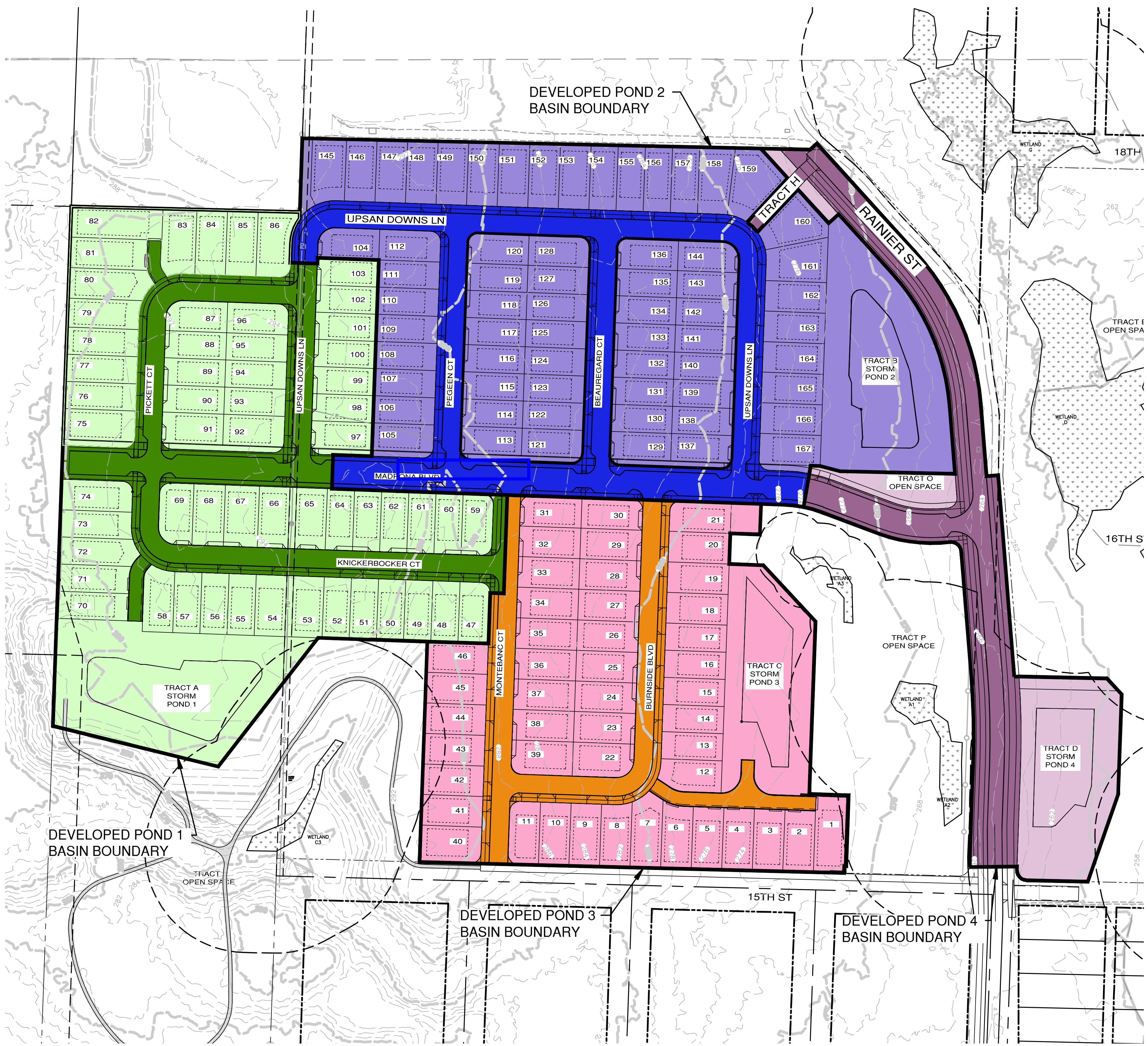
FIGURE 10.3 - DEVELOPED BASIN MAP

A PORTION OF THE NE 1/4 OF SECTION 9, TWP. 30 N., RGE. 1 W., WM

SCALE: 1" = 60'

CONTOUR INTERVAL = 2'



DEVELOPED BASIN - POND 1		
R.O.W.		LOTS
SUB-BASIN	AREA (AC)	MODELED AS
ROOFTOPS	2.389	ROOF TOPS / FLAT
DRIVEWAYS	0.523	DRIVEWAYS / FLAT
ROADWAYS	1.416	ROADS / FLAT
SIDEWALKS	0.320	SIDEWALKS / FLAT
LAWN/LANDSCAPE	3.357	C, PASTURE, FLAT
POND	0.480	POND
TOTAL:	8.485	

DEVELOPED BASIN - POND 2		
R.O.W.		LOTS
SUB-BASIN	AREA (AC)	MODELED AS
ROOFTOPS	2.571	ROOF TOPS / FLAT
DRIVEWAYS	0.588	DRIVEWAYS / FLAT
ROADWAYS	2.043	ROADS / FLAT
SIDEWALKS	0.459	SIDEWALKS / FLAT
LAWN/LANDSCAPE	3.441	C, PASTURE, FLAT
POND	0.390	POND
TOTAL:	9.492	

DEVELOPED BASIN - POND 3		
R.O.W.		LOTS
SUB-BASIN	AREA (AC)	MODELED AS
ROOFTOPS	1.937	ROOF TOPS / FLAT
DRIVEWAYS	0.422	DRIVEWAYS / FLAT
ROADWAYS	0.843	ROADS / FLAT
SIDEWALKS	0.151	SIDEWALKS / FLAT
LAWN/LANDSCAPE	2.733	C, PASTURE, FLAT
POND	0.341	POND
TOTAL:	6.427	

DEVELOPED BASIN - POND 4		
R.O.W.		LOTS
SUB-BASIN	AREA (AC)	MODELED AS
ROOFTOPS	–	ROOF TOPS / FLAT
DRIVEWAYS	–	DRIVEWAYS / FLAT
ROADWAYS	0.898	ROADS / FLAT
SIDEWALKS	0.557	SIDEWALKS / FLAT
LAWN/LANDSCAPE	1.206	C, PASTURE, FLAT
POND	0.307	POND
TOTAL:	2.968	

REVISIONS

ESM CONSULTING ENGINEERS LLC
www.esmcivil.com

MONTEBANC MANAGEMENT, LLC

MADRONA RIDGE P.U.D.

DEVELOPED BASIN MAP

CITY OF PORT TOWNSEND WASHINGTON

JOB NO.: 2090-003-021
DWG. NAME: DEV-1
DESIGNED BY: TLS
DRAWN BY: CG
DATE: 12/22/2021

DEV-1

1 OF 1 SHEETS

Table 10.3: Post-Developed Land Use and Areas

Sub-Basin	C, Pasture, Flat* (ac)	Roads, Flat (ac)	Rooftops, Flat (ac)	Driveways, Flat (ac)	Sidewalks, Flat (ac)	Pond (ac)	Total (ac)
Pond 1	3.357	1.416	2.389	0.523	0.320	0.480	8.485
Pond 2	3.441	2.043	2.571	0.588	0.459	0.390	9.492
Pond 3	2.733	0.843	1.937	0.422	0.151	0.341	6.427
Pond 4	1.206	0.898	-	-	0.557	0.307	2.968
TOTAL:	**10.737**	**5.200**	**6.897**	**1.533**	**1.487**	**1.518**	**27.372**

***NOTE: All disturbed surfacing that will not receive hard surfacing in the final post-constructed condition shall utilize amended soil in accordance with BMP T5.13. As such, these lawn areas may be modeled as "pasture rather than "Lawn".**

To obtain the storage required for each pond, the land use and available depth was input into the Western Washington Hydrology Model (WWHM) software program and the "Auto Pond" function was utilized to size the pond. Once complete, the "Duration Flows" (3rd column) data was analyzed to locate where the "Percentage" value became zero. At the point the "Percentage" became zero, the corresponding flow was then cross-referenced with "Discharge" column in the Pond Hydraulic Table. To find the stage and corresponding volume. If the flow was between stages, the higher stage and corresponding volume was utilized.

Using Pond 1 For example:

Step 1: After Auto Pond is complete, following is an excerpt from the WWHM output (Pond 1)

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2475	83	7	8	Pass
0.2506	**76**	**0**	**0**	**Pass**
0.2537	70	0	0	Pass

Step 2: Find the flow of 0.2506 cfs in the Pond Hydraulic Table

Pond Hydraulic Table

Stage (feet)	Area (Ac.)	Volume (ac-ft.)	Discharge (cfs)	Infilt (cfs)
8.3000	0.640	3.886	0.214	0.000
8.4000	**0.644**	**3.950**	**0.302**	**0.000**
8.5000	0.649	4.015	0.330	0.000

Because the flow of 0.2506 is between Stages 8.3 and 8.4, the higher stage is utilized with a corresponding volume of 3.950 ac-ft (172,079 cu-ft).

Each of the four ponds are designed in accordance with the performance goals and standards presented in Section 9. See the pond calculations within Appendix A for Pre- and Post-Developed flows, hydraulic tables and duration flows.

Refer to Table 10.4 for the detention storage required and provided for each of the four detention / wetpool facilities.

Table 10.4: Required and Provided Detention Storage Volumes

Pond	Detention Volume Required (cf)	Detention Volume Provided (cf)
Pond 1	172,079	202,939
Pond 2	198,939	201,685
Pond 3	116,741	118,788
Pond 4	53,622	87,388

Upon release from each of the four detention / wetpool facilities, stormwater runoff will be conveyed via closed tightline to a dispersal trench to the adjacent wetland.

Each proposed detention pond (Pond 1 through Pond 4) will provide an adequate dead-storage volume (as determined by WWHM) below its live-storage elevation to treat stormwater in a wetpool and will be configured with cells in accordance with the design specifications for BMP T10.10. Specifications for each water quality pond are shown on the pond detail sheets of the submitted plan set.

Refer to Table 10.5 below for the required water quality volume for each of the ponds

Table 10.5: Required and Provided Water Quality Treatment Volumes

Pond	Water Quality Volume Required (cf)	Water Quality Volume Provided (cf)
Pond 1	22,124	27,985
Pond 2	25,909	30,475
Pond 3	16,056	22,430
Pond 4	7,627	17,997

Flow Control BMPs

Due to space limitations and the limited infiltration capacity of the soils, the only BMPs from List #2 that will be implemented on each lot to satisfy Minimum Requirement #5 are BMP T5.13: Post-Construction Soil Quality and Depth and BMP T5.10C: Perforated Stub-out Connections.

Primary Overflow

The primary overflow is the overflow weir on the 18-inch diameter control riser. The weir is intended as a safety measure if any of the orifices are plugged. The bottom of the weir (top of riser) is set at the peak detention volume storage depth. The riser must be designed to provide for primary overflow of the developed (unmitigated) 100-year peak flow discharge from the detention facility. According to Chapter III-3.2.1 of the 2014 Manual.

The freeboard necessary above the top of the riser to allow for primary overflow without reaching the emergency spillway is determined from the following weir equation.

$Q100 = 9.739DH^{\frac{3}{2}}$ (Figure III-3.2.16 (Riser Inflow Curves), 2014 Manual)

Where: D = the diameter of the riser (1.5 feet)

H = head above the riser (ft)

$$Q100 = 2.6791\ cfs = 9.739(1.5)H^{\frac{3}{2}}$$

Secondary Overflow

The secondary inlet is the open top on the 48-inch (4 feet) diameter Type II catch basin with a bird cage. The secondary inlet is intended to provide a safety factor if the outlet pipe from the detention pond is plugged. The overflow elevation (rim of structure) is set at the peak detention storage depth. The freeboard necessary above the top of the rim of the catch basin to allow for secondary overflow without reaching the emergency spillway is determined from the weir equation as shown above.

Emergency Overflow Spillway

In addition to the above overflow provisions, each pond will have an emergency overflow that is sized to pass the 100-year developed (unmitigated) peak flow in the event of total failure of the primary or secondary overflow or in the event of extreme inflows. The emergency overflow

for each pond is designed to have a minimum 6 inches of freeboard, controls the location of pond overtopping and directs flow to an acceptable discharge point. The emergency overflow length is determined from the following equation:

Based on the 100-year developed flow provided by WWHM the spillway width (L) is given by:

$$Q_{100} = C(2g)^{1/2}[{}^{2}/_{3}\, LH^{\frac{3}{2}} + {}^{8}/_{15}\,(\tan\theta)H^{5/2}] \qquad \text{(Chapter III-3, p484)}$$

Where, Q_{100} = peak flow for the 100-year runoff event,

C = discharge coefficient (0.6)

g = gravity (32.2 ft/sec^2)

L = Length of weir (ft)

H = Height of water over weir (ft),

θ = angle of side slopes, ($\tan\theta = 3$)

Table 10.6 provides the flow depths for the primary, secondary, and emergency overflows for each of the four ponds as well as the length of the emergency overflow spillway.

Table 10.6: Overflow Flow Depth

	Primary Overflow (in)	Secondary Overflow (in)	Emergency Overflow (in)	Emergency Overflow Length (ft)
Pond 1	4.64	2.41	3.6	6
Pond 2	5.17	2.70	3.0	9.58
Pond 3	3.78	1.98	2.4	6
Pond 4	2.28	1.19	3	6

See Appendix A for Pond Overflow Calculations

Conveyance Capacity System and Analysis (Paving-Critical Pipe)

It was determined that the last series of pipes before the stormwater pond are the critical pipes in the conveyance system. Table 10.7 provides the 25-year and 100-year (unmitigated) peak flows as provided from WWHM for each of the critical pipe/water quality basins based on the land use area listed in Table 10.3

Table 10.7 - Critical Flow Rates (per land use provided in Table 10.3)

	25-Year Unmitigated Flow (cfs)	100-Year Unmitigated Flow (cfs)
Pond 1	2.7834	3.5090
Pond 2	3.2775	4.1312
Pond 3	2.0093	2.5336
Pond 4	0.9571	1.2067

The conveyance network has been analyzed and designed with sufficient capacity to convey and contain the required 25-year minimum as well as the 100-year storm event. Pipe system structures may overtop for runoff events that exceed the 25-year design capacity, provided the overtop from a 100-year runoff event does not create or aggravate a severe flooding problem or severe erosion problem.

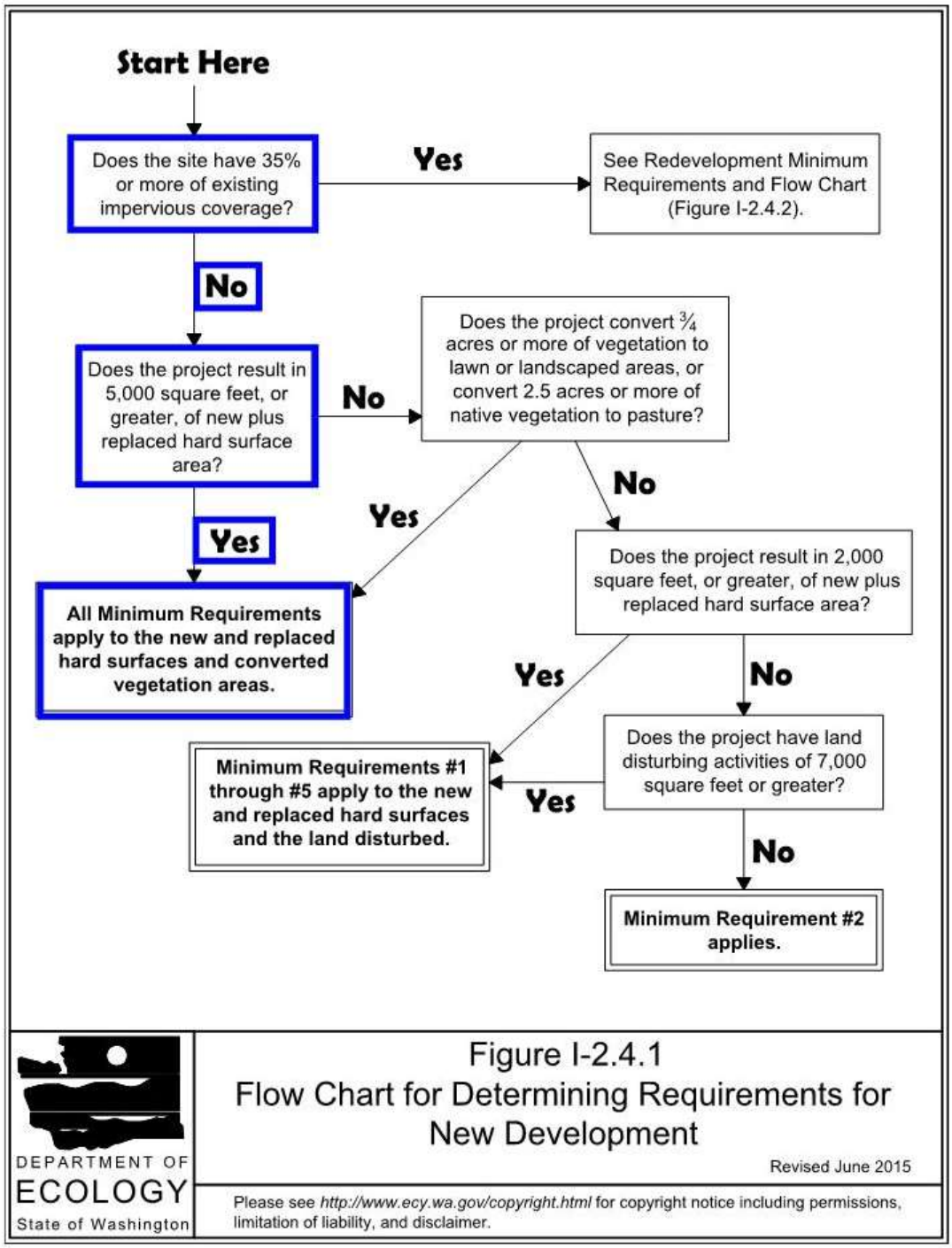
Hydraflow Express was used to determine the maximum capacity of the critical pipe(s) when installed with a slope of 0.50 percent. Based on this analysis, a 12-inch pipe at 0.50% has a flow capacity of 2.934 cfs and a 18-inch pipe can convey 8.653 cfs.

Therefore, a 12-inch diameter pipe with a 0.50 percent slope (Pond 4) or a 18-inch diameter pipe with a 0.50 percent slope (Ponds 1, 2, and 3) have sufficient capacity to convey the 100-year developed flow from each of the basins.

11. DISCUSSION OF MINIMUM REQUIREMENTS

Referencing Figure 1-2.4.1 from the Manual, (refer to Figure 11.1 below) the site does not have 35% or more of existing hard surface coverage and results in 5,000 square feet or greater of new plus replaced hard surface area. As such, all Minimum Requirements apply to the new and replaced hard surfaces and converted vegetation areas. Below are Minimum Requirements #1 though #9 with a discussion as to how each are applicable to this project.

Figure 11.1: Flow Chart for Determining Requirements for New Development



Minimum Requirement #1 - Preparation of Stormwater Site Plans

This Storm Water Site Plan Report and accompanying plans satisfy this requirement.

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

A Construction Stormwater Pollution Prevention Plan (SWPPP) will be included further in the design/approval/permitting process.

The SWPPP will address each of the 13 required elements, unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the narrative of the SWPPP.

Minimum Requirement #3 - Source Control of Pollution

All known, available and reasonable source control BMPs will be applied to the project. Applicable operational and structural source control BMPs, as described in Volume IV of the Manual will be implemented. Applicable construction BMPs, as described in Volume II of the Manual, will be applied and discussed in the Construction SWPPP. Operational and structural controls include, but are not limited to:

- BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots (S407)
- BMPs for Correcting Illicit Discharges to Storm Drains (S410)
- BMPs for Maintenance and Repair of Vehicles and Equipment (S414)
- BMPs for Maintenance of Stormwater Drainage and Treatment Systems (S417)
- BMPs for Washing and Steam Cleaning Vehicles / Equipment / Building Structures (S431)
- BMPs for Formation of a Pollution Prevention Team (S453)
- BMPs for Preventive Maintenance / Good Housekeeping (S454)
- BMPs for Spill Prevention and Cleanup (S455)
- BMPs for Employee Training (S456)
- BMPS for Inspections (S457)
- BMPs for Record Keeping (S458)

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

The proposed Pond 1 will discharge to the west and the remaining three ponds will discharge to the east, thus maintaining the natural discharge locations to the maximum extent practicable.

Minimum Requirement #5 - On-site Stormwater Management

Projects triggering Minimum Requirements #1 through #9, must meet the requirements in the Table below.

Project Type and Location	Requirement
New development on any parcel inside the UGA, or new development outside the UGA on a parcel less than 5 acres	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth or List #2 (applicant option).
New development outside the UGA on a parcel of 5 acres or larger	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth.
Redevelopment on any parcel inside the UGA, or redevelopment outside the UGA on a parcel less than 5 acres	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth or List #2 (applicant option).
Redevelopment outside the UGA on a parcel of 5 acres or larger	Low Impact Development Performance Standard and BMP T5.13: Post-Construction Soil Quality and Depth.

The project proponent site is within the UGA and List #2 has been chosen to satisfy this Minimum Requirement. For each surface, the BMPs in List #2 must be considered, and the first BMP that is considered feasible must be implemented.

- **Lawn and Landscaped Areas**
  - BMP T5.13: Post-Construction Soil Quality and Depth.

    Feasible and implemented on the project for all disturbed areas that will not receive hard surfacing in the Post-Developed condition.

Roofs:

1. Full Dispersion in accordance with BMP T5.30: Full Dispersion, or Downspout Full Infiltration Systems in accordance with BMP T5.10A: Down-spout Full Infiltration.

   Not feasible as required setbacks cannot be met and infiltration rate is anticipated (per the Geotechnical Report) to be less than 0.3 inches per hour

2. Bioretention (BMP T7.30: Bioretention Cells, Swales, and Planter Boxes) facilities that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.

   Not feasible as required setbacks cannot be met and infiltration rate is anticipated (per the Geotechnical Report) to be less than 0.3 inches per hour

3. Downspout Dispersion Systems in accordance with BMP T5.10B: Down-spout Dispersion Systems.

   Not feasible as required setbacks and vegetated flow path cannot be met.

4. Perforated Stub-out Connections in accordance with BMP T5.10C: Perforated Stub-out Connections.

   Feasible and implemented

Other Hard Surfaces:

1. Full Dispersion in accordance with BMP T5.30: Full Dispersion

   Not feasible as required setbacks and vegetated flow path cannot be met.

2. Permeable pavement in accordance with BMP T5.15: Permeable Pavements

   Not feasible as the infiltration rate is anticipated (per the Geotechnical Report) to be less than 0.3 inches per hour

3. Bioretention BMP's (BMP T7.30: Bioretention Cells, Swales, and Planter Boxes) that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.

   Not feasible as required setbacks cannot be met and infiltration rate is anticipated (per the Geotechnical Report) to be less than 0.3 inches per hour

4. Sheet Flow Dispersion in accordance with BMP T5.12: Sheet Flow Dispersion, or Concentrated Flow Dispersion in accordance with BMP T5.11: Concentrated Flow Dispersion

   Not feasible as required setbacks and vegetated flow path cannot be met.

<u>Minimum Requirement #6 - Runoff Treatment</u>

The following Threshold Discharge Areas (TDAs) require construction of Runoff Treatment BMPs. If a TDA meets any of the following thresholds, Runoff Treatment BMPs are required. The project proponent must demonstrate that the TDA does not meet either of the following thresholds for Runoff Treatment BMPs to not be required for that TDA.

- TDAs that have a total of 5,000 square feet or more of pollution-generating hard surface (PGHS).

  This project creates more than 5,000 square feet of PGHS in the single TDA, thus Runoff Treatment is Required.

- TDAs that have a total of 3/4 of an acre or more of pollution-generating pervious surfaces (PGPS) – not including permeable pavements, and from which there will be a surface discharge in a natural or man-made conveyance system from the site.

  Not applicable, as it has already been determined that runoff treatment is required.

Runoff from each of the four Threshold Discharge Areas will be treated through a combined Detention / Wetpool facility. See Section 10 for further discussion of Runoff Treatment for this project.

Minimum Requirement #7 - Flow Control

The following Threshold Discharge Areas (TDAs) require construction of Flow Control BMPs to achieve the Flow Control Performance Standard. If a TDA meets any of the following thresholds, Flow Control BMPs are required. The project proponent must demonstrate that the TDA does not meet any of the following thresholds for Flow Control BMPs to not be required for that TDA.

- TDAs that have a total of 10,000 square feet or more of effective impervious surfaces.

  This project creates greater than 10,000 square feet of effective impervious surfaces. As such, Flow Control is required

- TDAs that through a combination of effective hard surfaces and converted vegetation areas cause a 0.15 cubic feet per second (cfs) or greater increase in the 100-year flow frequency as estimated using an approved continuous simulation model and 15-minute time steps.

  This project results in a peak flow increase greater than 0.15 cfs during the 100-Year storm recurrence event. Flow control for this project is required.

- TDAs that convert 3/4 acres or more of native vegetation, pasture, scrub/shrub, or unmaintained non-native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture, and from which there is a surface discharge in a natural or manmade conveyance system from the TDA.

  Not analyzed as it has been determined that Flow Control is required.

Runoff from each of the four ponds will have a restricted release through a combined Detention / Wetpool facility. See Section 10 for further discussion of Runoff Treatment for this project.

Minimum Requirement #8 - Wetlands Protection

Detained and treated runoff from each of the ponds is proposed to be dispersed into wetland buffers.

The following Protective Levels are proposed:

- General Protection
- Protection from Pollutants

General Protection

1. Consult regulations issued under federal and state laws that regulate the discharge of pollutants to surface waters, including the Construction Stormwater General NPDES Permit.
2. Maintain the wetland buffer required by local and/or state regulations.
3. Retain areas of native vegetation connecting the wetland and its buffer with nearby wetlands and other contiguous areas of native vegetation.
4. Avoid compaction of soil and introduction of invasive plant or animal species in the wetland and its buffer.

5. Take measures to avoid general physical impacts (e.g., littering and vegetation destruction). Examples are protecting existing buffer zones; discouraging access, especially by vehicles, by planting outside the wetland, and encouragement of stewardship and signage by landowners.
6. Any stormwater management practices, such as Runoff Treatment or Flow Control BMP implementation, must be done outside of the wetland buffer boundary, except limited circumstances where the wetland and/or buffer may be used for additional Runoff Treatment and/or Flow Control of stormwater.
7. Discharge from a BMP or project site should be dispersed using a method to diffuse the flow before entering the wetland buffer.
8. Consider fences to restrict human access, but make sure it doesn't interfere with wildlife movement. They should be used when wildlife passage is not a major issue and the potential for intrusive impacts is high. When wildlife movement and intrusion are both issues, the circumstances will have to be weighed to make a decision about fencing. Check with the local and/or state agencies to determine if fencing would be allowed.

Protection from Pollutants

1. Provide Construction Stormwater BMPs as directed in Minimum Requirement #2: Construction Stormwater Pollution Prevention Plan (SWPPP) to prevent sediment and other pollutants from entering the wetland.
2. Provide Source Control BMPs as directed in Minimum Requirement #3: Source Control of Pollution. Refer to Volume IV and local jurisdiction requirements.
3. Provide On-Site Stormwater Management and use LID principles as much as practicable for the site, as directed in Minimum Requirement #5: On-Site Stormwater Management. LID principles and practices will help meet other wetland hydroperiod protection criteria and provide additional habitat.
4. Provide Runoff Treatment BMPs as directed in Minimum Requirement #6: Runoff Treatment to treat runoff prior to entering the wetland and its buffer.

Minimum Requirement #9 - Operations and Maintenance

An Operations and Maintenance Manual will be included further in the design/approval/permitting process.

12. SPECIAL REPORTS AND STUDIES

The following reports were utilized for the creation of this Stormwater Site Plan Report: and are incorporated by reference:

- *Geotechnical Report*, Aspect Consulting, August 11, 2021
- *Critical Area Report Supplement and Buffer Averaging Plan*, Wetland Resources, December 23, 2021

13. BOND QUANTITIES, DEDICATIONS, EASEMENTS

The Bond Quantity worksheet and any required bonding will be submitted further in the design/approval/permitting process.

The following dedications are proposed for this project:

- 40- and 50-Foot Rights-of-Way within the interior of the project.
- Right-of-Way Dedication (varying width) along Rainier Street

The following dedications are proposed for this project:

- 10-Foot Landscape Easement
- 10-Foot Utility Easement

APPENDIX A

Stormwater Design Calculations

Project: Madrona Ridge
Task: Basin Coverages
Date: 2022-03-14
Author: Michael R. Norton

Reference: Port Townsend Municipal Code Table 17.16.030

ASSUMPTIONS

Lot Coverage:	45%	
Driveways (Per Lot):	400	S.F.
Eaves (Per Lot):	0	S.F.
Patios/Walks/Etc (Per Lot):	0	S.F.

STREET / ALLEY LAND COVER PERCENTAGES

50-FOOT COLLECTOR (59' IMPROVEMENT WIDTH)

DESCRIPTION	WIDTH (FT)	PERCENTAGE (%)
SIDEWALK / PATHWAY	14	23.73%
ROADWAY / PARKING	35	59.32%
LAWN / LANDSCAPE	10	16.95%

40-FOOT LOCAL ACCESS

DESCRIPTION	WIDTH (FT)	PERCENTAGE (%)
SIDEWALK / PATHWAY	6	15.00%
ROADWAY / PARKING	28	70.00%
LAWN / LANDSCAPE	6	15.00%

22-FOOT ALLEY

DESCRIPTION	WIDTH (FT)	PERCENTAGE (%)
LAWN / LANDSCAPE	2	9.09%
ROADWAY / PARKING	20	90.91%

POND 1

NUMBR OF LOTS: **57**

DESCRIPTION	AREA (SF)	AREA (AC)
TOTAL BASIN AREA:	**369,627**	**8.485**
ROOfTOPS / FLAT:	104,060	2.389
DRIVEWAYS / FLAT:	22,800	0.523
SIDEWALKS / FLAT:	13,926	0.320
ROADS / FLAT:	61,684	1.416
POND:	20,913	0.480
C, PASTURE, FLAT:	146,244	3.357

POND 2

NUMBER OF LOTS: 64

DESCRIPTION	AREA (SF)	AREA (AC)
TOTAL BASIN AREA:	**413,423**	**9.491**
ROOFTOPS / FLAT:	111,995	2.571
DRIVEWAYS / FLAT:	25,600	0.588
SIDEWALKS / FLAT:	19,997	0.459
ROADS / FLAT:	88,995	2.043
POND:	16,967	0.390
C, PASTURE, FLAT:	149,869	3.441

POND 3

NUMBER OF LOTS: 46

DESCRIPTION	AREA (SF)	AREA (AC)
TOTAL BASIN AREA:	**279,949**	**6.427**
ROOFTOPS / FLAT:	84,366	1.937
DRIVEWAYS / FLAT:	18,400	0.422
SIDEWALKS / FLAT:	6,562	0.151
ROADS / FLAT:	36,731	0.843
POND:	14,856	0.341
C, PASTURE, FLAT:	119,034	2.733

POND 4

NUMBER OF LOTS: 0

DESCRIPTION	AREA (SF)	AREA (AC)
TOTAL BASIN AREA:	**129,276**	**2.968**
ROOFTOPS / FLAT:	-	-
DRIVEWAYS / FLAT:	-	-
SIDEWALKS / FLAT:	24,267	0.557
ROADS / FLAT:	39,114	0.898
POND:	13,375	0.307
C, PASTURE, FLAT:	52,520	1.206

PRE-DEV AREAS

BASIN	TOTAL AREA (SF)	TOTAL AREA (AC)
EX-POND 1	336,922	7.735
EX-POND 2	393,020	9.022
EX-POND 3	270,699	6.214
EX-POND 4	129,258	2.967
TOTAL:	1,129,899	25.939

PRE-DEV BASINS

DESCRIPTION	TOTAL AREA (SF)	TOTAL AREA (AC)
WEST	364,300	8.363
EAST	827,352	18.993
TOTAL:	1,191,652	27.356

Project: Madrona Ridge
Task: Detention and Water Quality Volumes
Date: 2022-03-17
Author: Michael R. Norton, P.E.

VOLUMES

POND	DETENTION REQUIRED (AC-FT)	DETENTION REQUIRED (CU-FT)	WATER QUALITY REQUIRED (AC-FT)	WATER QUALITY REQUIRED (CU-FT)
Pond 1	3.950	172,079	0.5079	22,124
Pond 2	4.567	198,939	0.5948	25,909
Pond 3	2.680	116,741	0.3686	16,056
Pond 4	1.231	53,622	0.1751	7,627

Pond 1

Event	Pre-Developed Peak Flows (cfs)	Developed Peak Flows (Unmitigated) (cfs)	Developed Peak Flows Mitigated (cfs)
2-Year	0.0464	1.4459	0.0211
10-Year	0.1729	2.3184	0.0491
25-Year	0.2600	2.7834	0.0716
50-Year	0.3316	3.1412	0.0932
100-Year	0.4075	3.5090	0.1199

Pond 3

Event	Pre-Developed Peak Flows (cfs)	Developed Peak Flows (Unmitigated) (cfs)	Developed Peak Flows Mitigated (cfs)
2-Year	0.0373	1.0432	0.0169
10-Year	0.1389	1.6734	0.0424
25-Year	0.2089	2.0093	0.0640
50-Year	0.2664	2.2678	0.0853
100-Year	0.3274	2.5336	0.1123

Pond 2

Event	Pre-Developed Peak Flows (cfs)	Developed Peak Flows (Unmitigated) (cfs)	Developed Peak Flows Mitigated (cfs)
2-Year	0.0541	1.7035	0.0246
10-Year	0.2017	2.7304	0.0590
25-Year	0.3032	3.2775	0.0873
50-Year	0.3868	3.6985	0.1148
100-Year	0.4753	4.1312	0.1490

Pond 4

Event	Pre-Developed Peak Flows (cfs)	Developed Peak Flows (Unmitigated) (cfs)	Developed Peak Flows Mitigated (cfs)
2-Year	0.0178	0.4971	0.0084
10-Year	0.0663	0.7972	0.0225
25-Year	0.0997	0.9571	0.0350
50-Year	0.1272	1.0802	0.0475
100-Year	0.1563	1.2067	0.0637

MADRONA RIDGE
POND 1
STORM CALCULATIONS

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	2022-03-17 Pond 1
Site Name:	Madrona Ridge - Pond 'A'
Site Address:	
City:	Port Townsend
Report Date:	3/17/2022
Gage:	Port Angeles
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	0.800
Version Date:	2021/08/18
Version:	4.2.18

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

Pre-Developed Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	7.735
Pervious Total	7.735
Impervious Land Use	acre
Impervious Total	0
Basin Total	7.735

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Developed Basin 1

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	3.357
Pervious Total	3.357

Impervious Land Use	acre
ROADS FLAT	1.416
ROOF TOPS FLAT	2.389
DRIVEWAYS FLAT	0.523
SIDEWALKS FLAT	0.32
POND	0.48
Impervious Total	5.128
Basin Total	8.485

Element Flows To:

Surface	Interflow	Groundwater
Pond 1	Pond 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Pond 1

Bottom Length: 117.19 ft.
Bottom Width: 117.19 ft.
Depth: 9 ft.
Volume at riser head: 4.0804 acre-feet.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 8.5 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.043 ft.
Notch Height: 1.600 ft.
Orifice 1 Diameter: 0.57 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.315	0.000	0.000	0.000
0.1000	0.318	0.031	0.002	0.000
0.2000	0.321	0.063	0.003	0.000
0.3000	0.325	0.096	0.004	0.000
0.4000	0.328	0.128	0.005	0.000
0.5000	0.331	0.161	0.006	0.000
0.6000	0.334	0.195	0.006	0.000
0.7000	0.338	0.228	0.007	0.000
0.8000	0.341	0.262	0.007	0.000
0.9000	0.345	0.297	0.008	0.000
1.0000	0.348	0.331	0.008	0.000
1.1000	0.351	0.366	0.009	0.000
1.2000	0.355	0.402	0.009	0.000
1.3000	0.358	0.437	0.010	0.000
1.4000	0.362	0.473	0.010	0.000
1.5000	0.365	0.510	0.010	0.000
1.6000	0.369	0.546	0.011	0.000
1.7000	0.372	0.584	0.011	0.000
1.8000	0.376	0.621	0.011	0.000
1.9000	0.379	0.659	0.012	0.000
2.0000	0.383	0.697	0.012	0.000
2.1000	0.386	0.735	0.012	0.000
2.2000	0.390	0.774	0.013	0.000
2.3000	0.393	0.813	0.013	0.000
2.4000	0.397	0.853	0.013	0.000
2.5000	0.401	0.893	0.013	0.000
2.6000	0.404	0.933	0.014	0.000
2.7000	0.408	0.974	0.014	0.000
2.8000	0.412	1.015	0.014	0.000
2.9000	0.415	1.056	0.015	0.000
3.0000	0.419	1.098	0.015	0.000
3.1000	0.423	1.140	0.015	0.000

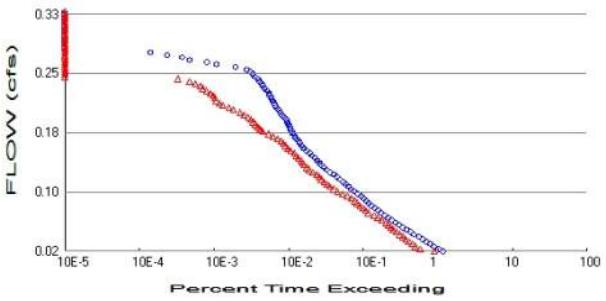
3.2000	0.427	1.183	0.015	0.000
3.3000	0.430	1.226	0.016	0.000
3.4000	0.434	1.269	0.016	0.000
3.5000	0.438	1.313	0.016	0.000
3.6000	0.442	1.357	0.016	0.000
3.7000	0.446	1.401	0.017	0.000
3.8000	0.449	1.446	0.017	0.000
3.9000	0.453	1.491	0.017	0.000
4.0000	0.457	1.537	0.017	0.000
4.1000	0.461	1.582	0.017	0.000
4.2000	0.465	1.629	0.018	0.000
4.3000	0.469	1.676	0.018	0.000
4.4000	0.473	1.723	0.018	0.000
4.5000	0.477	1.770	0.018	0.000
4.6000	0.481	1.818	0.018	0.000
4.7000	0.485	1.866	0.019	0.000
4.8000	0.489	1.915	0.019	0.000
4.9000	0.493	1.964	0.019	0.000
5.0000	0.497	2.014	0.019	0.000
5.1000	0.501	2.064	0.019	0.000
5.2000	0.505	2.114	0.020	0.000
5.3000	0.509	2.165	0.020	0.000
5.4000	0.513	2.216	0.020	0.000
5.5000	0.517	2.268	0.020	0.000
5.6000	0.522	2.320	0.020	0.000
5.7000	0.526	2.372	0.021	0.000
5.8000	0.530	2.425	0.021	0.000
5.9000	0.534	2.478	0.021	0.000
6.0000	0.538	2.532	0.021	0.000
6.1000	0.542	2.586	0.021	0.000
6.2000	0.547	2.640	0.022	0.000
6.3000	0.551	2.695	0.022	0.000
6.4000	0.555	2.751	0.022	0.000
6.5000	0.560	2.806	0.022	0.000
6.6000	0.564	2.863	0.022	0.000
6.7000	0.568	2.919	0.022	0.000
6.8000	0.573	2.976	0.023	0.000
6.9000	0.577	3.034	0.023	0.000
7.0000	0.581	3.092	0.027	0.000
7.1000	0.586	3.150	0.035	0.000
7.2000	0.590	3.209	0.045	0.000
7.3000	0.595	3.268	0.057	0.000
7.4000	0.599	3.328	0.069	0.000
7.5000	0.603	3.388	0.082	0.000
7.6000	0.608	3.449	0.096	0.000
7.7000	0.612	3.510	0.110	0.000
7.8000	0.617	3.571	0.124	0.000
7.9000	0.621	3.633	0.138	0.000
8.0000	0.626	3.696	0.156	0.000
8.1000	0.631	3.759	0.175	0.000
8.2000	0.635	3.822	0.194	0.000
8.3000	0.640	3.886	0.214	0.000
8.4000	0.644	3.950	0.302	0.000
8.5000	0.649	4.015	0.330	0.000
8.6000	0.654	4.080	0.832	0.000
8.7000	0.658	4.146	1.735	0.000
8.8000	0.663	4.212	2.832	0.000
8.9000	0.668	4.278	3.963	0.000

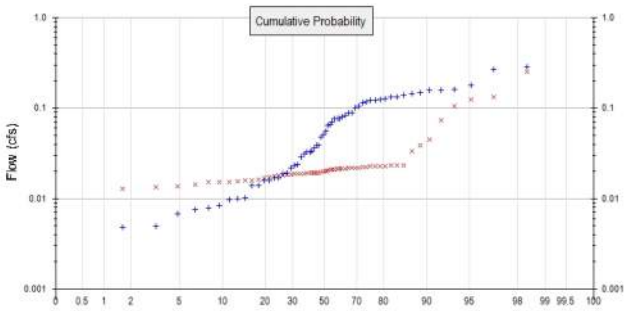
0.2506 CFS IS BETWEEN 0.214 CFS AND 0.302 CFS. USE 0.302 CFS WITH AA REQUIRED AREA OF 3.950 AC-FT (172,079 CU-FT)

9.0000	0.672	4.345	4.970	0.000
9.1000	0.677	4.413	5.732	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 7.735
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 3.357
Total Impervious Area: 5.128

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.04642
5 year	0.113921
10 year	0.172937
25 year	0.259972
50 year	0.331634
100 year	0.407532

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.021095
5 year	0.03563
10 year	0.049063
25 year	0.071563
50 year	0.093216
100 year	0.119905

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.016	0.018
1950	0.076	0.023
1951	0.055	0.023
1952	0.010	0.014
1953	0.017	0.021
1954	0.158	0.124
1955	0.146	0.017
1956	0.051	0.022
1957	0.089	0.019
1958	0.014	0.016

1959	0.088	0.022
1960	0.132	0.020
1961	0.163	0.023
1962	0.010	0.014
1963	0.033	0.018
1964	0.038	0.022
1965	0.019	0.020
1966	0.017	0.019
1967	0.157	0.022
1968	0.029	0.017
1969	0.010	0.019
1970	0.008	0.015
1971	0.123	0.019
1972	0.180	0.023
1973	0.024	0.020
1974	0.019	0.021
1975	0.032	0.020
1976	0.039	0.023
1977	0.007	0.015
1978	0.005	0.016
1979	0.005	0.016
1980	0.084	0.045
1981	0.066	0.023
1982	0.124	0.073
1983	0.116	0.022
1984	0.022	0.018
1985	0.116	0.022
1986	0.270	0.021
1987	0.101	0.019
1988	0.036	0.019
1989	0.033	0.018
1990	0.065	0.022
1991	0.129	0.133
1992	0.148	0.021
1993	0.008	0.013
1994	0.002	0.011
1995	0.014	0.018
1996	0.071	0.019
1997	0.077	0.021
1998	0.008	0.015
1999	0.283	0.250
2000	0.081	0.021
2001	0.016	0.013
2002	0.106	0.023
2003	0.077	0.019
2004	0.122	0.105
2005	0.048	0.016
2006	0.139	0.039
2007	0.134	0.033
2008	0.023	0.019
2009	0.033	0.019

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.2834	0.2496
2	0.2703	0.1330
3	0.1801	0.1239

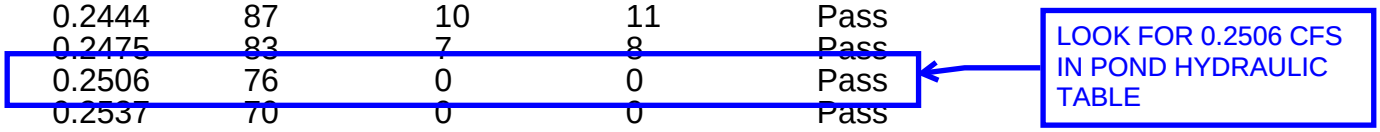
4	0.1628	0.1049
5	0.1575	0.0734
6	0.1566	0.0454
7	0.1478	0.0392
8	0.1462	0.0333
9	0.1395	0.0231
10	0.1344	0.0230
11	0.1320	0.0230
12	0.1288	0.0229
13	0.1241	0.0229
14	0.1234	0.0228
15	0.1218	0.0226
16	0.1159	0.0224
17	0.1156	0.0221
18	0.1057	0.0219
19	0.1009	0.0218
20	0.0894	0.0218
21	0.0879	0.0217
22	0.0835	0.0215
23	0.0807	0.0215
24	0.0771	0.0214
25	0.0768	0.0212
26	0.0761	0.0211
27	0.0707	0.0208
28	0.0661	0.0207
29	0.0646	0.0203
30	0.0554	0.0198
31	0.0513	0.0198
32	0.0478	0.0197
33	0.0387	0.0193
34	0.0385	0.0193
35	0.0363	0.0193
36	0.0335	0.0193
37	0.0328	0.0191
38	0.0326	0.0190
39	0.0315	0.0190
40	0.0288	0.0188
41	0.0238	0.0187
42	0.0234	0.0187
43	0.0216	0.0185
44	0.0192	0.0184
45	0.0187	0.0180
46	0.0168	0.0179
47	0.0168	0.0177
48	0.0159	0.0171
49	0.0158	0.0170
50	0.0140	0.0162
51	0.0139	0.0158
52	0.0100	0.0157
53	0.0100	0.0155
54	0.0097	0.0153
55	0.0084	0.0152
56	0.0079	0.0151
57	0.0076	0.0142
58	0.0068	0.0135
59	0.0049	0.0135
60	0.0048	0.0129
61	0.0016	0.0112

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0232	25068	19087	76	Pass
0.0263	21817	12348	56	Pass
0.0294	19083	10611	55	Pass
0.0326	16846	9681	57	Pass
0.0357	15004	8675	57	Pass
0.0388	13377	7946	59	Pass
0.0419	11864	7285	61	Pass
0.0450	10241	6605	64	Pass
0.0481	9124	5974	65	Pass
0.0512	8132	5403	66	Pass
0.0544	7219	5024	69	Pass
0.0575	6417	4622	72	Pass
0.0606	5743	4256	74	Pass
0.0637	5120	3739	73	Pass
0.0668	4620	3311	71	Pass
0.0699	4192	2973	70	Pass
0.0731	3685	2515	68	Pass
0.0762	3337	2291	68	Pass
0.0793	3018	2117	70	Pass
0.0824	2759	1933	70	Pass
0.0855	2520	1781	70	Pass
0.0886	2338	1645	70	Pass
0.0917	2156	1474	68	Pass
0.0949	2003	1299	64	Pass
0.0980	1826	1122	61	Pass
0.1011	1606	969	60	Pass
0.1042	1465	866	59	Pass
0.1073	1357	762	56	Pass
0.1104	1248	704	56	Pass
0.1136	1143	640	55	Pass
0.1167	1039	586	56	Pass
0.1198	940	546	58	Pass
0.1229	866	508	58	Pass
0.1260	761	448	58	Pass
0.1291	685	405	59	Pass
0.1322	635	370	58	Pass
0.1354	584	344	58	Pass
0.1385	549	329	59	Pass
0.1416	514	314	61	Pass
0.1447	478	290	60	Pass
0.1478	439	268	61	Pass
0.1509	407	255	62	Pass
0.1541	371	227	61	Pass
0.1572	338	207	61	Pass
0.1603	321	194	60	Pass
0.1634	303	181	59	Pass
0.1665	292	167	57	Pass
0.1696	271	151	55	Pass
0.1727	257	132	51	Pass
0.1759	243	115	47	Pass
0.1790	234	95	40	Pass
0.1821	223	88	39	Pass
0.1852	219	82	37	Pass

0.1883	211	77	36	Pass
0.1914	205	71	34	Pass
0.1946	200	66	33	Pass
0.1977	186	61	32	Pass
0.2008	173	54	31	Pass
0.2039	164	48	29	Pass
0.2070	155	39	25	Pass
0.2101	147	34	23	Pass
0.2132	141	28	19	Pass
0.2164	135	25	18	Pass
0.2195	130	23	17	Pass
0.2226	125	22	17	Pass
0.2257	119	21	17	Pass
0.2288	116	19	16	Pass
0.2319	110	17	15	Pass
0.2351	101	15	14	Pass
0.2382	97	14	14	Pass
0.2413	92	12	13	Pass
0.2444	87	10	11	Pass
0.2475	83	7	8	Pass
0.2506	76	0	0	Pass
0.2537	70	0	0	Pass
0.2569	66	0	0	Pass
0.2600	58	0	0	Pass
0.2631	41	0	0	Pass
0.2662	23	0	0	Pass
0.2693	17	0	0	Pass
0.2724	10	0	0	Pass
0.2756	8	0	0	Pass
0.2787	5	0	0	Pass
0.2818	3	0	0	Pass
0.2849	0	0	0	Pass
0.2880	0	0	0	Pass
0.2911	0	0	0	Pass
0.2942	0	0	0	Pass
0.2974	0	0	0	Pass
0.3005	0	0	0	Pass
0.3036	0	0	0	Pass
0.3067	0	0	0	Pass
0.3098	0	0	0	Pass
0.3129	0	0	0	Pass
0.3161	0	0	0	Pass
0.3192	0	0	0	Pass
0.3223	0	0	0	Pass
0.3254	0	0	0	Pass
0.3285	0	0	0	Pass
0.3316	0	0	0	Pass



Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.5079 acre-feet
On-line facility target flow:	0.6729 cfs.
Adjusted for 15 min:	0.6729 cfs.
Off-line facility target flow:	0.3635 cfs.
Adjusted for 15 min:	0.3635 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
Pond 1 POC	☐	366.76			☐	0.00			
Total Volume Infiltrated		366.76	0.00	0.00		0.00	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    2009 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   2022-03-17 Pond 1.wdm
MESSU       25   Pre2022-03-17 Pond 1.MES
            27   Pre2022-03-17 Pond 1.L61
            28   Pre2022-03-17 Pond 1.L62
            30   POC2022-03-17 Pond 11.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        Pre-Developed 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#   ***
Pre-Developed Basin 1***
PERLND  10                       7.735     COPY   501     12
PERLND  10                       7.735     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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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    2009 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   2022-03-17 Pond 1.wdm
MESSU       25   Mit2022-03-17 Pond 1.MES
            27   Mit2022-03-17 Pond 1.L61
            28   Mit2022-03-17 Pond 1.L62
            30   POC2022-03-17 Pond 11.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      13
      IMPLND       1
      IMPLND       4
      IMPLND       5
      IMPLND       8
      IMPLND      14
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Pond 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           ***
   13     C, Pasture, 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 ***
   13         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  *********
   13         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 ***
   13         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
   13              0       4.5      0.06       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
   13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                 ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   13           0.15       0.4       0.3         6       0.5       0.4
  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
   13              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
    5      DRIVEWAYS/FLAT         1    1    1   27    0
    8      SIDEWALKS/FLAT         1    1    1   27    0
   14      POND                   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
    5         0    0    1    0    0    0
    8         0    0    1    0    0    0
   14         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
    5         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
   14         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
    5         0    0    0    0    0
    8         0    0    0    0    0
   14         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
    5            400      0.01       0.1       0.1
    8            400      0.01       0.1       0.1
   14            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
    5              0         0
    8              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
    5              0         0
    8              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Developed Basin 1***
PERLND  13                      3.357     RCHRES   1      2
PERLND  13                      3.357     RCHRES   1      3
IMPLND   1                      1.416     RCHRES   1      5
IMPLND   4                      2.389     RCHRES   1      5
IMPLND   5                      0.523     RCHRES   1      5
IMPLND   8                       0.32     RCHRES   1      5
IMPLND  14                       0.48     RCHRES   1      5

******Routing******
PERLND  13                      3.357     COPY     1     12
IMPLND   1                      1.416     COPY     1     15
IMPLND   4                      2.389     COPY     1     15
IMPLND   5                      0.523     COPY     1     15
IMPLND   8                       0.32     COPY     1     15
IMPLND  14                       0.48     COPY     1     15
PERLND  13                      3.357     COPY     1     13
RCHRES   1                          1     COPY   501     16
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     Pond 1                  1    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
  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
  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  0  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      0.02       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.315266  0.000000  0.000000
  0.100000  0.318502  0.031688  0.002788
  0.200000  0.321755  0.063701  0.003943
  0.300000  0.325025  0.096040  0.004829
  0.400000  0.328311  0.128707  0.005576
  0.500000  0.331614  0.161703  0.006234
  0.600000  0.334933  0.195031  0.006829
  0.700000  0.338269  0.228691  0.007377
  0.800000  0.341621  0.262685  0.007886
  0.900000  0.344990  0.297016  0.008364
  1.000000  0.348375  0.331684  0.008817
  1.100000  0.351777  0.366692  0.009247
```

1.200000	0.355196	0.402041	0.009658
1.300000	0.358631	0.437732	0.010053
1.400000	0.362082	0.473767	0.010432
1.500000	0.365550	0.510149	0.010798
1.600000	0.369035	0.546878	0.011152
1.700000	0.372536	0.583957	0.011496
1.800000	0.376053	0.621386	0.011829
1.900000	0.379587	0.659168	0.012153
2.000000	0.383138	0.697304	0.012469
2.100000	0.386705	0.735797	0.012777
2.200000	0.390289	0.774646	0.013077
2.300000	0.393889	0.813855	0.013371
2.400000	0.397506	0.853425	0.013659
2.500000	0.401139	0.893357	0.013941
2.600000	0.404789	0.933654	0.014217
2.700000	0.408455	0.974316	0.014487
2.800000	0.412138	1.015345	0.014753
2.900000	0.415837	1.056744	0.015014
3.000000	0.419553	1.098514	0.015271
3.100000	0.423286	1.140656	0.015523
3.200000	0.427035	1.183172	0.015772
3.300000	0.430800	1.226063	0.016016
3.400000	0.434582	1.269333	0.016257
3.500000	0.438381	1.312981	0.016495
3.600000	0.442196	1.357009	0.016729
3.700000	0.446027	1.401421	0.016959
3.800000	0.449876	1.446216	0.017187
3.900000	0.453740	1.491397	0.017412
4.000000	0.457621	1.536965	0.017633
4.100000	0.461519	1.582922	0.017853
4.200000	0.465433	1.629269	0.018069
4.300000	0.469364	1.676009	0.018283
4.400000	0.473312	1.723143	0.018494
4.500000	0.477275	1.770672	0.018703
4.600000	0.481256	1.818599	0.018910
4.700000	0.485253	1.866924	0.019114
4.800000	0.489266	1.915650	0.019317
4.900000	0.493296	1.964778	0.019517
5.000000	0.497343	2.014310	0.019715
5.100000	0.501406	2.064248	0.019911
5.200000	0.505485	2.114592	0.020105
5.300000	0.509581	2.165346	0.020298
5.400000	0.513694	2.216509	0.020488
5.500000	0.517823	2.268085	0.020677
5.600000	0.521969	2.320075	0.020864
5.700000	0.526131	2.372480	0.021050
5.800000	0.530310	2.425302	0.021234
5.900000	0.534505	2.478543	0.021416
6.000000	0.538717	2.532204	0.021597
6.100000	0.542945	2.586287	0.021776
6.200000	0.547190	2.640794	0.021954
6.300000	0.551451	2.695726	0.022130
6.400000	0.555729	2.751085	0.022305
6.500000	0.560024	2.806872	0.022478
6.600000	0.564335	2.863090	0.022651
6.700000	0.568662	2.919740	0.022822
6.800000	0.573006	2.976823	0.022991
6.900000	0.577367	3.034342	0.023160
7.000000	0.581744	3.092298	0.027746
7.100000	0.586137	3.150692	0.035737
7.200000	0.590547	3.209526	0.045683
7.300000	0.594974	3.268802	0.057010
7.400000	0.599417	3.328521	0.069358
7.500000	0.603877	3.388686	0.082466
7.600000	0.608353	3.449298	0.096128
7.700000	0.612846	3.510358	0.110174
7.800000	0.617355	3.571868	0.124460
7.900000	0.621881	3.633829	0.138859
8.000000	0.626423	3.696245	0.156548
8.100000	0.630982	3.759115	0.175052

```
  8.200000  0.635558  3.822442  0.194336
  8.300000  0.640150  3.886227  0.214371
  8.400000  0.644758  3.950473  0.302240
  8.500000  0.649383  4.015180  0.330516
  8.600000  0.654025  4.080350  0.832845
  8.700000  0.658683  4.145986  1.735281
  8.800000  0.663357  4.212088  2.832227
  8.900000  0.668049  4.278658  3.963315
  9.000000  0.672756  4.345698  4.970353
  END FTABLE  1
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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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   STAGE  1 1        1      WDM   1001 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
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       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 1979/ 7/31 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-1.352E-03     0.00000  9.1504E-10     0.00000  -1.638E-07

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

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MADRONA RIDGE
POND 2
STORM CALCULATIONS

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	2022-03-17 Pond 2
Site Name:	Madrona Ridge - Pond 2
Site Address:	
City:	Port Townsend
Report Date:	3/17/2022
Gage:	Port Angeles
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	0.800
Version Date:	2021/08/18
Version:	4.2.18

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

Pre-Developed Basin 2

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	9.022
Pervious Total	9.022
Impervious Land Use	acre
Impervious Total	0
Basin Total	9.022

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Developed Basin 2

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	3.441
Pervious Total	3.441

Impervious Land Use	acre
ROADS FLAT	2.043
ROOF TOPS FLAT	2.571
DRIVEWAYS FLAT	0.588
SIDEWALKS FLAT	0.459
POND	0.39
Impervious Total	6.051
Basin Total	9.492

Element Flows To:

Surface	Interflow	Groundwater
Pond 2	Pond 2	

Routing Elements
Predeveloped Routing

Mitigated Routing

Pond 2

Bottom Length: 128.01 ft.
Bottom Width: 128.01 ft.
Depth: 9 ft.
Volume at riser head: 4.6407 acre-feet.
Side slope 1: 3 To 1
Side slope 2: 3 To 1
Side slope 3: 3 To 1
Side slope 4: 3 To 1
Discharge Structure
Riser Height: 8.4 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.090 ft.
Notch Height: 1.200 ft.
Orifice 1 Diameter: 0.619 in. Elevation:0 ft.
Orifice 2 Diameter: 0.5 in. Elevation:6.8 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.376	0.000	0.000	0.000
0.1000	0.379	0.037	0.003	0.000
0.2000	0.383	0.075	0.004	0.000
0.3000	0.386	0.114	0.005	0.000
0.4000	0.390	0.153	0.006	0.000
0.5000	0.394	0.192	0.007	0.000
0.6000	0.397	0.232	0.008	0.000
0.7000	0.401	0.272	0.008	0.000
0.8000	0.404	0.312	0.009	0.000
0.9000	0.408	0.353	0.009	0.000
1.0000	0.412	0.394	0.010	0.000
1.1000	0.416	0.435	0.010	0.000
1.2000	0.419	0.477	0.011	0.000
1.3000	0.423	0.519	0.011	0.000
1.4000	0.427	0.562	0.012	0.000
1.5000	0.430	0.604	0.012	0.000
1.6000	0.434	0.648	0.013	0.000
1.7000	0.438	0.691	0.013	0.000
1.8000	0.442	0.735	0.014	0.000
1.9000	0.446	0.780	0.014	0.000
2.0000	0.450	0.825	0.014	0.000
2.1000	0.453	0.870	0.015	0.000
2.2000	0.457	0.915	0.015	0.000
2.3000	0.461	0.961	0.015	0.000
2.4000	0.465	1.008	0.016	0.000
2.5000	0.469	1.055	0.016	0.000
2.6000	0.473	1.102	0.016	0.000
2.7000	0.477	1.149	0.017	0.000
2.8000	0.481	1.197	0.017	0.000
2.9000	0.485	1.246	0.017	0.000
3.0000	0.489	1.294	0.018	0.000

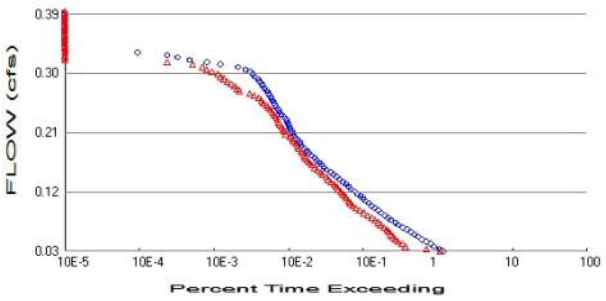
3.1000	0.493	1.343	0.018	0.000
3.2000	0.497	1.393	0.018	0.000
3.3000	0.501	1.443	0.018	0.000
3.4000	0.505	1.493	0.019	0.000
3.5000	0.509	1.544	0.019	0.000
3.6000	0.513	1.595	0.019	0.000
3.7000	0.518	1.647	0.020	0.000
3.8000	0.522	1.699	0.020	0.000
3.9000	0.526	1.751	0.020	0.000
4.0000	0.530	1.804	0.020	0.000
4.1000	0.534	1.857	0.021	0.000
4.2000	0.538	1.911	0.021	0.000
4.3000	0.543	1.965	0.021	0.000
4.4000	0.547	2.020	0.021	0.000
4.5000	0.551	2.075	0.022	0.000
4.6000	0.555	2.130	0.022	0.000
4.7000	0.560	2.186	0.022	0.000
4.8000	0.564	2.242	0.022	0.000
4.9000	0.568	2.299	0.023	0.000
5.0000	0.573	2.356	0.023	0.000
5.1000	0.577	2.413	0.023	0.000
5.2000	0.581	2.471	0.023	0.000
5.3000	0.586	2.530	0.023	0.000
5.4000	0.590	2.589	0.024	0.000
5.5000	0.595	2.648	0.024	0.000
5.6000	0.599	2.708	0.024	0.000
5.7000	0.604	2.768	0.024	0.000
5.8000	0.608	2.828	0.025	0.000
5.9000	0.613	2.889	0.025	0.000
6.0000	0.617	2.951	0.025	0.000
6.1000	0.622	3.013	0.025	0.000
6.2000	0.626	3.075	0.025	0.000
6.3000	0.631	3.138	0.026	0.000
6.4000	0.635	3.202	0.026	0.000
6.5000	0.640	3.265	0.026	0.000
6.6000	0.644	3.330	0.026	0.000
6.7000	0.649	3.394	0.026	0.000
6.8000	0.654	3.460	0.027	0.000
6.9000	0.658	3.525	0.029	0.000
7.0000	0.663	3.591	0.030	0.000
7.1000	0.668	3.658	0.031	0.000
7.2000	0.672	3.725	0.032	0.000
7.3000	0.677	3.793	0.042	0.000
7.4000	0.682	3.861	0.059	0.000
7.5000	0.687	3.929	0.080	0.000
7.6000	0.691	3.998	0.104	0.000
7.7000	0.696	4.067	0.130	0.000
7.8000	0.701	4.137	0.158	0.000
7.9000	0.706	4.208	0.187	0.000
8.0000	0.711	4.279	0.217	0.000
8.1000	0.716	4.350	0.247	0.000
8.2000	0.720	4.422	0.277	0.000
8.3000	0.725	4.494	0.314	0.000
8.4000	0.730	4.567	0.353	0.000
8.5000	0.735	4.640	0.856	0.000
8.6000	0.740	4.714	1.759	0.000
8.7000	0.745	4.788	2.856	0.000
8.8000	0.750	4.863	3.987	0.000

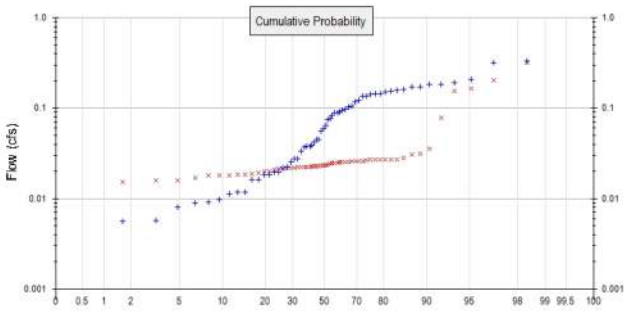
0.3178 CFS IS BETWEEN 0.314 CFS AND 0.353 CFS. USE 0.353 CFS WITH AA REQUIRED AREA OF 4.567 AC-FT (198,939 CU-FT)

8.9000	0.755	4.939	4.995	0.000
9.0000	0.760	5.014	5.757	0.000
9.1000	0.765	5.091	6.249	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 9.022
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 3.441
Total Impervious Area: 6.051

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.054143
5 year	0.132875
10 year	0.201712
25 year	0.303228
50 year	0.386814
100 year	0.475339

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.024598
5 year	0.042354
10 year	0.05901
25 year	0.087272
50 year	0.114786
100 year	0.149022

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1949	0.019	0.022
1950	0.089	0.027
1951	0.065	0.027
1952	0.011	0.016
1953	0.020	0.025
1954	0.184	0.165
1955	0.170	0.020
1956	0.060	0.025
1957	0.104	0.022
1958	0.016	0.019

1959	0.103	0.026
1960	0.154	0.023
1961	0.190	0.027
1962	0.012	0.017
1963	0.038	0.021
1964	0.045	0.026
1965	0.022	0.024
1966	0.020	0.022
1967	0.183	0.026
1968	0.034	0.020
1969	0.012	0.023
1970	0.009	0.018
1971	0.144	0.022
1972	0.210	0.027
1973	0.028	0.023
1974	0.022	0.024
1975	0.037	0.023
1976	0.045	0.027
1977	0.008	0.018
1978	0.006	0.019
1979	0.006	0.018
1980	0.097	0.036
1981	0.077	0.028
1982	0.145	0.078
1983	0.135	0.026
1984	0.025	0.021
1985	0.135	0.025
1986	0.315	0.025
1987	0.118	0.023
1988	0.042	0.022
1989	0.039	0.022
1990	0.075	0.026
1991	0.150	0.204
1992	0.172	0.025
1993	0.010	0.016
1994	0.002	0.013
1995	0.016	0.021
1996	0.082	0.022
1997	0.090	0.025
1998	0.009	0.018
1999	0.331	0.315
2000	0.094	0.025
2001	0.018	0.015
2002	0.123	0.027
2003	0.090	0.023
2004	0.142	0.153
2005	0.056	0.019
2006	0.163	0.031
2007	0.157	0.031
2008	0.027	0.023
2009	0.038	0.022

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.3306	0.3152
2	0.3152	0.2043
3	0.2101	0.1654

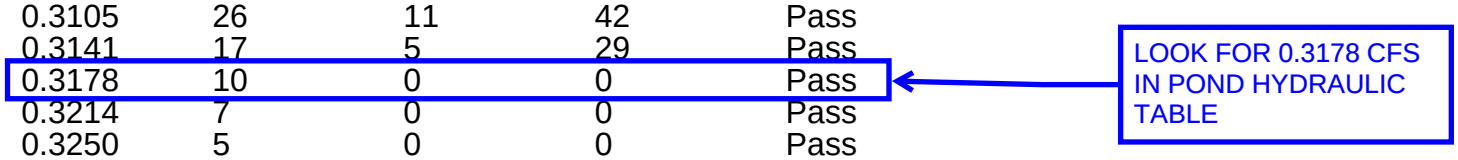
4	0.1899	0.1535
5	0.1837	0.0782
6	0.1827	0.0359
7	0.1724	0.0315
8	0.1705	0.0307
9	0.1627	0.0280
10	0.1568	0.0271
11	0.1539	0.0270
12	0.1503	0.0269
13	0.1448	0.0268
14	0.1439	0.0267
15	0.1421	0.0267
16	0.1352	0.0263
17	0.1349	0.0260
18	0.1233	0.0258
19	0.1177	0.0257
20	0.1043	0.0256
21	0.1026	0.0254
22	0.0974	0.0254
23	0.0941	0.0253
24	0.0900	0.0251
25	0.0896	0.0250
26	0.0888	0.0247
27	0.0825	0.0246
28	0.0771	0.0244
29	0.0753	0.0239
30	0.0646	0.0234
31	0.0598	0.0234
32	0.0558	0.0231
33	0.0451	0.0228
34	0.0449	0.0228
35	0.0424	0.0226
36	0.0391	0.0226
37	0.0383	0.0224
38	0.0380	0.0224
39	0.0368	0.0224
40	0.0336	0.0222
41	0.0278	0.0221
42	0.0273	0.0220
43	0.0252	0.0218
44	0.0224	0.0216
45	0.0218	0.0212
46	0.0196	0.0212
47	0.0196	0.0210
48	0.0185	0.0200
49	0.0185	0.0200
50	0.0163	0.0191
51	0.0162	0.0187
52	0.0117	0.0186
53	0.0116	0.0183
54	0.0113	0.0180
55	0.0098	0.0179
56	0.0092	0.0178
57	0.0088	0.0168
58	0.0080	0.0160
59	0.0057	0.0159
60	0.0056	0.0152
61	0.0019	0.0131

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0271	24897	22843	91	Pass
0.0307	22116	14917	67	Pass
0.0343	18968	7837	41	Pass
0.0380	17036	7054	41	Pass
0.0416	14923	6261	41	Pass
0.0452	13064	5739	43	Pass
0.0489	11790	5339	45	Pass
0.0525	10401	5007	48	Pass
0.0561	9122	4699	51	Pass
0.0598	8265	4395	53	Pass
0.0634	7217	4034	55	Pass
0.0670	6316	3640	57	Pass
0.0707	5741	3392	59	Pass
0.0743	5037	3046	60	Pass
0.0779	4620	2787	60	Pass
0.0816	4128	2449	59	Pass
0.0852	3698	2160	58	Pass
0.0888	3403	1914	56	Pass
0.0925	3027	1698	56	Pass
0.0961	2727	1533	56	Pass
0.0997	2528	1454	57	Pass
0.1034	2316	1364	58	Pass
0.1070	2116	1281	60	Pass
0.1106	1981	1223	61	Pass
0.1143	1783	1133	63	Pass
0.1179	1637	1072	65	Pass
0.1215	1476	986	66	Pass
0.1252	1348	921	68	Pass
0.1288	1256	872	69	Pass
0.1325	1137	786	69	Pass
0.1361	1020	726	71	Pass
0.1397	935	685	73	Pass
0.1434	852	605	71	Pass
0.1470	786	573	72	Pass
0.1506	691	521	75	Pass
0.1543	635	472	74	Pass
0.1579	591	435	73	Pass
0.1615	549	408	74	Pass
0.1652	509	379	74	Pass
0.1688	478	365	76	Pass
0.1724	432	348	80	Pass
0.1761	400	324	81	Pass
0.1797	377	311	82	Pass
0.1833	341	290	85	Pass
0.1870	323	278	86	Pass
0.1906	304	264	86	Pass
0.1942	289	249	86	Pass
0.1979	272	239	87	Pass
0.2015	254	222	87	Pass
0.2051	242	195	80	Pass
0.2088	234	188	80	Pass
0.2124	223	179	80	Pass
0.2160	217	172	79	Pass

0.2197	213	165	77	Pass
0.2233	205	158	77	Pass
0.2269	200	152	76	Pass
0.2306	185	144	77	Pass
0.2342	169	136	80	Pass
0.2378	163	131	80	Pass
0.2415	155	122	78	Pass
0.2451	146	113	77	Pass
0.2487	141	108	76	Pass
0.2524	135	98	72	Pass
0.2560	131	92	70	Pass
0.2596	125	84	67	Pass
0.2633	118	73	61	Pass
0.2669	115	64	55	Pass
0.2705	110	47	42	Pass
0.2742	101	43	42	Pass
0.2778	97	40	41	Pass
0.2814	93	36	38	Pass
0.2851	87	32	36	Pass
0.2887	83	29	34	Pass
0.2923	76	26	34	Pass
0.2960	71	24	33	Pass
0.2996	65	20	30	Pass
0.3032	56	17	30	Pass
0.3069	45	15	33	Pass
0.3105	26	11	42	Pass
0.3141	17	5	29	Pass
0.3178	10	0	0	Pass
0.3214	7	0	0	Pass
0.3250	5	0	0	Pass
0.3287	2	0	0	Pass
0.3323	0	0	0	Pass
0.3359	0	0	0	Pass
0.3396	0	0	0	Pass
0.3432	0	0	0	Pass
0.3468	0	0	0	Pass
0.3505	0	0	0	Pass
0.3541	0	0	0	Pass
0.3577	0	0	0	Pass
0.3614	0	0	0	Pass
0.3650	0	0	0	Pass
0.3686	0	0	0	Pass
0.3723	0	0	0	Pass
0.3759	0	0	0	Pass
0.3795	0	0	0	Pass
0.3832	0	0	0	Pass
0.3868	0	0	0	Pass



Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.5948 acre-feet
On-line facility target flow:	0.7936 cfs.
Adjusted for 15 min:	0.7936 cfs.
Off-line facility target flow:	0.4294 cfs.
Adjusted for 15 min:	0.4294 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
Pond 2 POC	☐	428.16			☐	0.00			
Total Volume Infiltrated		428.16	0.00	0.00		0.00	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.

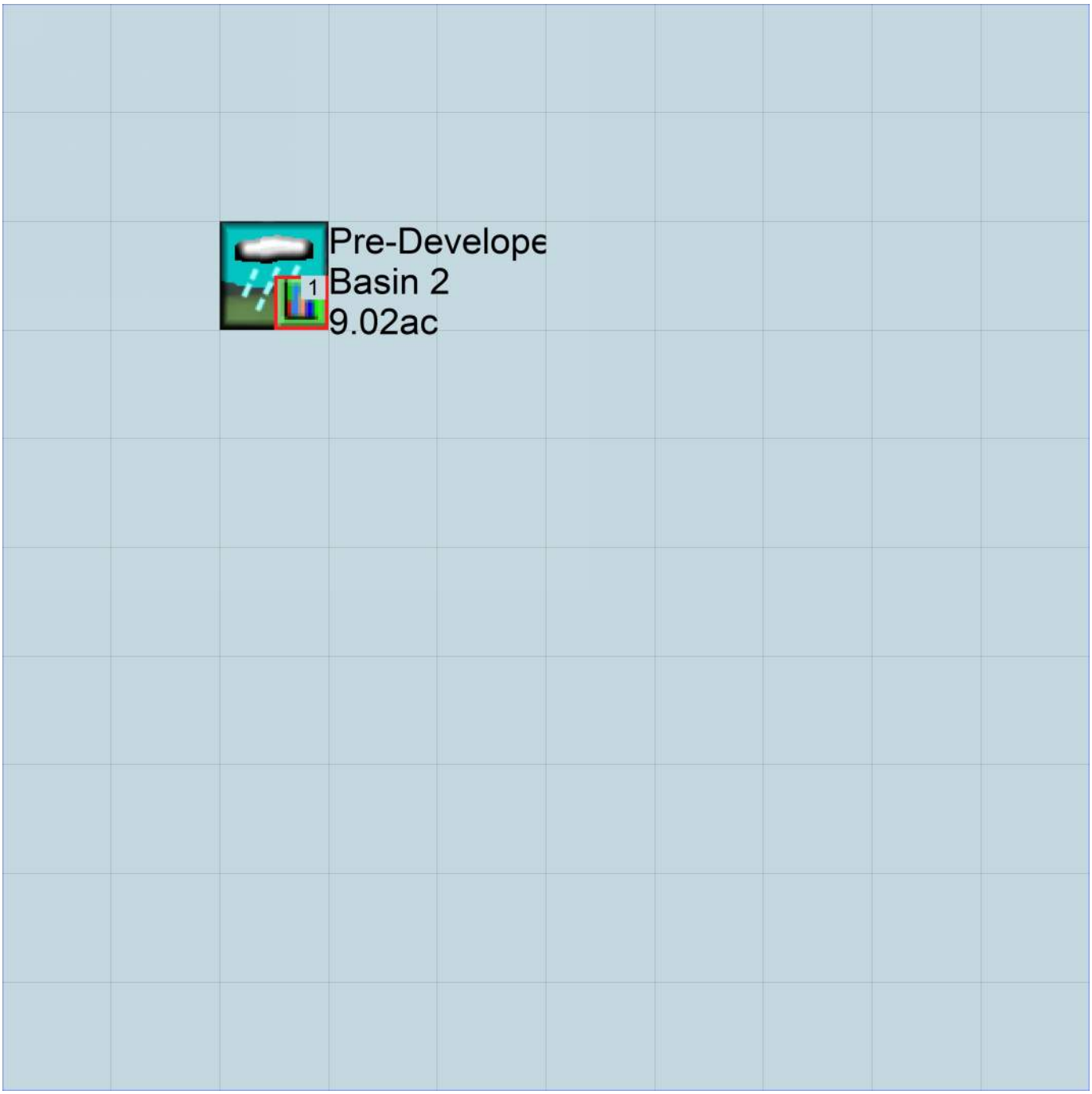
PERLND Changes

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    2009 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   2022-03-17 Pond 2.wdm
MESSU       25   Pre2022-03-17 Pond 2.MES
            27   Pre2022-03-17 Pond 2.L61
            28   Pre2022-03-17 Pond 2.L62
            30   POC2022-03-17 Pond 21.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        Pre-Developed Basin 2       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#   ***
Pre-Developed Basin 2***
PERLND  10                      9.022     COPY   501     12
PERLND  10                      9.022     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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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    2009 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   2022-03-17 Pond 2.wdm
MESSU       25   Mit2022-03-17 Pond 2.MES
            27   Mit2022-03-17 Pond 2.L61
            28   Mit2022-03-17 Pond 2.L62
            30   POC2022-03-17 Pond 21.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      13
      IMPLND       1
      IMPLND       4
      IMPLND       5
      IMPLND       8
      IMPLND      14
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Pond 2                     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           ***
   13     C, Pasture, 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 ***
   13         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  *********
   13         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 ***
   13         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
   13              0       4.5      0.06       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
   13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   13          0.15       0.4       0.3         6       0.5       0.4
  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
   13              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
    5      DRIVEWAYS/FLAT         1    1    1   27    0
    8      SIDEWALKS/FLAT         1    1    1   27    0
   14      POND                   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
    5         0    0    1    0    0    0
    8         0    0    1    0    0    0
   14         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
    5         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
   14         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
    5         0    0    0    0    0
    8         0    0    0    0    0
   14         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
    5            400      0.01       0.1       0.1
    8            400      0.01       0.1       0.1
   14            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
    5              0         0
    8              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
    5              0         0
    8              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Developed Basin 2***
PERLND  13                      3.441     RCHRES   1      2
PERLND  13                      3.441     RCHRES   1      3
IMPLND   1                      2.043     RCHRES   1      5
IMPLND   4                      2.571     RCHRES   1      5
IMPLND   5                      0.588     RCHRES   1      5
IMPLND   8                      0.459     RCHRES   1      5
IMPLND  14                       0.39     RCHRES   1      5

******Routing******
PERLND  13                      3.441     COPY     1     12
IMPLND   1                      2.043     COPY     1     15
IMPLND   4                      2.571     COPY     1     15
IMPLND   5                      0.588     COPY     1     15
IMPLND   8                      0.459     COPY     1     15
IMPLND  14                       0.39     COPY     1     15
PERLND  13                      3.441     COPY     1     13
RCHRES   1                          1     COPY   501     16
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     Pond 2                  1    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
  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
  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  0  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      0.02       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.376189  0.000000  0.000000
  0.100000  0.379724  0.037796  0.003288
  0.200000  0.383275  0.075946  0.004650
  0.300000  0.386843  0.114451  0.005695
  0.400000  0.390427  0.153315  0.006576
  0.500000  0.394028  0.192538  0.007352
  0.600000  0.397645  0.232121  0.008054
  0.700000  0.401279  0.272068  0.008699
  0.800000  0.404930  0.312378  0.009300
  0.900000  0.408597  0.353054  0.009864
  1.000000  0.412280  0.394098  0.010398
  1.100000  0.415980  0.435511  0.010905
```

1.200000	0.419697	0.477295	0.011390
1.300000	0.423430	0.519451	0.011855
1.400000	0.427179	0.561982	0.012303
1.500000	0.430946	0.604888	0.012735
1.600000	0.434728	0.648172	0.013152
1.700000	0.438527	0.691835	0.013557
1.800000	0.442343	0.735878	0.013950
1.900000	0.446175	0.780304	0.014332
2.000000	0.450024	0.825114	0.014705
2.100000	0.453890	0.870310	0.015068
2.200000	0.457771	0.915893	0.015422
2.300000	0.461670	0.961865	0.015769
2.400000	0.465585	1.008228	0.016108
2.500000	0.469516	1.054983	0.016440
2.600000	0.473464	1.102132	0.016766
2.700000	0.477429	1.149676	0.017085
2.800000	0.481410	1.197618	0.017399
2.900000	0.485407	1.245959	0.017707
3.000000	0.489421	1.294700	0.018009
3.100000	0.493452	1.343844	0.018307
3.200000	0.497499	1.393392	0.018600
3.300000	0.501563	1.443345	0.018888
3.400000	0.505643	1.493705	0.019173
3.500000	0.509739	1.544474	0.019452
3.600000	0.513853	1.595654	0.019728
3.700000	0.517983	1.647245	0.020001
3.800000	0.522129	1.699251	0.020269
3.900000	0.526292	1.751672	0.020534
4.000000	0.530471	1.804510	0.020796
4.100000	0.534667	1.857767	0.021054
4.200000	0.538879	1.911444	0.021309
4.300000	0.543108	1.965544	0.021561
4.400000	0.547354	2.020067	0.021811
4.500000	0.551616	2.075015	0.022057
4.600000	0.555894	2.130391	0.022301
4.700000	0.560189	2.186195	0.022542
4.800000	0.564501	2.242430	0.022780
4.900000	0.568829	2.299096	0.023016
5.000000	0.573174	2.356196	0.023250
5.100000	0.577535	2.413732	0.023481
5.200000	0.581913	2.471704	0.023711
5.300000	0.586307	2.530115	0.023937
5.400000	0.590718	2.588966	0.024162
5.500000	0.595145	2.648259	0.024385
5.600000	0.599589	2.707996	0.024606
5.700000	0.604049	2.768178	0.024824
5.800000	0.608526	2.828807	0.025041
5.900000	0.613019	2.889884	0.025256
6.000000	0.617529	2.951411	0.025469
6.100000	0.622056	3.013391	0.025681
6.200000	0.626599	3.075823	0.025890
6.300000	0.631158	3.138711	0.026098
6.400000	0.635734	3.202056	0.026304
6.500000	0.640327	3.265859	0.026509
6.600000	0.644936	3.330122	0.026712
6.700000	0.649562	3.394847	0.026914
6.800000	0.654204	3.460035	0.027114
6.900000	0.658863	3.525689	0.029458
7.000000	0.663538	3.591809	0.030544
7.100000	0.668230	3.658397	0.031422
7.200000	0.672938	3.725455	0.032191
7.300000	0.677663	3.792985	0.042178
7.400000	0.682404	3.860989	0.059274
7.500000	0.687162	3.929467	0.080443
7.600000	0.691936	3.998422	0.104486
7.700000	0.696727	4.067855	0.130653
7.800000	0.701535	4.137768	0.158397
7.900000	0.706359	4.208163	0.187290
8.000000	0.711199	4.279041	0.216977
8.100000	0.716056	4.350404	0.247156

```
  8.200000  0.720930  4.422253  0.277562
  8.300000  0.725820  4.494590  0.314873
  8.400000  0.730727  4.567418  0.353890
  8.500000  0.735650  4.640737  0.856511
  8.600000  0.740590  4.714549  1.759231
  8.700000  0.745546  4.788855  2.856455
  8.800000  0.750519  4.863659  3.987813
  8.900000  0.755508  4.938960  4.995115
  9.000000  0.760514  5.014761  5.757649
  END FTABLE  1
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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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   STAGE  1 1        1      WDM   1001 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
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       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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MADRONA RIDGE
POND 3
STORM CALCULATIONS

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	2022-03-17 Pond 3
Site Name:	Madrona Ridge - Pond 'C'
Site Address:	
City:	Port Townsend
Report Date:	3/17/2022
Gage:	Port Angeles
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	0.800
Version Date:	2021/08/18
Version:	4.2.18

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

Pre-Developed Basin 3

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	6.214
Pervious Total	6.214
Impervious Land Use	acre
Impervious Total	0
Basin Total	6.214

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Developed Basin 3

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	2.733
Pervious Total	2.733

Impervious Land Use	acre
ROADS FLAT	0.843
ROOF TOPS FLAT	1.937
DRIVEWAYS FLAT	0.422
SIDEWALKS FLAT	0.151
POND	0.341
Impervious Total	3.694
Basin Total	6.427

Element Flows To:

Surface	Interflow	Groundwater
Pond 3	Pond 3	

Routing Elements
Predeveloped Routing

Mitigated Routing

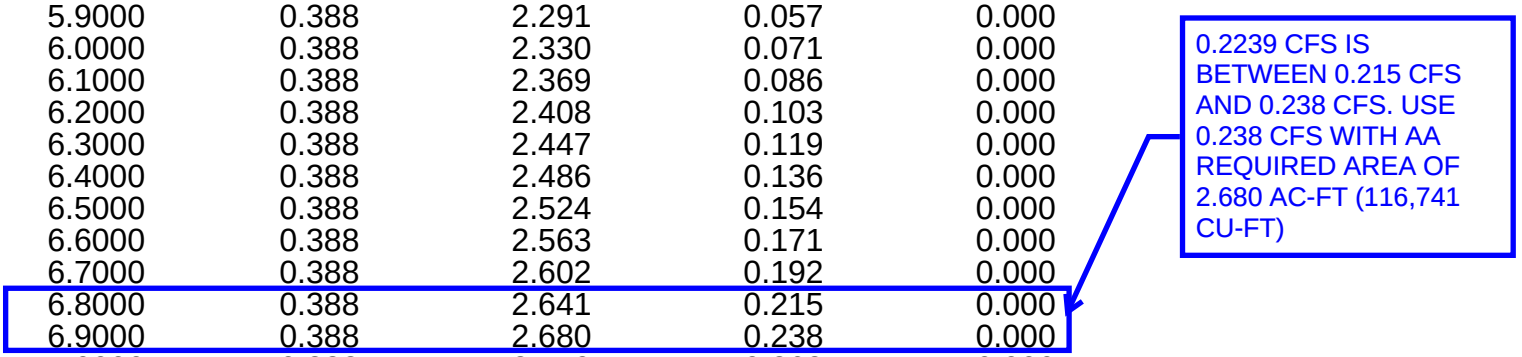
Pond 3

Bottom Length:	130.08 ft.
Bottom Width:	130.08 ft.
Depth:	9 ft.
Volume at riser head:	2.9522 acre-feet.
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:	7.5 ft.
Riser Diameter:	18 in.
Notch Type:	Rectangular
Notch Width:	0.050 ft.
Notch Height:	1.900 ft.
Orifice 1 Diameter:	0.55 in. Elevation:0 ft.
Orifice 2 Diameter:	0.5 in. Elevation:5.1 ft.
Orifice 3 Diameter:	0.55 in. Elevation:5.4 ft.
Element Flows To:	
Outlet 1	Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.388	0.000	0.000	0.000
0.1000	0.388	0.038	0.002	0.000
0.2000	0.388	0.077	0.003	0.000
0.3000	0.388	0.116	0.004	0.000
0.4000	0.388	0.155	0.005	0.000
0.5000	0.388	0.194	0.005	0.000
0.6000	0.388	0.233	0.006	0.000
0.7000	0.388	0.271	0.006	0.000
0.8000	0.388	0.310	0.007	0.000
0.9000	0.388	0.349	0.007	0.000
1.0000	0.388	0.388	0.008	0.000
1.1000	0.388	0.427	0.008	0.000
1.2000	0.388	0.466	0.009	0.000
1.3000	0.388	0.505	0.009	0.000
1.4000	0.388	0.543	0.009	0.000
1.5000	0.388	0.582	0.010	0.000
1.6000	0.388	0.621	0.010	0.000
1.7000	0.388	0.660	0.010	0.000
1.8000	0.388	0.699	0.011	0.000
1.9000	0.388	0.738	0.011	0.000
2.0000	0.388	0.776	0.011	0.000
2.1000	0.388	0.815	0.011	0.000
2.2000	0.388	0.854	0.012	0.000
2.3000	0.388	0.893	0.012	0.000
2.4000	0.388	0.932	0.012	0.000
2.5000	0.388	0.971	0.013	0.000
2.6000	0.388	1.010	0.013	0.000
2.7000	0.388	1.048	0.013	0.000
2.8000	0.388	1.087	0.013	0.000
2.9000	0.388	1.126	0.014	0.000

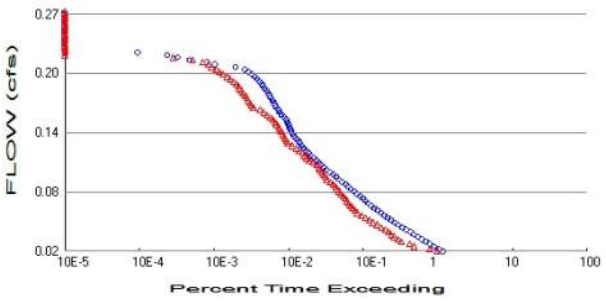
3.0000	0.388	1.165	0.014	0.000
3.1000	0.388	1.204	0.014	0.000
3.2000	0.388	1.243	0.014	0.000
3.3000	0.388	1.281	0.014	0.000
3.4000	0.388	1.320	0.015	0.000
3.5000	0.388	1.359	0.015	0.000
3.6000	0.388	1.398	0.015	0.000
3.7000	0.388	1.437	0.015	0.000
3.8000	0.388	1.476	0.016	0.000
3.9000	0.388	1.515	0.016	0.000
4.0000	0.388	1.553	0.016	0.000
4.1000	0.388	1.592	0.016	0.000
4.2000	0.388	1.631	0.016	0.000
4.3000	0.388	1.670	0.017	0.000
4.4000	0.388	1.709	0.017	0.000
4.5000	0.388	1.748	0.017	0.000
4.6000	0.388	1.786	0.017	0.000
4.7000	0.388	1.825	0.017	0.000
4.8000	0.388	1.864	0.018	0.000
4.9000	0.388	1.903	0.018	0.000
5.0000	0.388	1.942	0.018	0.000
5.1000	0.388	1.981	0.018	0.000
5.2000	0.388	2.019	0.020	0.000
5.3000	0.388	2.058	0.021	0.000
5.4000	0.388	2.097	0.022	0.000
5.5000	0.388	2.136	0.026	0.000
5.6000	0.388	2.175	0.027	0.000
5.7000	0.388	2.214	0.034	0.000
5.8000	0.388	2.253	0.044	0.000
5.9000	0.388	2.291	0.057	0.000
6.0000	0.388	2.330	0.071	0.000
6.1000	0.388	2.369	0.086	0.000
6.2000	0.388	2.408	0.103	0.000
6.3000	0.388	2.447	0.119	0.000
6.4000	0.388	2.486	0.136	0.000
6.5000	0.388	2.524	0.154	0.000
6.6000	0.388	2.563	0.171	0.000
6.7000	0.388	2.602	0.192	0.000
6.8000	0.388	2.641	0.215	0.000
6.9000	0.388	2.680	0.238	0.000
7.0000	0.388	2.719	0.262	0.000
7.1000	0.388	2.758	0.365	0.000
7.2000	0.388	2.796	0.398	0.000
7.3000	0.388	2.835	0.433	0.000
7.4000	0.388	2.874	0.468	0.000
7.5000	0.388	2.913	0.505	0.000
7.6000	0.388	2.952	1.008	0.000
7.7000	0.388	2.991	1.911	0.000
7.8000	0.388	3.029	3.008	0.000
7.9000	0.388	3.068	4.140	0.000
8.0000	0.388	3.107	5.147	0.000
8.1000	0.388	3.146	5.910	0.000
8.2000	0.388	3.185	6.402	0.000
8.3000	0.388	3.224	6.848	0.000
8.4000	0.388	3.263	7.233	0.000
8.5000	0.388	3.301	7.598	0.000
8.6000	0.388	3.340	7.944	0.000
8.7000	0.388	3.379	8.275	0.000

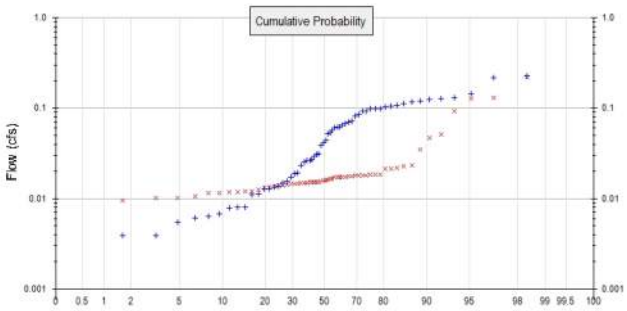


8.8000	0.388	3.418	8.593	0.000
8.9000	0.388	3.457	8.898	0.000
9.0000	0.388	3.496	9.193	0.000
9.1000	0.388	3.534	9.478	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 6.214
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 2.733
Total Impervious Area: 3.694

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.037292
5 year	0.091519
10 year	0.138931
25 year	0.208851
50 year	0.266422
100 year	0.327395

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.016896
5 year	0.029913
10 year	0.042391
25 year	0.063966
50 year	0.085322
100 year	0.112263

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.013	0.015
1950	0.061	0.018
1951	0.044	0.022
1952	0.008	0.010
1953	0.013	0.017
1954	0.127	0.129
1955	0.117	0.013
1956	0.041	0.017
1957	0.072	0.015
1958	0.011	0.012

1959	0.071	0.018
1960	0.106	0.015
1961	0.131	0.021
1962	0.008	0.011
1963	0.026	0.014
1964	0.031	0.018
1965	0.015	0.016
1966	0.014	0.015
1967	0.126	0.018
1968	0.023	0.013
1969	0.008	0.015
1970	0.006	0.012
1971	0.099	0.015
1972	0.145	0.021
1973	0.019	0.016
1974	0.015	0.016
1975	0.025	0.016
1976	0.031	0.018
1977	0.005	0.012
1978	0.004	0.012
1979	0.004	0.012
1980	0.067	0.051
1981	0.053	0.023
1982	0.100	0.047
1983	0.093	0.018
1984	0.017	0.014
1985	0.093	0.017
1986	0.217	0.018
1987	0.081	0.015
1988	0.029	0.015
1989	0.027	0.014
1990	0.052	0.018
1991	0.104	0.130
1992	0.119	0.017
1993	0.007	0.010
1994	0.001	0.008
1995	0.011	0.014
1996	0.057	0.015
1997	0.062	0.017
1998	0.006	0.011
1999	0.228	0.223
2000	0.065	0.017
2001	0.013	0.010
2002	0.085	0.018
2003	0.062	0.015
2004	0.098	0.093
2005	0.038	0.013
2006	0.112	0.035
2007	0.108	0.023
2008	0.019	0.015
2009	0.026	0.015

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.2277	0.2232
2	0.2171	0.1302
3	0.1447	0.1286

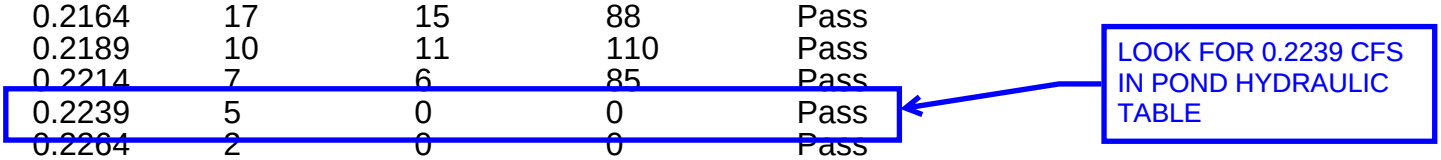
4	0.1308	0.0934
5	0.1266	0.0512
6	0.1258	0.0471
7	0.1188	0.0346
8	0.1174	0.0233
9	0.1120	0.0228
10	0.1080	0.0217
11	0.1060	0.0212
12	0.1035	0.0211
13	0.0997	0.0182
14	0.0991	0.0182
15	0.0978	0.0182
16	0.0931	0.0181
17	0.0929	0.0181
18	0.0849	0.0180
19	0.0811	0.0178
20	0.0718	0.0176
21	0.0706	0.0175
22	0.0671	0.0174
23	0.0648	0.0173
24	0.0620	0.0173
25	0.0617	0.0173
26	0.0611	0.0171
27	0.0568	0.0166
28	0.0531	0.0164
29	0.0519	0.0162
30	0.0445	0.0158
31	0.0412	0.0157
32	0.0384	0.0155
33	0.0311	0.0152
34	0.0309	0.0151
35	0.0292	0.0151
36	0.0269	0.0151
37	0.0264	0.0150
38	0.0262	0.0150
39	0.0253	0.0149
40	0.0231	0.0148
41	0.0192	0.0147
42	0.0188	0.0146
43	0.0173	0.0146
44	0.0155	0.0143
45	0.0150	0.0140
46	0.0135	0.0139
47	0.0135	0.0137
48	0.0128	0.0133
49	0.0127	0.0131
50	0.0112	0.0125
51	0.0111	0.0121
52	0.0081	0.0119
53	0.0080	0.0118
54	0.0078	0.0117
55	0.0068	0.0115
56	0.0063	0.0114
57	0.0061	0.0107
58	0.0055	0.0102
59	0.0039	0.0101
60	0.0039	0.0096
61	0.0013	0.0083

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0186	24832	20929	84	Pass
0.0211	21517	16578	77	Pass
0.0237	18741	10202	54	Pass
0.0262	16482	8881	53	Pass
0.0287	14626	6928	47	Pass
0.0312	12962	6258	48	Pass
0.0337	11473	5553	48	Pass
0.0362	10239	5061	49	Pass
0.0387	9088	4607	50	Pass
0.0412	8040	4199	52	Pass
0.0437	7112	3726	52	Pass
0.0462	6310	3292	52	Pass
0.0487	5627	2892	51	Pass
0.0512	5001	2584	51	Pass
0.0537	4496	2284	50	Pass
0.0562	4064	2012	49	Pass
0.0587	3679	1786	48	Pass
0.0612	3317	1640	49	Pass
0.0637	2988	1524	51	Pass
0.0662	2725	1446	53	Pass
0.0687	2490	1371	55	Pass
0.0712	2304	1295	56	Pass
0.0737	2116	1226	57	Pass
0.0762	1958	1149	58	Pass
0.0787	1768	1066	60	Pass
0.0812	1601	1009	63	Pass
0.0837	1456	952	65	Pass
0.0862	1340	898	67	Pass
0.0887	1234	842	68	Pass
0.0912	1123	764	68	Pass
0.0937	1017	694	68	Pass
0.0962	918	661	72	Pass
0.0987	844	631	74	Pass
0.1012	762	598	78	Pass
0.1037	683	565	82	Pass
0.1062	632	538	85	Pass
0.1087	583	515	88	Pass
0.1112	545	450	82	Pass
0.1138	509	403	79	Pass
0.1163	472	374	79	Pass
0.1188	427	352	82	Pass
0.1213	400	331	82	Pass
0.1238	371	293	78	Pass
0.1263	338	269	79	Pass
0.1288	320	238	74	Pass
0.1313	303	210	69	Pass
0.1338	289	202	69	Pass
0.1363	270	193	71	Pass
0.1388	252	186	73	Pass
0.1413	242	178	73	Pass
0.1438	232	170	73	Pass
0.1463	223	163	73	Pass
0.1488	217	156	71	Pass

0.1513	211	147	69	Pass
0.1538	205	139	67	Pass
0.1563	198	130	65	Pass
0.1588	184	120	65	Pass
0.1613	169	110	65	Pass
0.1638	160	99	61	Pass
0.1663	155	88	56	Pass
0.1688	146	72	49	Pass
0.1713	141	68	48	Pass
0.1738	135	65	48	Pass
0.1763	130	61	46	Pass
0.1788	123	59	47	Pass
0.1813	118	56	47	Pass
0.1838	113	52	46	Pass
0.1863	108	50	46	Pass
0.1888	101	47	46	Pass
0.1913	97	45	46	Pass
0.1938	92	42	45	Pass
0.1963	87	39	44	Pass
0.1988	80	35	43	Pass
0.2013	76	32	42	Pass
0.2039	68	28	41	Pass
0.2064	62	25	40	Pass
0.2089	55	23	41	Pass
0.2114	41	20	48	Pass
0.2139	22	18	81	Pass
0.2164	17	15	88	Pass
0.2189	10	11	110	Pass
0.2214	7	6	85	Pass
0.2239	5	0	0	Pass
0.2264	2	0	0	Pass
0.2289	0	0	0	Pass
0.2314	0	0	0	Pass
0.2339	0	0	0	Pass
0.2364	0	0	0	Pass
0.2389	0	0	0	Pass
0.2414	0	0	0	Pass
0.2439	0	0	0	Pass
0.2464	0	0	0	Pass
0.2489	0	0	0	Pass
0.2514	0	0	0	Pass
0.2539	0	0	0	Pass
0.2564	0	0	0	Pass
0.2589	0	0	0	Pass
0.2614	0	0	0	Pass
0.2639	0	0	0	Pass
0.2664	0	0	0	Pass



Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.3686 acre-feet
On-line facility target flow:	0.4841 cfs.
Adjusted for 15 min:	0.4841 cfs.
Off-line facility target flow:	0.2616 cfs.
Adjusted for 15 min:	0.2616 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
Pond 3 POC	☐	266.98			☐	0.00			
Total Volume Infiltrated		266.98	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

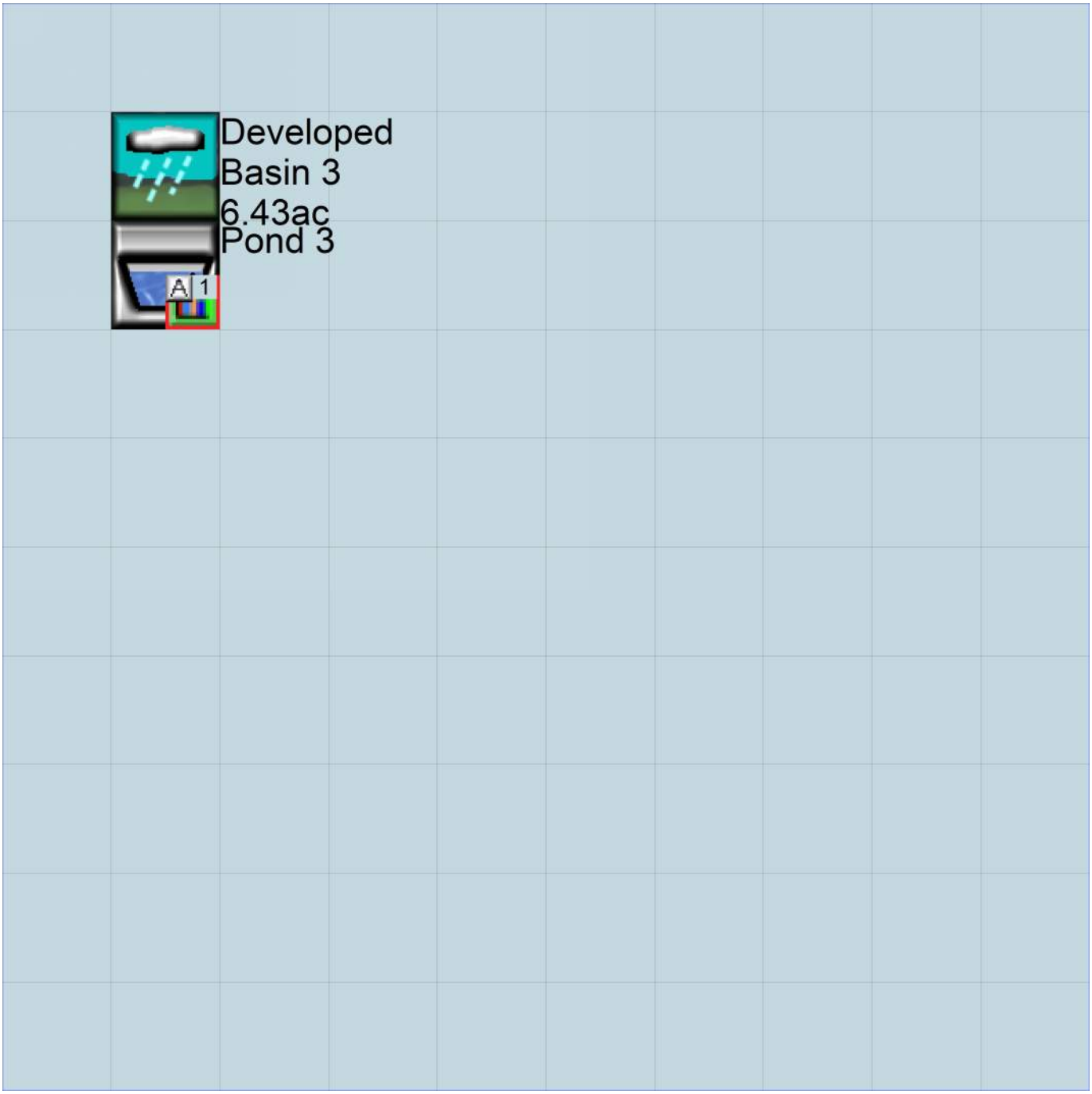
No PERLND changes have been made.

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    2009 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   2022-03-17 Pond 3.wdm
MESSU       25   Pre2022-03-17 Pond 3.MES
            27   Pre2022-03-17 Pond 3.L61
            28   Pre2022-03-17 Pond 3.L62
            30   POC2022-03-17 Pond 31.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        Pre-Developed Basin 3       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#   ***
Pre-Developed Basin 3***
PERLND  10                       6.214     COPY   501     12
PERLND  10                       6.214     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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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    2009 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   2022-03-17 Pond 3.wdm
MESSU       25   Mit2022-03-17 Pond 3.MES
            27   Mit2022-03-17 Pond 3.L61
            28   Mit2022-03-17 Pond 3.L62
            30   POC2022-03-17 Pond 31.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      13
      IMPLND       1
      IMPLND       4
      IMPLND       5
      IMPLND       8
      IMPLND      14
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Pond 3                     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           ***
   13     C, Pasture, 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 ***
   13         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  *********
   13         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 ***
   13         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
   13              0       4.5      0.06       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
   13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   13          0.15       0.4       0.3         6       0.5       0.4
  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
   13              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
    5      DRIVEWAYS/FLAT         1    1    1   27    0
    8      SIDEWALKS/FLAT         1    1    1   27    0
   14      POND                   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
    5         0    0    1    0    0    0
    8         0    0    1    0    0    0
   14         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
    5         0    0    4    0    0    0    1    9
    8         0    0    4    0    0    0    1    9
   14         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
    5         0    0    0    0    0
    8         0    0    0    0    0
   14         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
    5            400      0.01       0.1       0.1
    8            400      0.01       0.1       0.1
   14            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
    5              0         0
    8              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    4              0         0
    5              0         0
    8              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Developed Basin 3***
PERLND  13                      2.733     RCHRES   1      2
PERLND  13                      2.733     RCHRES   1      3
IMPLND   1                      0.843     RCHRES   1      5
IMPLND   4                      1.937     RCHRES   1      5
IMPLND   5                      0.422     RCHRES   1      5
IMPLND   8                      0.151     RCHRES   1      5
IMPLND  14                      0.341     RCHRES   1      5

******Routing******
PERLND  13                      2.733     COPY     1     12
IMPLND   1                      0.843     COPY     1     15
IMPLND   4                      1.937     COPY     1     15
IMPLND   5                      0.422     COPY     1     15
IMPLND   8                      0.151     COPY     1     15
IMPLND  14                      0.341     COPY     1     15
PERLND  13                      2.733     COPY     1     13
RCHRES   1                          1     COPY   501     16
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     Pond 3                  1    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
  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
  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  0  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      0.02       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.388450  0.000000  0.000000
  0.100000  0.388450  0.038845  0.002596
  0.200000  0.388450  0.077690  0.003671
  0.300000  0.388450  0.116535  0.004496
  0.400000  0.388450  0.155380  0.005192
  0.500000  0.388450  0.194225  0.005805
  0.600000  0.388450  0.233070  0.006359
  0.700000  0.388450  0.271915  0.006868
  0.800000  0.388450  0.310760  0.007342
  0.900000  0.388450  0.349605  0.007788
  1.000000  0.388450  0.388450  0.008209
  1.100000  0.388450  0.427295  0.008610
```

1.200000	0.388450	0.466140	0.008992
1.300000	0.388450	0.504984	0.009360
1.400000	0.388450	0.543829	0.009713
1.500000	0.388450	0.582674	0.010054
1.600000	0.388450	0.621519	0.010384
1.700000	0.388450	0.660364	0.010703
1.800000	0.388450	0.699209	0.011013
1.900000	0.388450	0.738054	0.011315
2.000000	0.388450	0.776899	0.011609
2.100000	0.388450	0.815744	0.011896
2.200000	0.388450	0.854589	0.012176
2.300000	0.388450	0.893434	0.012449
2.400000	0.388450	0.932279	0.012717
2.500000	0.388450	0.971124	0.012979
2.600000	0.388450	1.009969	0.013236
2.700000	0.388450	1.048814	0.013489
2.800000	0.388450	1.087659	0.013736
2.900000	0.388450	1.126504	0.013979
3.000000	0.388450	1.165349	0.014218
3.100000	0.388450	1.204194	0.014453
3.200000	0.388450	1.243039	0.014684
3.300000	0.388450	1.281884	0.014912
3.400000	0.388450	1.320729	0.015136
3.500000	0.388450	1.359574	0.015357
3.600000	0.388450	1.398419	0.015575
3.700000	0.388450	1.437264	0.015790
3.800000	0.388450	1.476108	0.016002
3.900000	0.388450	1.514953	0.016211
4.000000	0.388450	1.553798	0.016418
4.100000	0.388450	1.592643	0.016622
4.200000	0.388450	1.631488	0.016823
4.300000	0.388450	1.670333	0.017022
4.400000	0.388450	1.709178	0.017219
4.500000	0.388450	1.748023	0.017414
4.600000	0.388450	1.786868	0.017606
4.700000	0.388450	1.825713	0.017796
4.800000	0.388450	1.864558	0.017985
4.900000	0.388450	1.903403	0.018171
5.000000	0.388450	1.942248	0.018356
5.100000	0.388450	1.981093	0.018538
5.200000	0.388450	2.019938	0.020864
5.300000	0.388450	2.058783	0.021932
5.400000	0.388450	2.097628	0.022792
5.500000	0.388450	2.136473	0.026138
5.600000	0.388450	2.175318	0.027894
5.700000	0.388450	2.214163	0.034510
5.800000	0.388450	2.253008	0.044934
5.900000	0.388450	2.291853	0.057529
6.000000	0.388450	2.330698	0.071654
6.100000	0.388450	2.369543	0.086907
6.200000	0.388450	2.408388	0.102994
6.300000	0.388450	2.447232	0.119684
6.400000	0.388450	2.486077	0.136787
6.500000	0.388450	2.524922	0.154137
6.600000	0.388450	2.563767	0.171590
6.700000	0.388450	2.602612	0.192861
6.800000	0.388450	2.641457	0.215060
6.900000	0.388450	2.680302	0.238151
7.000000	0.388450	2.719147	0.262100
7.100000	0.388450	2.757992	0.365237
7.200000	0.388450	2.796837	0.398777
7.300000	0.388450	2.835682	0.433345
7.400000	0.388450	2.874527	0.468910
7.500000	0.388450	2.913372	0.505446
7.600000	0.388450	2.952217	1.008270
7.700000	0.388450	2.991062	1.911190
7.800000	0.388450	3.029907	3.008611
7.900000	0.388450	3.068752	4.140164
8.000000	0.388450	3.107597	5.147659
8.100000	0.388450	3.146442	5.910381

```
  8.200000  0.388450  3.185287  6.402280
  8.300000  0.388450  3.224132  6.848832
  8.400000  0.388450  3.262977  7.233896
  8.500000  0.388450  3.301822  7.598122
  8.600000  0.388450  3.340667  7.944568
  8.700000  0.388450  3.379512  8.275611
  8.800000  0.388450  3.418356  8.593141
  8.900000  0.388450  3.457201  8.898689
  9.000000  0.388450  3.496046  9.193518
  END FTABLE  1
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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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   STAGE  1 1        1      WDM   1001 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
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       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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MADRONA RIDGE
POND 4
STORM CALCULATIONS

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	2022-03-17 Pond 4
Site Name:	Madrona Ridge - Pond 4
Site Address:	
City:	Port Townsend
Report Date:	3/17/2022
Gage:	Port Angeles
Data Start:	1948/10/01
Data End:	2009/09/30
Timestep:	15 Minute
Precip Scale:	0.800
Version Date:	2021/08/18
Version:	4.2.18

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

Pre-Developed Basin 'D'

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	2.967
Pervious Total	2.967
Impervious Land Use	acre
Impervious Total	0
Basin Total	2.967

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Developed Basin 4

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	1.206
Pervious Total	1.206

Impervious Land Use	acre
ROADS FLAT	0.898
SIDEWALKS FLAT	0.557
POND	0.307
Impervious Total	1.762
Basin Total	2.968

Element Flows To:

Surface	Interflow	Groundwater
Pond 4	Pond 4	

Routing Elements
Predeveloped Routing

Mitigated Routing

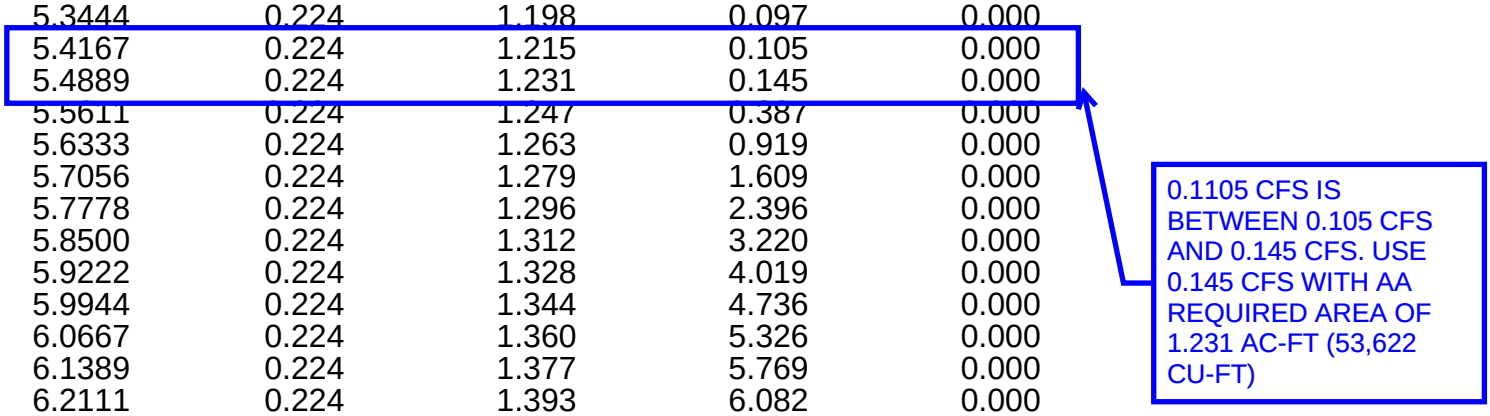
Pond 4

Bottom Length: 98.85 ft.
Bottom Width: 98.85 ft.
Depth: 6.5 ft.
Volume at riser head: 1.2474 acre-feet.
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: 5.5 ft.
Riser Diameter: 18 in.
Notch Type: Rectangular
Notch Width: 0.022 ft.
Notch Height: 1.451 ft.
Orifice 1 Diameter: 0.402 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.224	0.000	0.000	0.000
0.0722	0.224	0.016	0.001	0.000
0.1444	0.224	0.032	0.001	0.000
0.2167	0.224	0.048	0.002	0.000
0.2889	0.224	0.064	0.002	0.000
0.3611	0.224	0.081	0.002	0.000
0.4333	0.224	0.097	0.002	0.000
0.5056	0.224	0.113	0.003	0.000
0.5778	0.224	0.129	0.003	0.000
0.6500	0.224	0.145	0.003	0.000
0.7222	0.224	0.162	0.003	0.000
0.7944	0.224	0.178	0.003	0.000
0.8667	0.224	0.194	0.004	0.000
0.9389	0.224	0.210	0.004	0.000
1.0111	0.224	0.226	0.004	0.000
1.0833	0.224	0.243	0.004	0.000
1.1556	0.224	0.259	0.004	0.000
1.2278	0.224	0.275	0.004	0.000
1.3000	0.224	0.291	0.005	0.000
1.3722	0.224	0.307	0.005	0.000
1.4444	0.224	0.324	0.005	0.000
1.5167	0.224	0.340	0.005	0.000
1.5889	0.224	0.356	0.005	0.000
1.6611	0.224	0.372	0.005	0.000
1.7333	0.224	0.388	0.005	0.000
1.8056	0.224	0.405	0.005	0.000
1.8778	0.224	0.421	0.006	0.000
1.9500	0.224	0.437	0.006	0.000
2.0222	0.224	0.453	0.006	0.000
2.0944	0.224	0.469	0.006	0.000
2.1667	0.224	0.486	0.006	0.000
2.2389	0.224	0.502	0.006	0.000

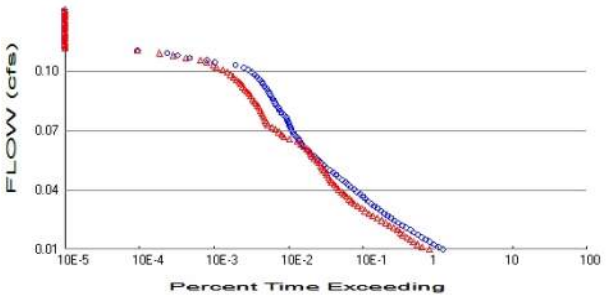
2.3111	0.224	0.518	0.006	0.000
2.3833	0.224	0.534	0.006	0.000
2.4556	0.224	0.550	0.006	0.000
2.5278	0.224	0.567	0.007	0.000
2.6000	0.224	0.583	0.007	0.000
2.6722	0.224	0.599	0.007	0.000
2.7444	0.224	0.615	0.007	0.000
2.8167	0.224	0.631	0.007	0.000
2.8889	0.224	0.648	0.007	0.000
2.9611	0.224	0.664	0.007	0.000
3.0333	0.224	0.680	0.007	0.000
3.1056	0.224	0.696	0.007	0.000
3.1778	0.224	0.712	0.007	0.000
3.2500	0.224	0.729	0.007	0.000
3.3222	0.224	0.745	0.008	0.000
3.3944	0.224	0.761	0.008	0.000
3.4667	0.224	0.777	0.008	0.000
3.5389	0.224	0.793	0.008	0.000
3.6111	0.224	0.810	0.008	0.000
3.6833	0.224	0.826	0.008	0.000
3.7556	0.224	0.842	0.008	0.000
3.8278	0.224	0.858	0.008	0.000
3.9000	0.224	0.874	0.008	0.000
3.9722	0.224	0.891	0.008	0.000
4.0444	0.224	0.907	0.008	0.000
4.1167	0.224	0.923	0.010	0.000
4.1889	0.224	0.939	0.012	0.000
4.2611	0.224	0.955	0.016	0.000
4.3333	0.224	0.972	0.019	0.000
4.4056	0.224	0.988	0.023	0.000
4.4778	0.224	1.004	0.028	0.000
4.5500	0.224	1.020	0.033	0.000
4.6222	0.224	1.036	0.038	0.000
4.6944	0.224	1.053	0.043	0.000
4.7667	0.224	1.069	0.048	0.000
4.8389	0.224	1.085	0.053	0.000
4.9111	0.224	1.101	0.058	0.000
4.9833	0.224	1.117	0.064	0.000
5.0556	0.224	1.134	0.069	0.000
5.1278	0.224	1.150	0.076	0.000
5.2000	0.224	1.166	0.083	0.000
5.2722	0.224	1.182	0.090	0.000
5.3444	0.224	1.198	0.097	0.000
5.4167	0.224	1.215	0.105	0.000
5.4889	0.224	1.231	0.145	0.000
5.5611	0.224	1.247	0.387	0.000
5.6333	0.224	1.263	0.919	0.000
5.7056	0.224	1.279	1.609	0.000
5.7778	0.224	1.296	2.396	0.000
5.8500	0.224	1.312	3.220	0.000
5.9222	0.224	1.328	4.019	0.000
5.9944	0.224	1.344	4.736	0.000
6.0667	0.224	1.360	5.326	0.000
6.1389	0.224	1.377	5.769	0.000
6.2111	0.224	1.393	6.082	0.000
6.2833	0.224	1.409	6.420	0.000
6.3556	0.224	1.425	6.703	0.000
6.4278	0.224	1.441	6.974	0.000

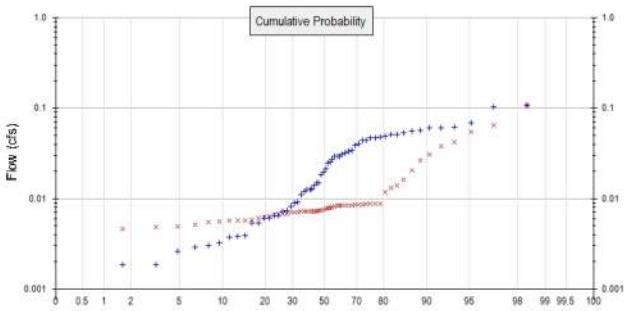


6.5000	0.224	1.458	7.235	0.000
6.5722	0.224	1.474	7.486	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 2.967
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.206
Total Impervious Area: 1.762

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.017806
5 year	0.043698
10 year	0.066336
25 year	0.09972
50 year	0.127209
100 year	0.156321

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.008444
5 year	0.015534
10 year	0.022536
25 year	0.034956
50 year	0.047537
100 year	0.063709

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.006	0.007
1950	0.029	0.009
1951	0.021	0.014
1952	0.004	0.005
1953	0.006	0.008
1954	0.060	0.065
1955	0.056	0.006
1956	0.020	0.008
1957	0.034	0.007
1958	0.005	0.006

1959	0.034	0.009
1960	0.051	0.007
1961	0.062	0.012
1962	0.004	0.005
1963	0.013	0.007
1964	0.015	0.009
1965	0.007	0.008
1966	0.006	0.007
1967	0.060	0.009
1968	0.011	0.006
1969	0.004	0.007
1970	0.003	0.006
1971	0.047	0.007
1972	0.069	0.013
1973	0.009	0.008
1974	0.007	0.008
1975	0.012	0.008
1976	0.015	0.009
1977	0.003	0.006
1978	0.002	0.006
1979	0.002	0.006
1980	0.032	0.038
1981	0.025	0.021
1982	0.048	0.026
1983	0.044	0.009
1984	0.008	0.007
1985	0.044	0.008
1986	0.104	0.008
1987	0.039	0.007
1988	0.014	0.007
1989	0.013	0.007
1990	0.025	0.008
1991	0.049	0.055
1992	0.057	0.008
1993	0.003	0.005
1994	0.001	0.004
1995	0.005	0.007
1996	0.027	0.007
1997	0.030	0.008
1998	0.003	0.006
1999	0.109	0.108
2000	0.031	0.008
2001	0.006	0.005
2002	0.041	0.009
2003	0.029	0.007
2004	0.047	0.042
2005	0.018	0.006
2006	0.053	0.031
2007	0.052	0.016
2008	0.009	0.007
2009	0.013	0.007

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.1087	0.1084
2	0.1037	0.0648
3	0.0691	0.0550

4	0.0625	0.0421
5	0.0604	0.0383
6	0.0601	0.0306
7	0.0567	0.0263
8	0.0561	0.0206
9	0.0535	0.0160
10	0.0516	0.0138
11	0.0506	0.0129
12	0.0494	0.0117
13	0.0476	0.0087
14	0.0473	0.0087
15	0.0467	0.0087
16	0.0445	0.0086
17	0.0444	0.0086
18	0.0405	0.0086
19	0.0387	0.0086
20	0.0343	0.0084
21	0.0337	0.0084
22	0.0320	0.0083
23	0.0309	0.0083
24	0.0296	0.0083
25	0.0295	0.0083
26	0.0292	0.0082
27	0.0271	0.0080
28	0.0254	0.0079
29	0.0248	0.0078
30	0.0212	0.0076
31	0.0197	0.0076
32	0.0184	0.0074
33	0.0148	0.0073
34	0.0148	0.0073
35	0.0139	0.0073
36	0.0128	0.0073
37	0.0126	0.0072
38	0.0125	0.0072
39	0.0121	0.0072
40	0.0110	0.0072
41	0.0091	0.0071
42	0.0090	0.0070
43	0.0083	0.0070
44	0.0074	0.0068
45	0.0072	0.0068
46	0.0065	0.0067
47	0.0064	0.0066
48	0.0061	0.0064
49	0.0061	0.0063
50	0.0054	0.0060
51	0.0053	0.0059
52	0.0039	0.0058
53	0.0038	0.0057
54	0.0037	0.0057
55	0.0032	0.0056
56	0.0030	0.0055
57	0.0029	0.0051
58	0.0026	0.0049
59	0.0019	0.0049
60	0.0019	0.0046
61	0.0006	0.0040

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0089	24811	16335	65	Pass
0.0101	21517	13028	60	Pass
0.0113	18743	11306	60	Pass
0.0125	16491	9980	60	Pass
0.0137	14626	9142	62	Pass
0.0149	12966	8245	63	Pass
0.0161	11475	7261	63	Pass
0.0173	10243	6690	65	Pass
0.0185	9088	6128	67	Pass
0.0197	8049	5428	67	Pass
0.0209	7114	4800	67	Pass
0.0220	6312	4259	67	Pass
0.0232	5627	3747	66	Pass
0.0244	5003	3285	65	Pass
0.0256	4496	2868	63	Pass
0.0268	4064	2537	62	Pass
0.0280	3679	2269	61	Pass
0.0292	3317	2038	61	Pass
0.0304	2988	1799	60	Pass
0.0316	2727	1619	59	Pass
0.0328	2490	1487	59	Pass
0.0340	2306	1394	60	Pass
0.0352	2116	1275	60	Pass
0.0364	1959	1181	60	Pass
0.0376	1768	1095	61	Pass
0.0388	1603	1004	62	Pass
0.0400	1456	931	63	Pass
0.0412	1341	869	64	Pass
0.0424	1234	807	65	Pass
0.0436	1123	767	68	Pass
0.0448	1017	730	71	Pass
0.0459	918	703	76	Pass
0.0471	844	671	79	Pass
0.0483	761	629	82	Pass
0.0495	682	601	88	Pass
0.0507	632	574	90	Pass
0.0519	582	543	93	Pass
0.0531	545	508	93	Pass
0.0543	506	469	92	Pass
0.0555	470	440	93	Pass
0.0567	427	422	98	Pass
0.0579	400	404	101	Pass
0.0591	371	377	101	Pass
0.0603	336	345	102	Pass
0.0615	319	318	99	Pass
0.0627	303	278	91	Pass
0.0639	289	220	76	Pass
0.0651	270	184	68	Pass
0.0663	251	171	68	Pass
0.0675	242	157	64	Pass
0.0687	232	142	61	Pass
0.0698	223	128	57	Pass
0.0710	217	111	51	Pass

0.0722	211	108	51	Pass
0.0734	205	104	50	Pass
0.0746	197	100	50	Pass
0.0758	184	97	52	Pass
0.0770	169	93	55	Pass
0.0782	160	89	55	Pass
0.0794	155	86	55	Pass
0.0806	146	82	56	Pass
0.0818	141	78	55	Pass
0.0830	135	73	54	Pass
0.0842	130	70	53	Pass
0.0854	123	66	53	Pass
0.0866	118	63	53	Pass
0.0878	113	59	52	Pass
0.0890	108	55	50	Pass
0.0902	101	52	51	Pass
0.0914	97	49	50	Pass
0.0926	92	46	50	Pass
0.0937	87	42	48	Pass
0.0949	80	39	48	Pass
0.0961	76	36	47	Pass
0.0973	68	32	47	Pass
0.0985	62	28	45	Pass
0.0997	54	23	42	Pass
0.1009	41	21	51	Pass
0.1021	22	17	77	Pass
0.1033	17	14	82	Pass
0.1045	10	9	90	Pass
0.1057	7	6	85	Pass
0.1069	5	4	80	Pass
0.1081	2	2	100	Pass
0.1093	0	0	100	Pass
0.1105	0	0	0	Pass
0.1117	0	0	0	Pass
0.1129	0	0	0	Pass
0.1141	0	0	0	Pass
0.1153	0	0	0	Pass
0.1165	0	0	0	Pass
0.1176	0	0	0	Pass
0.1188	0	0	0	Pass
0.1200	0	0	0	Pass
0.1212	0	0	0	Pass
0.1224	0	0	0	Pass
0.1236	0	0	0	Pass
0.1248	0	0	0	Pass
0.1260	0	0	0	Pass
0.1272	0	0	0	Pass

LOOK FOR 0.1105 CFS IN POND HYDRAULIC TABLE

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0.1751 acre-feet
On-line facility target flow:	0.231 cfs.
Adjusted for 15 min:	0.231 cfs.
Off-line facility target flow:	0.1248 cfs.
Adjusted for 15 min:	0.1248 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
Pond 4 POC	☐	126.48			☐	0.00			
Total Volume Infiltrated		126.48	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

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    2009 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   2022-03-17 Pond 4.wdm
MESSU       25   Pre2022-03-17 Pond 4.MES
            27   Pre2022-03-17 Pond 4.L61
            28   Pre2022-03-17 Pond 4.L62
            30   POC2022-03-17 Pond 41.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        Pre-Developed Basin 'D'     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#   ***
Pre-Developed Basin 'D'***
PERLND  10                       2.967     COPY   501     12
PERLND  10                       2.967     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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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    2009 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   2022-03-17 Pond 4.wdm
MESSU       25   Mit2022-03-17 Pond 4.MES
            27   Mit2022-03-17 Pond 4.L61
            28   Mit2022-03-17 Pond 4.L62
            30   POC2022-03-17 Pond 41.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      13
      IMPLND       1
      IMPLND       8
      IMPLND      14
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Pond 4                     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           ***
   13     C, Pasture, 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 ***
   13         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  *********
   13         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 ***
   13         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
   13              0       4.5      0.06       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
   13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   13          0.15       0.4       0.3         6       0.5       0.4
  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
   13              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
    8      SIDEWALKS/FLAT         1    1    1   27    0
   14      POND                   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
    8         0    0    1    0    0    0
   14         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
    8         0    0    4    0    0    0    1    9
   14         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
    8         0    0    0    0    0
   14         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
    8            400      0.01       0.1       0.1
   14            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >       IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    8              0         0
   14              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    1              0         0
    8              0         0
   14              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Developed Basin 4***
PERLND  13                       1.206     RCHRES   1      2
PERLND  13                       1.206     RCHRES   1      3
IMPLND   1                       0.898     RCHRES   1      5
IMPLND   8                       0.557     RCHRES   1      5
IMPLND  14                       0.307     RCHRES   1      5

******Routing******
PERLND  13                       1.206     COPY     1     12
IMPLND   1                       0.898     COPY     1     15
IMPLND   8                       0.557     COPY     1     15
IMPLND  14                       0.307     COPY     1     15
PERLND  13                       1.206     COPY     1     13
RCHRES   1                           1     COPY   501     16
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     Pond 4                 1    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
  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
  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  0  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      0.02       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  0.0  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    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.224308  0.000000  0.000000
  0.072222  0.224308  0.016200  0.001179
  0.144444  0.224308  0.032400  0.001667
  0.216667  0.224308  0.048600  0.002041
  0.288889  0.224308  0.064800  0.002357
  0.361111  0.224308  0.081000  0.002635
  0.433333  0.224308  0.097200  0.002887
  0.505556  0.224308  0.113400  0.003118
  0.577778  0.224308  0.129600  0.003333
  0.650000  0.224308  0.145800  0.003536
  0.722222  0.224308  0.162000  0.003727
  0.794444  0.224308  0.178200  0.003909
  0.866667  0.224308  0.194400  0.004083
  0.938889  0.224308  0.210600  0.004249
  1.011111  0.224308  0.226800  0.004410
  1.083333  0.224308  0.243000  0.004564
  1.155556  0.224308  0.259200  0.004714
  1.227778  0.224308  0.275400  0.004859
  1.300000  0.224308  0.291600  0.005000
  1.372222  0.224308  0.307800  0.005137
  1.444444  0.224308  0.324000  0.005271
  1.516667  0.224308  0.340200  0.005401
  1.588889  0.224308  0.356400  0.005528
  1.661111  0.224308  0.372600  0.005652
  1.733333  0.224308  0.388800  0.005774
  1.805556  0.224308  0.405000  0.005893
  1.877778  0.224308  0.421200  0.006009
  1.950000  0.224308  0.437400  0.006124
  2.022222  0.224308  0.453600  0.006236
  2.094444  0.224308  0.469800  0.006347
  2.166667  0.224308  0.486000  0.006455
  2.238889  0.224308  0.502200  0.006562
```

```
  2.311111  0.224308  0.518400  0.006667
  2.383333  0.224308  0.534601  0.006770
  2.455556  0.224308  0.550801  0.006872
  2.527778  0.224308  0.567001  0.006972
  2.600000  0.224308  0.583201  0.007071
  2.672222  0.224308  0.599401  0.007169
  2.744444  0.224308  0.615601  0.007265
  2.816667  0.224308  0.631801  0.007360
  2.888889  0.224308  0.648001  0.007454
  2.961111  0.224308  0.664201  0.007546
  3.033333  0.224308  0.680401  0.007638
  3.105556  0.224308  0.696601  0.007728
  3.177778  0.224308  0.712801  0.007818
  3.250000  0.224308  0.729001  0.007906
  3.322222  0.224308  0.745201  0.007993
  3.394444  0.224308  0.761401  0.008080
  3.466667  0.224308  0.777601  0.008165
  3.538889  0.224308  0.793801  0.008250
  3.611111  0.224308  0.810001  0.008334
  3.683333  0.224308  0.826201  0.008416
  3.755556  0.224308  0.842401  0.008499
  3.827778  0.224308  0.858601  0.008580
  3.900000  0.224308  0.874801  0.008661
  3.972222  0.224308  0.891001  0.008740
  4.044444  0.224308  0.907201  0.008819
  4.116667  0.224308  0.923401  0.010189
  4.188889  0.224308  0.939601  0.012755
  4.261111  0.224308  0.955801  0.016003
  4.333333  0.224308  0.972001  0.019752
  4.405556  0.224308  0.988201  0.023893
  4.477778  0.224308  1.004401  0.028347
  4.550000  0.224308  1.020601  0.033056
  4.622222  0.224308  1.036801  0.037969
  4.694444  0.224308  1.053001  0.043045
  4.766667  0.224308  1.069201  0.048250
  4.838889  0.224308  1.085401  0.053551
  4.911111  0.224308  1.101601  0.058921
  4.983333  0.224308  1.117801  0.064333
  5.055556  0.224308  1.134001  0.069864
  5.127778  0.224308  1.150201  0.076506
  5.200000  0.224308  1.166401  0.083372
  5.272222  0.224308  1.182601  0.090454
  5.344444  0.224308  1.198801  0.097745
  5.416667  0.224308  1.215001  0.105240
  5.488889  0.224308  1.231201  0.145809
  5.561111  0.224308  1.247401  0.387693
  5.633333  0.224308  1.263601  0.918980
  5.705556  0.224308  1.279801  1.609333
  5.777778  0.224308  1.296001  2.396484
  5.850000  0.224308  1.312201  3.220389
  5.922222  0.224308  1.328401  4.019635
  5.994444  0.224308  1.344601  4.736609
  6.066667  0.224308  1.360801  5.326568
  6.138889  0.224308  1.377001  5.769246
  6.211111  0.224308  1.393201  6.082441
  6.283333  0.224308  1.409401  6.420234
  6.355556  0.224308  1.425601  6.703064
  6.427778  0.224308  1.441801  6.974190
  6.500000  0.224308  1.458001  7.234955
  END FTABLE  1
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    0.8            PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    0.8            IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    0.76           PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    0.76           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   STAGE  1 1        1      WDM   1001 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
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       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

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

Project: Madrona Ridge
Task: Pond Overflows
Date: 2022-02-14
Author: Michael R Norton

Formula(s): $Q100 = 9.739DH^{\frac{3}{2}}$ (Figure III-3.2.16 (Riser Inflow Curves), 2014 Manual)

Where: D = the diameter of the riser (feet)
H = head above the riser (ft)

Q_100 = 3.21[LH^(3/2) + 2.4H^(5/2)]

Where: Q_100 100-Year Unmitigated Peak Flow
L Length of Weir (ft) (Minimum 6')

L=[(Q_100) / (3.21H^(3/2)]-2.4H

Pond 1

FREEBOARD Necessary above Top of Riser **Top of Live Storage:** 287.50

Q_100 (Unmitigated):	3.509	CFS						
Riser Diameter:	1.5	Feet						
	3.509	=	9.739	x	1.5	h^(1.5)		
	3.509	=	14.6085	x	h^(1.5)			
	0.240202622	=	h^(1.5)					
	h:	0.3865	feet	=	**4.64**	**Inches**		
	h^(1.5):	0.240284						

Secondary Overflow

Riser Diameter:	4	Feet						
	3.509	=	9.739	x	4	h^(1.5)		
	3.509	=	38.956	x	h^(1.5)			
	0.090075983	=	h^(1.5)					
	h:	0.201	feet	=	**2.41**	**Inches**		
	h^(1.5):	0.090114						

Emergency Overflow

Height:	**0.3**	ft	=	**3.6**	inches					
	L	=	Q_100	/	[3.21	*	H^(3/2)]	-	2.4	* H
	L	=	3.509	/	0.52746	-	0.72			
	L	=	**5.93**	**Feet**	(6-Feet Minimum)					

Top of Live Storage:	287.50	**Bottom of 6-Inch Freeboard:**	288.50
Flow Depth over Riser:	287.89		
Rim - Secondary Overflow:	287.95		
Flow Depth Over Secondary:	288.15		
Bottom of Spillway	288.20		
Spillway Flow Elevation:	288.50		
Top of Berm:	289.00		

Pond 2

FREEBOARD Necessary above Top of Riser **Top of Live Storage:** 272.50

Q_100 (Unmitigated):	4.1312	CFS						
Riser Diameter:	1.5	Feet						
	4.1312	=	9.739	x	1.5	h^(1.5)		
	4.1312	=	14.6085	x	h^(1.5)			
	0.282794264	=	h^(1.5)					
	h:	0.431	feet	=	**5.17**	**Inches**		
	h^(1.5):	0.282954						

Secondary Overflow

Riser Diameter:	4	Feet						
	4.1312	=	9.739	x	4	h^(1.5)		
	4.1312	=	38.956	x	h^(1.5)			
	0.106047849	=	h^(1.5)					
	h:	0.225	feet	=	**2.70**	**Inches**		
	h^(1.5):	0.106727						

Emergency Overflow

Height:	**0.25**	ft	=	**3**	inches					
	L	=	Q_100	/	[3.21	*	H^(3/2)]	-	2.4	* H
	L	=	4.1312	/	0.40125	-	0.72			
	L	=	**9.58**	**Feet**	(6-Feet Minimum)					

Top of Live Storage:	272.50	**Bottom of 6-Inch Freeboard:**	273.50
Flow Depth over Riser:	272.93		
Rim - Secondary Overflow:	273.00		
Flow Depth Over Secondary:	273.23		
Bottom of Spillway	273.25		
Spillway Flow Elevation:	273.50		
Top of Berm:	274.00		

Pond 3

FREEBOARD Necessary above Top of Riser **Top of Live Storage:** 278.50

Q_100 (Unmitigated):	2.5336	CFS						
Riser Diameter:	1.5	Feet						
	2.5336	=	9.739	x	1.5	h^(1.5)		
	2.5336	=	14.6085	x	h^(1.5)			
	0.173433275	=	h^(1.5)					
	h:	0.315	feet	=	**3.78**	**Inches**		
	h^(1.5):	0.176793						

Secondary Overflow

Riser Diameter:	4	Feet						
	2.5336	=	9.739	x	4	h^(1.5)		
	2.5336	=	38.956	x	h^(1.5)			
	0.065037478	=	h^(1.5)					
	h:	0.165	feet	=	**1.98**	**Inches**		
	h^(1.5):	0.067023						

Emergency Overflow

Height:	**0.25**	ft	=	**3**	inches					
	L	=	Q_100	/	[3.21	*	H^(3/2)]	-	2.4	* H
	L	=	2.5336	/	0.40125	-	2			
	L	=	**4.31**	**Feet**	(6-Feet Minimum)					

Top of Live Storage:	278.50	**Bottom of 6-Inch Freeboard:**	279.50
Flow Depth over Riser:	278.82		
Rim - Secondary Overflow:	278.85		
Flow Depth Over Secondary:	279.02		
Bottom of Spillway	279.10		
Spillway Flow Elevation:	279.35		
Top of Berm:	280.00		

Pond 4

FREEBOARD Necessary above Top of Riser — **Top of Live Storage:** 266.50

Q_100 (Unmitigated):	1.2067	CFS						
Riser Diameter:	1.5	Feet						
	1.2067	=	9.739	x	1.5	h^(1.5)		
	1.2067	=	14.6085	x	h^(1.5)			
	0.082602594	=	h^(1.5)					
	h:	0.19	feet	=	**2.28**	**Inches**		
	h^(1.5):	0.082819						

Secondary Overflow

Riser Diameter:	4	Feet						
	1.2067	=	9.739	x	4	h^(1.5)		
	1.2067	=	38.956	x	h^(1.5)			
	0.030975973	=	h^(1.5)					
	h:	0.099	feet	=	**1.19**	**Inches**		
	h^(1.5):	0.03115						

Emergency Overflow

Height:	**0.25**	ft	=	**3**	inches					
	L	=	Q_100	/	[3.21	*	H^(3/2)]	-	2.4	* H
	L	=	1.2067	/	0.40125	-	0.72			
	L	=	**2.29**	**Feet**	(6-Feet Minimum)					

Top of Live Storage:	266.50	**Bottom of 6-Inch Freeboard:**	267.50
Flow Depth over Riser:	266.69		
Rim - Secondary Overflow:	266.75		
Flow Depth Over Secondary:	266.85		
Bottom of Spillway	266.90		
Spillway Flow Elevation:	267.15		
Top of Berm:	268.00		

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Mar 22 2022

12-Inch Pipe Capacity

Circular

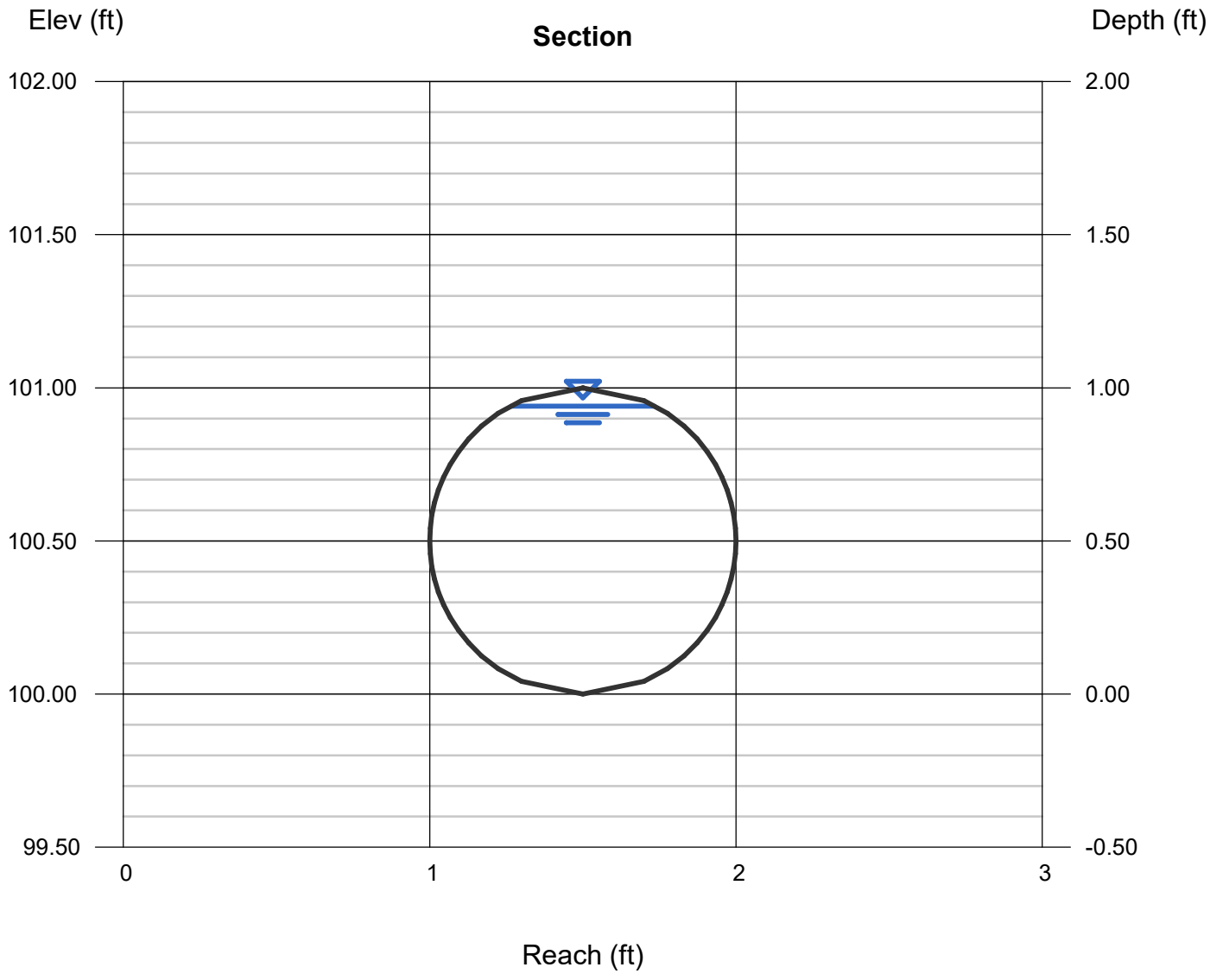
Diameter (ft)	= 1.00
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Q vs Depth
No. Increments	= 50

Highlighted

Depth (ft)	= 0.94
Q (cfs)	= 2.934
Area (sqft)	= 0.77
Velocity (ft/s)	= 3.83
Wetted Perim (ft)	= 2.65
Crit Depth, Yc (ft)	= 0.74
Top Width (ft)	= 0.47
EGL (ft)	= 1.17



Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Tuesday, Mar 22 2022

18-Inch Pipe Capacity

Circular

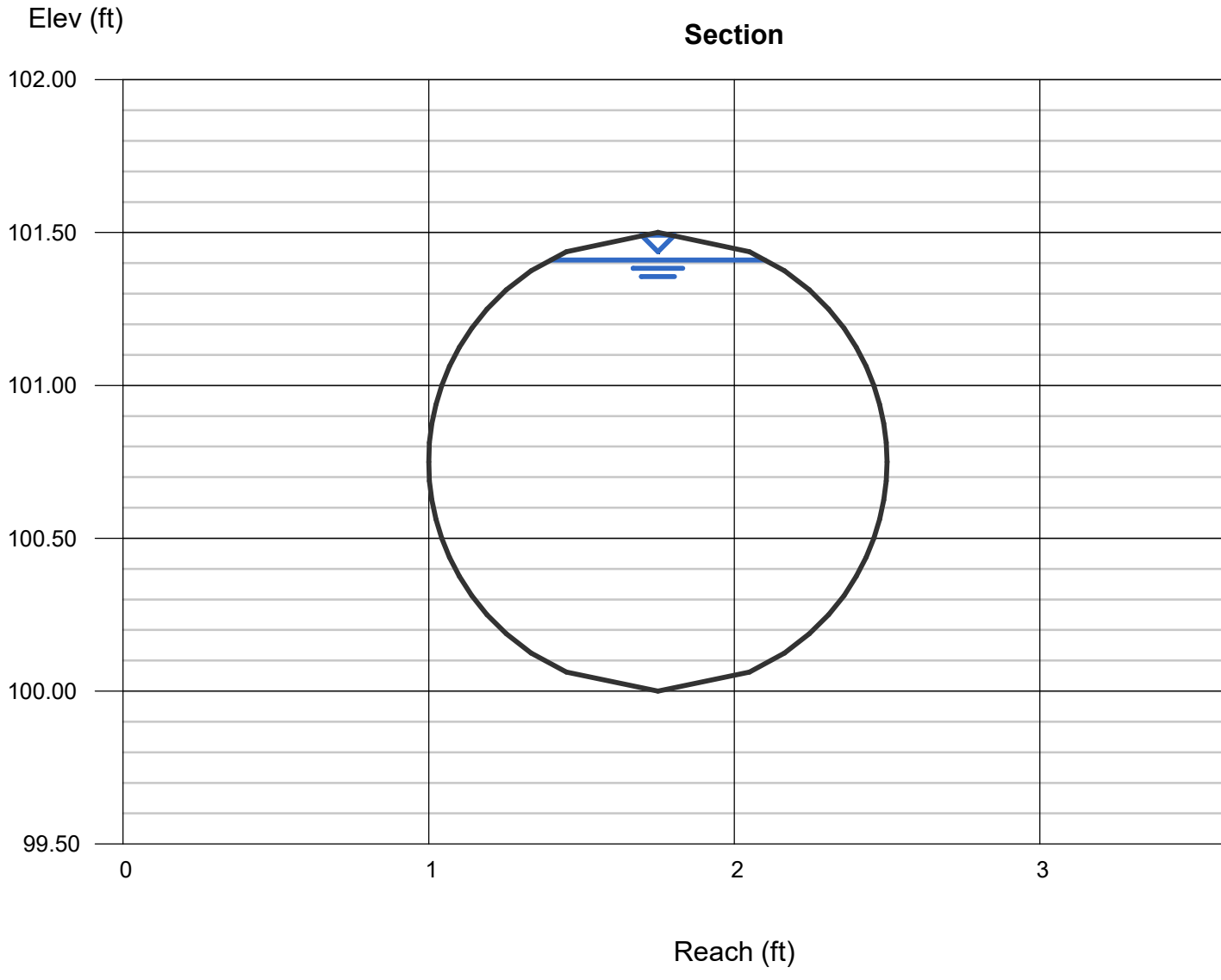
Diameter (ft)	= 1.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Q vs Depth
No. Increments	= 50

Highlighted

Depth (ft)	= 1.41
Q (cfs)	= 8.653
Area (sqft)	= 1.72
Velocity (ft/s)	= 5.02
Wetted Perim (ft)	= 3.98
Crit Depth, Yc (ft)	= 1.14
Top Width (ft)	= 0.71
EGL (ft)	= 1.80



APPENDIX B

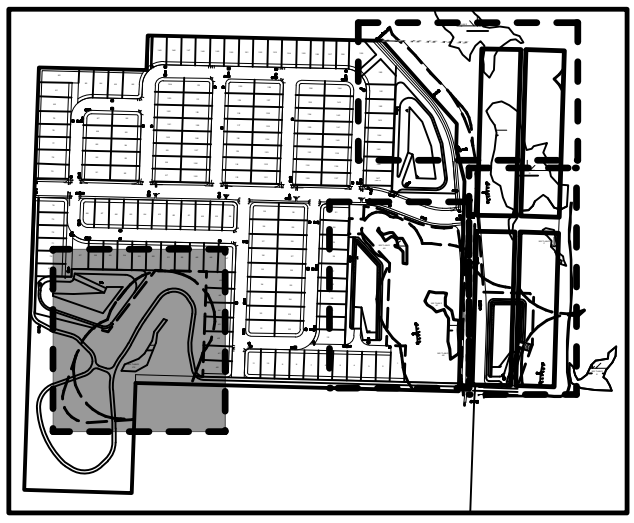
Critical Areas Map

CRITICAL AREA STUDY & BUFFER MITIGATION PLAN MAP (SHEET 2)

MADRONA RIDGE - RAINIER STREET

PORTION OF SECTION 9, TOWNSHIP 30N, RANGE 1E, W.M.

INSET 1



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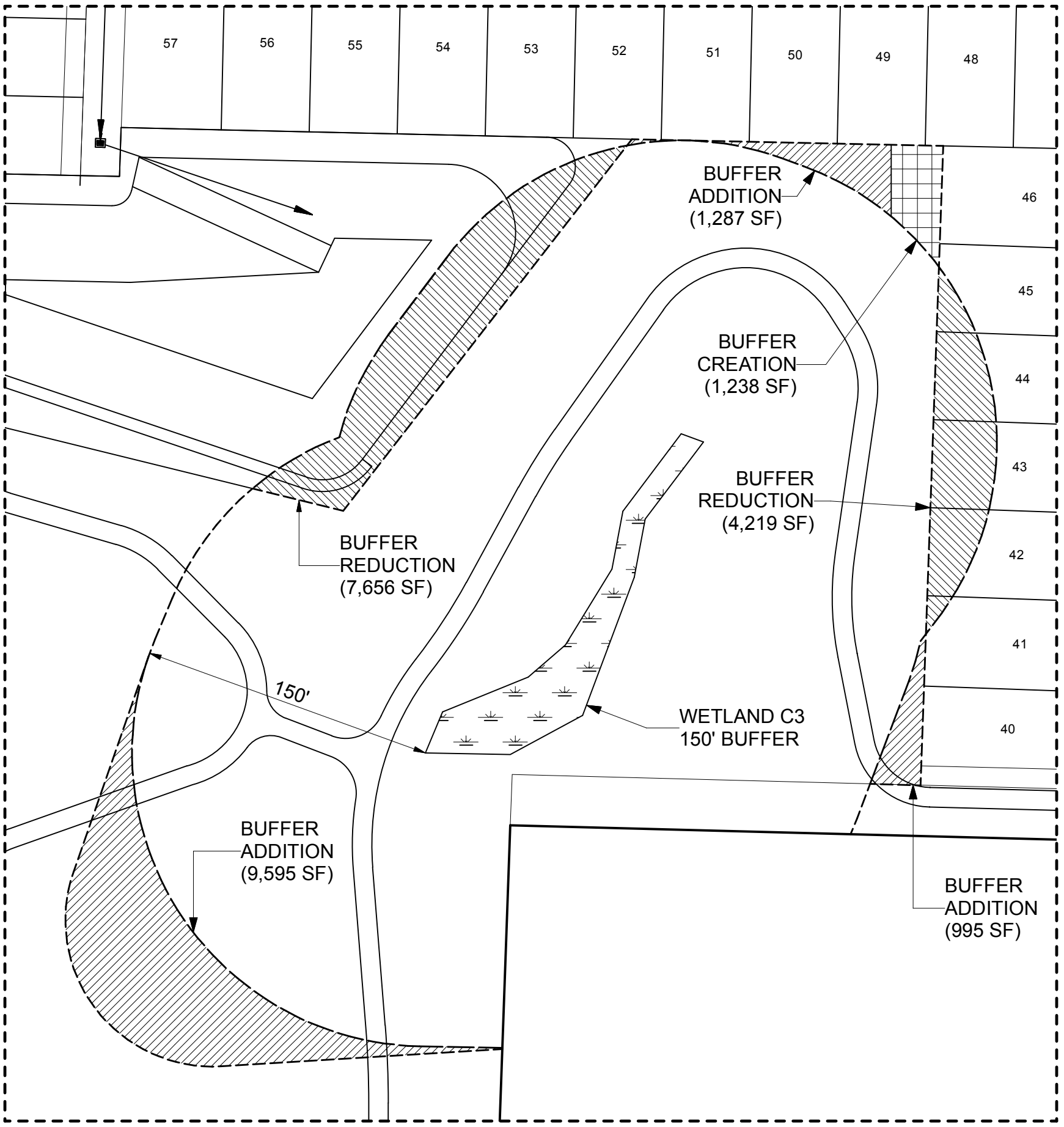


Scale 1" = 60'

0 30 60 90 120

LEGEND

- WETLAND
- BUFFER ADDITION
- BUFFER REDUCTION
- STANDARD BUFFER
- PERMANENT BUFFER IMPACT
- TEMPORARY BUFFER IMPACT
- BUFFER CREATION
- FINAL BUFFER

Wetland Resources, Inc.
Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance
9505 19th Avenue S.E. Suite 106 Everett,Washington 98208
Phone: (425) 337-3174
Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

Critical Area Study &
Buffer Mitigation Plan Map
Madrona Ridge
Port Townsend

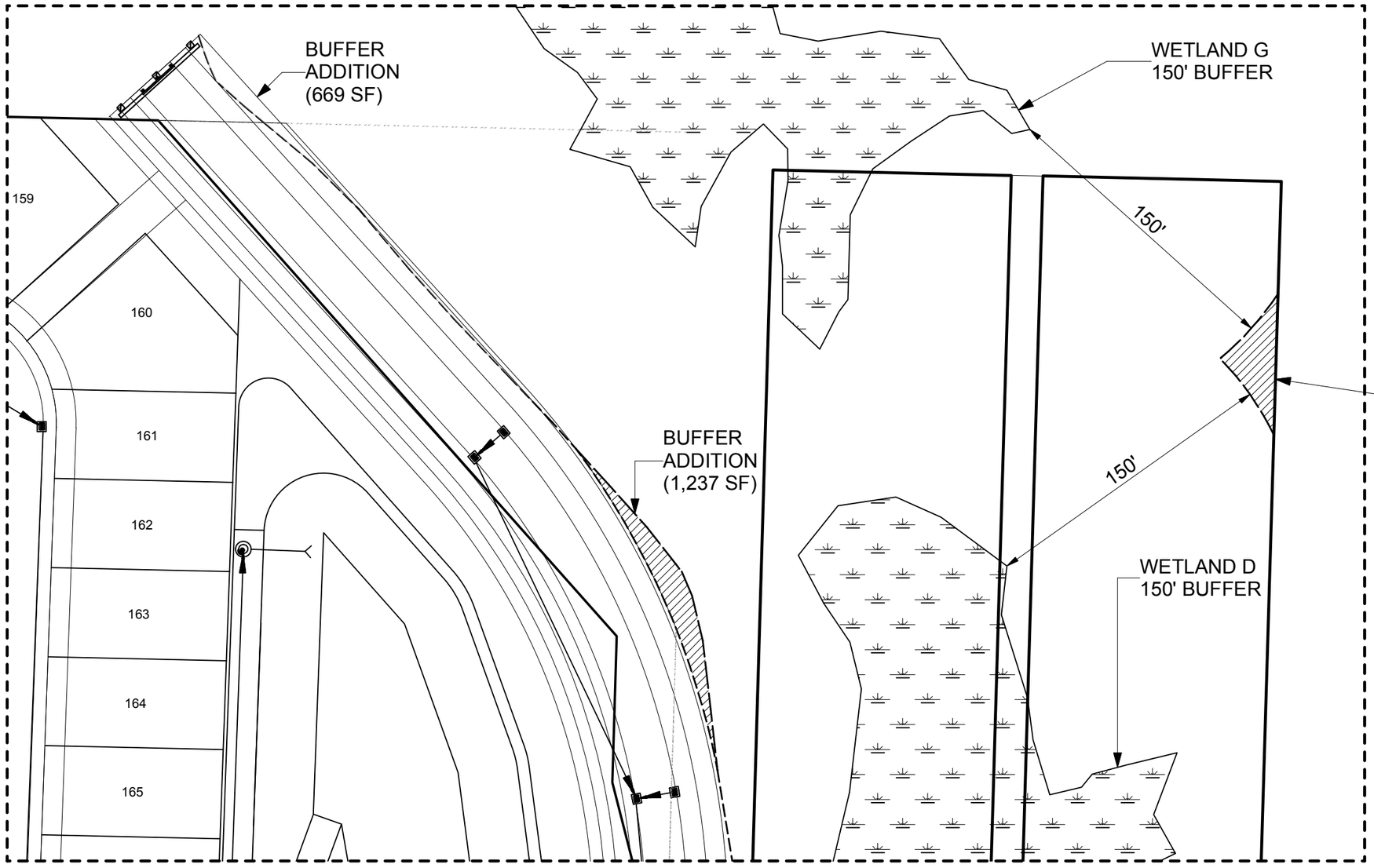
MonteBanc Management LLC
Attn:Chip McBroom
6230 Hollywood Blvd
Sarasota FL, 34231

Sheet 2/5
WRI #: 21224
Drawn by: EC
Date: 12/23/2021

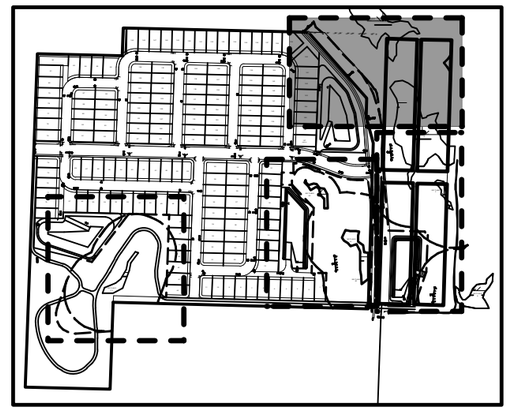
CRITICAL AREA STUDY & BUFFER MITIGATION PLAN MAP (SHEET 3)

MADRONA RIDGE - RAINIER STREET

PORTION OF SECTION 9, TOWNSHIP 30N, RANGE 1E, W.M.



INSET 2



LEGEND

WETLAND	PERMANENT BUFFER IMPACT
BUFFER ADDITION	TEMPORARY BUFFER IMPACT
BUFFER REDUCTION	BUFFER CREATION
STANDARD BUFFER	FINAL BUFFER

Scale 1" = 60'

0 30 60 90 120

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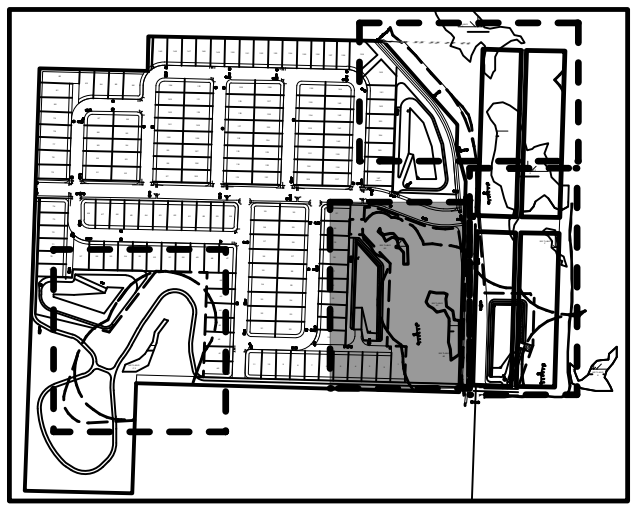
WRI #: 21224
Drawn by: EC
Date: 12/23/2021

CRITICAL AREA STUDY & BUFFER MITIGATION PLAN MAP (SHEET 4)

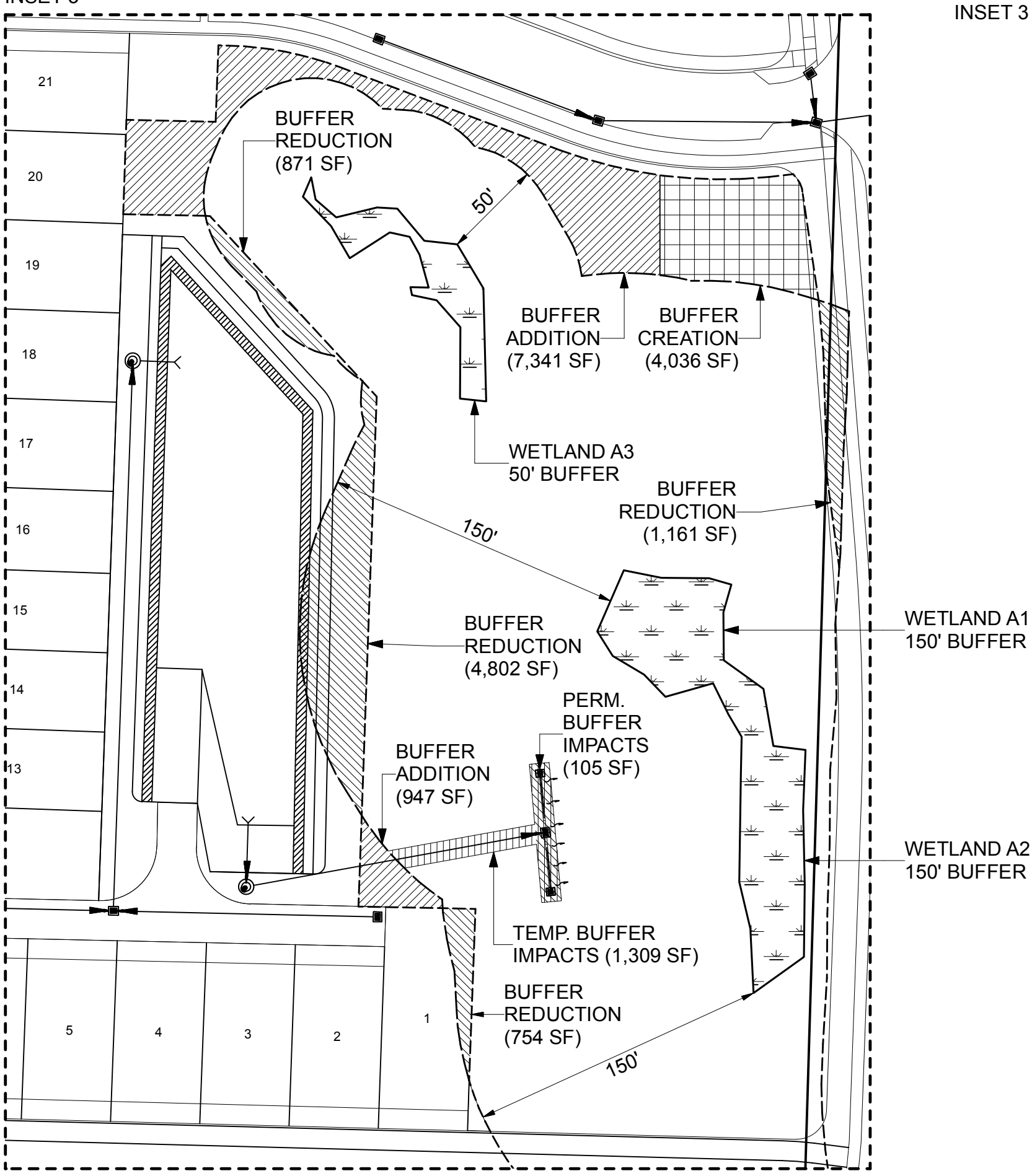
MADRONA RIDGE - RAINIER STREET

PORTION OF SECTION 9, TOWNSHIP 30N, RANGE 1E, W.M.



INSET 3

INSET 3



LEGEND

- WETLAND
- PERMANENT BUFFER IMPACT
- BUFFER ADDITION
- TEMPORARY BUFFER IMPACT
- BUFFER REDUCTION
- BUFFER CREATION
- STANDARD BUFFER
- FINAL BUFFER

Scale 1" = 60'

0 30 60 90 120

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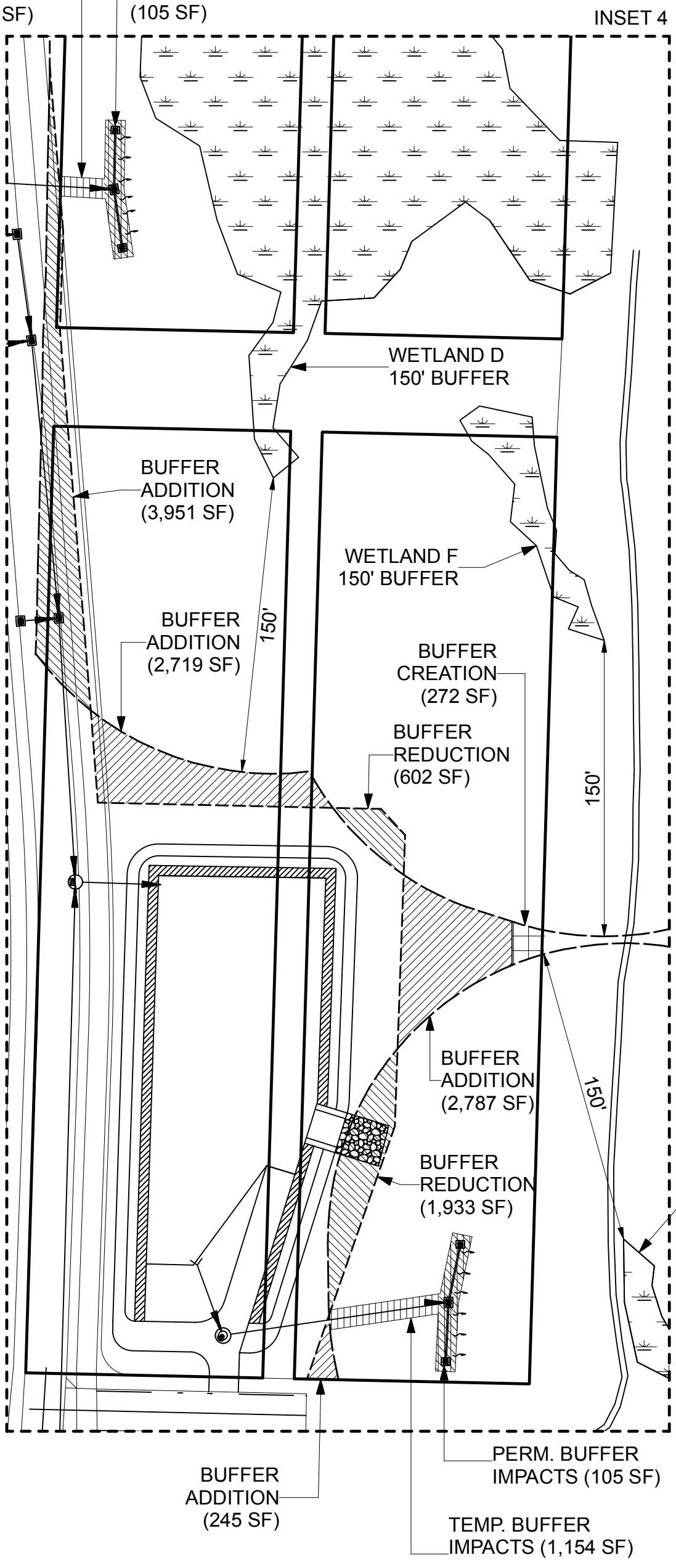
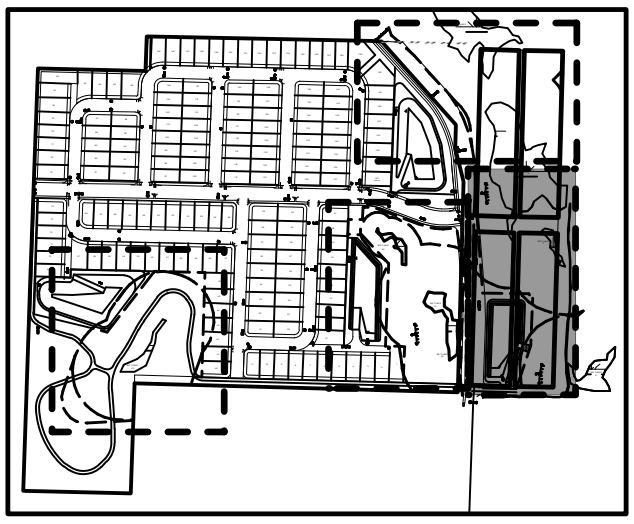
CRITICAL AREA STUDY & BUFFER MITIGATION PLAN MAP (SHEET 5)

MADRONA RIDGE - RAINIER STREET

PORTION OF SECTION 9, TOWNSHIP 30N, RANGE 1E, W.M.





LEGEND	
WETLAND	PERMANENT BUFFER IMPACT
BUFFER ADDITION	TEMPORARY BUFFER IMPACT
BUFFER REDUCTION	BUFFER CREATION
STANDARD BUFFER	FINAL BUFFER

Scale 1" = 60'

0 30 60 90 120

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WRI #: 21224
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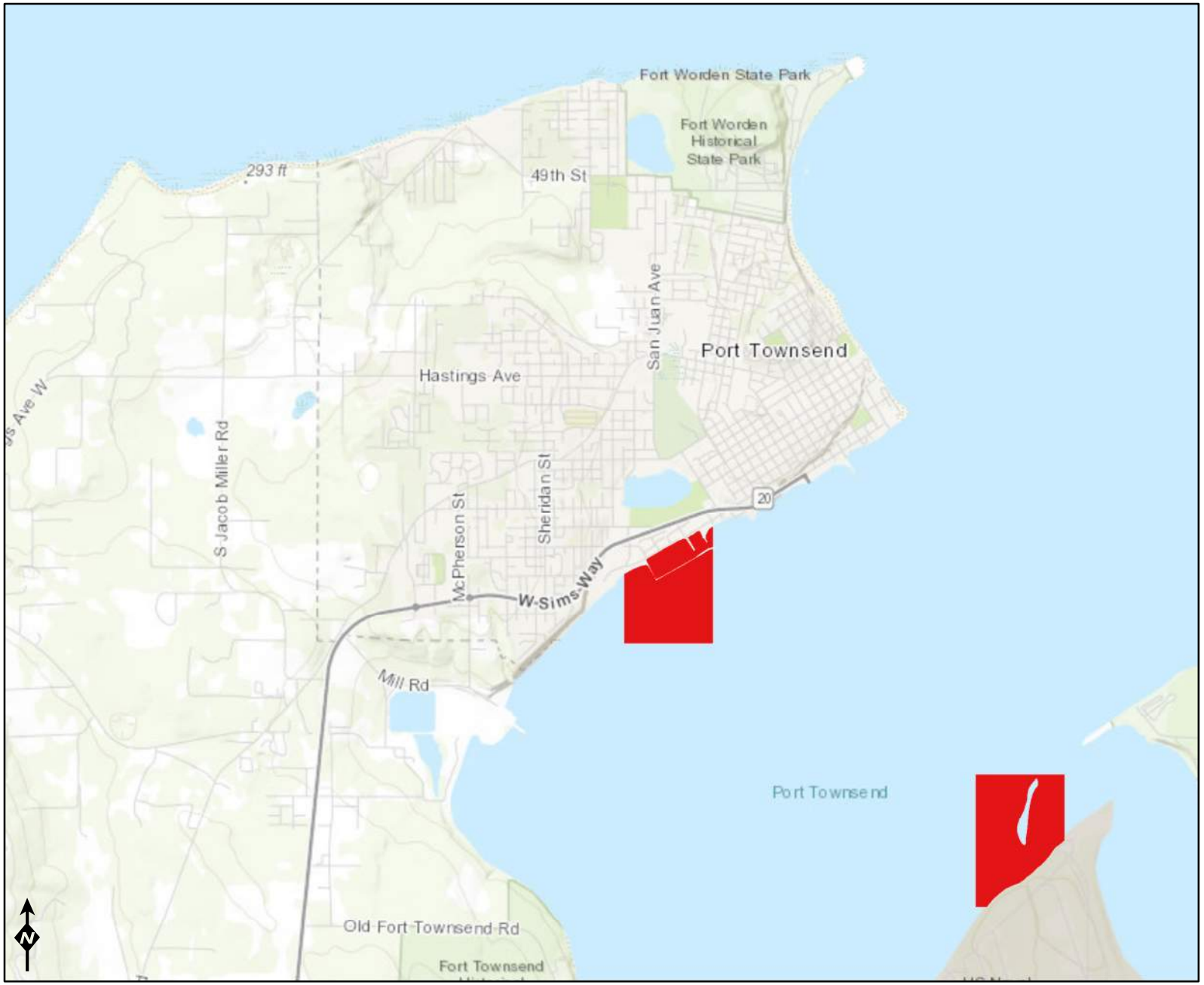
Date: 12/23/2021

APPENDIX C

Category 5, 303(d) Listings

July 27, 2021

Water Quality Atlas



Assessed Water/Sediment

Water
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment
- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Miles
0 0.5 1 2

DEPARTMENT OF ECOLOGY
State of Washington

Category 5, 303(d) Listings

Listing ID	Parameter	Details
63391	Benzo(a)anthracene	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63391
63392	Benzo(a)pyrene	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63392
63393	Benzo(b)fluoranthene	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63393
63394	Benzo(k)fluoranthene	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63394
63395	Chrysene	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63395
63396	Dibenzo(a,h)anthracene	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63396
63404	Indeno(1,2,3-c,d)pyrene	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63404
63410	Polychlorinated Biphenyls (PCBs)	https://apps.ecology.wa.gov/approvedwqa/approvedpages/viewapprovedlisting.aspx?LISTING_ID=63410