



East Hill

Drainage Report

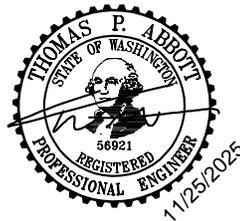
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SECTION 1: PROJECT OVERVIEW

The proposed East Hill project is an approximately 208.64-acre site. The proposed project is a Residential Ultra Low Capacity and Master Plan Neighborhood development on 19 parcels addressed at 8904 Tveit Rd Arlington, WA 98223. See parcel table in Appendix 1.4 for more detail. The project proposes to construct 670 single family homes on the site. Road extension from Tveit Rd to Burn Rd is proposed under a separate permit. A public road system will be constructed to facilitate access to the site. Public utilities are proposed to be extended to serve the site. See the Vicinity Map in Appendix 1 for visual representation of the subject property.

Existing Site

A few of the parcels are currently occupied by single family homes and associated structures. The project parcels are currently zoned RULC (Residential Ultra Low Capacity), MPN (Master Plan Neighborhood). Existing ground cover is a combination of trees, brush, grass, and gravel.

The proposed development will exist within the bounds of 2 stormwater threshold discharge areas (TDAs) as not all site runoff from developed surfaces meets within ¼ mile from the project site downstream. Soundview Consultants LLC has prepared a Wetlands Critical Areas Report dated February of 2024 on the site. Multiple wetlands and five streams were identified by Soundview on the site. See the Critical Areas Report from Soundview for more detail.

A Geotechnical Report has been prepared by Terra Associates, Inc. dated June, 2024 on the site. Please reference the geotechnical report for detailed soils information. Slopes on the site, as confirmed by the Geotechnical Report, vary by area. Elevation changes of up to 350ft occur on the site, with steep portions largely located on the northern or northwestern portions of the site. Slopes on the site generally descend from south towards the north. Terra Associates lists potential erosion hazards and landslide hazards, especially regarding the steep bluffs on the north end of the site.

Areas of known landslide activity border the northerly end of the site, namely the northern portions of Basins 1, 2 and 7. Terra has recommended development buffers from those steep slope areas unless mitigation is proposed. All lots will be set back the recommended distance defined by Terra in their report. See Geotechnical Report for more detail.

Proposed Development

The proposed project will construct 670 single family residential lots and access road network. Emergency and standard access drives along with associated private and public utilities are proposed to serve project development. It is anticipated that phasing out of lot development will occur. These phases will be determined at a later date. It is anticipated that the "Spine Road" (the extension of Tveit Road through the site to Burn Road) will be constructed for the length of roadway that can be constructed upon land legally owned for development before other development begins of the phased lot development. The Spine Road is proposed under a separate permit and project number.

Proposed Drainage System

This project is designed to comply with the 2024 Department of Ecology Stormwater Manual for Western Washington (2024 DOE SWMWW). Stormwater will be mitigated via multiple detention vaults and ponds located on the site.

Onsite development will disturb 100.06 AC which will be collected to multiple detention vaults and ponds for mitigation and stormwater quality treatment. These include 9 collection basins across 2 different TDAs. TDA 1 contains 8 basins, constituting the majority of onsite area. TDA 1 drains to Eagle Creek via multiple Flowpaths. TDA 2 contains approximately 3.12 AC of onsite area and drains east and north. TDA 2 drains to Eagle Creek offsite, having exceeded the 0.25 mile flowpath after leaving the site prior to joining Eagle Creek. Separate ponds and stormwater infrastructure are proposed for the Spine Road project to be completed under a separate permit and project number. These basins are shown visually on basins maps included within this report for reference only. They are not calculated or modeled within WWHM for flow control sizing in this report.

Proposed new pollution generating impervious surfaces (PGIS) will exceed the 5,000 SF threshold and thus basic water quality treatment will be provided via a water quality treatment structure that treats stormwater runoff after discharge from the various stormwater detention vaults and ponds. StormFilter water quality treatment units are proposed for this purpose. Design of water quality treatment units will be submitted with a later submittal date.

The proposed detention and water quality treatment systems will discharge to wetland and stream buffers onsite to preserve natural drainage pattern and comply with Minimum Requirement #8. Additional data collection is necessary to accurately model onsite drainage to comply with MR #8. Additional data and modeling will be provided at a later submittal. This report includes modeling that shows compliance with MR #7 to ensure project feasibility. Flow from the majority of the site will be released into TDA 1 where runoff will eventually join the different forks of Eagle Creek, a tributary of the Stillaguamish River.

Erosion/Sedimentation Control

Erosion control measures that will be utilized during construction will include a combination of silt fence, storm drain inlet protection, interceptor swales, and sediment ponds. See Section 2.0 for discussion of how SWPP Elements are addressed.

Minimum Requirements

Per the 2024 DOE Manual, Minimum Requirements 1-9 apply to the proposed development.

Minimum Requirement #1: Preparation of Stormwater Site Plans

This report along with the preliminary plans satisfies the minimum requirement.

Minimum Requirement #2: Construction Stormwater Pollution Prevention

See Section 2 of this Report for the SWPPP BMP Elements, and the SWPP (submitted as a separate document) for a complete discussion of erosion control BMP's and their use specific to the site.

Minimum Requirement #3: Source of Pollution

Permanent source control BMPs are not applicable for the subject site since the associated activities for the new residence do not fall within the types of facilities listed within Volume IV of the DOE Manual (Residential developments are not required to implement source control BMP's). BMPs for erosion and sedimentation control will be specified in the Construction Plans and the CSWPP.

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

Flow from the site will preserve its natural drainage patterns, generally flowing south to north. Two TDAs are identified on site, with TDA 1 encompassing the vast majority of the site. Multiple flowpaths leave TDA 1 via the various forks of Eagle Creek. All Flowpaths in TDA 1 meet within 0.25 miles of the site before eventually joining the South Fork Stillaguamish River. TDA 1 is further subdivided into "basins" for purposes of later Minimum Requirement #8 modeling.

TDA 2 consists of the southwest corner of the site. A small wetland outflows towards the east, with flows going into drainage ditches along 200th St NE and continuing past the 0.25 mile boundary of analysis before eventually joining Eagle Creek and the South Fork Stillaguamish.

Minimum Requirement #5: On-Site Stormwater Management

The project proposes 5 detention vaults and 2 ponds to provide flow control. All flows will be released to their natural outfall. In addition, BMP T5.13 soils are to be underlain within all pervious areas that are disturbed by development. The geotechnical report notes that infiltration and/or dispersion of stormwater flow upgradient of the landslide hazard areas will not be feasible due to site soils and the potential to cause issues with slope stability.

Minimum Requirement #6: Runoff Treatment

As the project will exceed the 5,000 SF threshold of new/replaced PGIS, the project is required to provide basic water quality treatment per the 2024 DOE Manual. StormFilters will be utilized to provide the required water quality treatment.

Minimum Requirement #7: Flow Control

Multiple detention units will be used on site to provide flow control. 5 detention vaults and 2 ponds are planned to mitigate runoff and release stormwater at historical rates to their natural drainage pattern.

Minimum Requirement #8: Wetlands Protection

Soundview Consultants prepared a Critical Areas report dated February, 2024 identifying multiple wetlands and streams on site. Minimum Requirement #8 stipulates that hydroperiod modeling will be required for this site, however further study by the Wetland Consultant is ongoing. Hydroperiod modeling will be completed following the end of this study.

Minimum Requirement #9: Operation and Maintenance

See Operations and Maintenance in Section 6 of this report.

SECTION 2: TEMPORARY EROSION AND SEDIMENT CONTROL DESIGN

SWPPP Design Elements

A Construction Stormwater Pollution Prevention Plan (SWPPP) will be provided prior to construction. The SWPPP report is modeled under the guidelines of the 2024 DOE Manual. Construction SWPPP Elements #1 through #13 are addressed below.

Element #1 – Mark Clearing Limits

All clearing limits will be delineated with high visibility plastic fence and/or silt fence. See sheets ER-01 of the construction plans for locations and details.

Element #2 – Establish Construction Access

Stabilized construction accesses will be installed as shown on the preliminary plans. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #3 – Control Flow Rates

Mitigation of construction period runoff will be provided by level spreaders to facilitate full dispersion. Flow will be slowed by check dams before entering the permanent storm drainage system and being dispersed on site per BMP T5.30. See sheets ER-01 of the construction plans for location and details for flow and sediment control BMP's.

Element #4 – Install Sediment Controls

Silt fence, catch basin protection, and check dams will be utilized to contain sediments within the project's clearing limits. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #5 – Stabilize Soils

Exposed soils will be stabilized as specified in the Grading and Erosion Control Notes with temporary and permanent seeding, mulching, and plastic covering. See sheet ER-02 of the construction plans at a future date for notes.

Element #6 – Protect Slopes

Slopes can be steep on the site. Soils will be stabilized as specified in the Grading and Erosion Control Notes. Slopes shall be protected as specified under Element #5.

Element #7 – Protect Drain Inlets

Storm drain inlet protection will be utilized to contain sediments within the project's clearing limits. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #8 – Stabilize Channels and Outlets

Temporary channels shall be stabilized with check dams. See sheets ER-01 and ER-02 of the construction plans at a future date for locations and details.

Element #9 – Control Pollutants

Pollutants shall be controlled as specified in Volume IV of the 2024 DOE Manual—Source Control BMPs to address potential sources of pollution which may exacerbate possible soil/groundwater contamination identified onsite.

Element #10 – Control De-Watering

There will be no de-watering as a part of this project. See sheet ER-02 of the construction plans at a future date for notes.

Element #11 – Maintain BMPs

Maintenance of the BMPs is specified within the Construction Sequence and Grading and Erosion Control Notes. See sheets ER-01 and ER-02 of the construction plans for the Construction Sequence and notes.

Element #12: Manage the Project

The Grading and Erosion Control Notes specify seasonal work limitations. Maintenance of the BMPs is specified within the Construction Sequence and Grading and Erosion Control Notes. See sheets ER-01 and ER-02 of the construction plans at a future date for the Construction Sequence and notes.

Element #13: Protect on-site stormwater management BMPs

On-site stormwater management BMPs used for runoff from roofs and other hard surfaces are not feasible due to soil conditions and proposed project density.

SECTION 3: DOWNSTREAM ANALYSIS

Task 1. Study Area Definition and Maps

Snohomish County maps, surveying, and aerial photography were the best references to the site's topography. The limits of the downstream analysis extend roughly 0.25 miles beyond the subject property's natural discharge locations.

Task 2. Resource Review

All of the resources below have been reviewed for existing and potential issues near the project site:

Adopted Basin Plans

No Adopted Basin Plans were located that include the project site.

Drainage Basin

This site is in the Stillaguamish Basin, the Lower South Fork Stillaguamish sub-basin, within the South Fork Stillaguamish watershed. Discharge from the proposed development is divided into two TDAs, TDA 1 and TDA 2 respectively. TDA 1 will discharge north into various forks of Eagle Creek, a tributary of the South Fork Stillaguamish. TDA 2 drains east and north, eventually reaching Eagle Creek offsite after passing the 0.25 mile boundary of analysis. Eagle Creek is a tributary of the South Fork Stillaguamish River.

Floodplain / Floodway (FEMA) maps

Per FEMA Floodplain map #53061C0415F the subject property is not within a floodplain.

Critical Areas Map

There are multiple wetlands located across the site. There are steep slopes and a landslide hazard zone. See section 7 for a complete list of reports prepared for the project including a Critical Areas Report and a Geotechnical Report.

Drainage Complaints

No relevant issues were identified near the proposed site.

Road Drainage Problems

No issues were identified near the proposed site.

Soil Survey

Site soils are classified as Alderwood gravelly sandy loam (0 to 8 percent slopes) which is classified as Hydrologic Soil Group B, Norma Loam which is classified as Hydrologic Soil Group B/D, Pastik silt loam (8 to 25 percent slopes) which is classified as Hydrologic Soil Group C, Ragnar fine sandy loam (0 to 8 percent) which is classified as Hydrologic Soil Group A, Tokul gravelly medial loam (0 to 8 percent) which is classified as Hydrologic Soil Group B, Tokul gravelly medial loam (8 to 15 percent) which is classified as Hydrologic Soil Group B, Tokul gravelly medial loam (15 to 30 percent) which is classified as Hydrologic Soil Group B, and Tokul-Winston gravelly loams (25 to 65 percent) which is classified as Hydrologic Soil Group C.

Per the Geotechnical report, the site lies within an area where infiltration is considered infeasible.

Wetland Inventory Maps

Wetlands are identified to be on, or immediately adjacent to, the project site. Reference the critical areas report submitted with this report for additional information regarding the wetland areas onsite.

Migrating River Studies

Migrating River Studies are not considered applicable to the proposed development.

Section 303d List of Polluted Waters

Washington State Department of Ecology's Water Quality Assessment for Washington contains no listings for water sources within the sites ¼ mile boundary.

Water Quality Problems

Washington State Department of Ecology's Water Quality Assessment for Washington contains no listings for water sources within the sites ¼ mile boundary.

Stormwater Compliance Plans

Not applicable to the proposed project.

Task 3. Field Inspection/Downstream Analysis

On April 2nd, 2025, a Downstream Analysis was performed at the site. The weather consisted of 57°F and partially cloudy skies. The following observations were verified during the visit.

The subject property consists of steep bluffs leading to a more moderately graded plateau bisected by a ravine. Ground cover consisted primarily of forest and brush. Four branches of Eagle Creek flow through the site, with the stream being fed by several wetlands located throughout the site. Three Flowpaths were identified leaving the site.

TDA 1:

Flowpath 1 is further componentized into Flowpaths 1A, 1B, 1C, and 1D and consist of the forks of Eagle Creek. Flowpath 1A runs along the western edge of the site, flowing due north until it is joined by Flowpath 1B and 1C.

Flowpath 1B is a small fork of Eagle creek descending from the western plateau on the site. Flowpath 1B flows due north into the lowlands at the north end of the site before veering west and joining Flowpath 1A on its northerly course.

Flowpath 1C is the middle fork of Eagle Creek, which runs through the ravine at the center of the site and flows due north for much of its length. As it nears the property line, Flowpath 1C turns west and joins Flowpath 1A and 1B before crossing Tveit Rd via a culvert. The combined flow of Flowpaths 1A, 1B, and 1C continues north until it reaches the corner of 215th St NE and 88th Dr NE at which point it turns east and joins with Flowpath 1D.

Flowpath 1D begins off-site and flows through the northeastern corner of the site. Flow is directed northwest through the property and passes under Tveit Rd via a culvert. Flow continues northwest until Flowpath 1D joins Flowpaths 1A, 1B, and 1C at the corner C of 215th St NE and 88th Dr NE. Flowpath 1 then continues on past the 0.25 mile boundary of analysis until it joins the South Fork Stillaguamish River.

TDA 2:

Flowpath 2 begins on the southeastern edge of the site and flows due east until it reaches 95th Ave NE. Flow was observed leaving the site and joining the existing drainage ditch along the road where it is conveyed north and then east along 200th St NE beyond the 0.25 mile boundary of analysis.

Flowpath 3 is specific to the Spine Road, with flow control and water quality handled under a separate permit and drainage report. Flows from Flowpath 3 are carried west from the southwest corner of the site, joining the drainage ditch along the eastern side of Burn Rd. Flow is then conveyed west across the roadway via a culvert, whereupon the flow joins Portage Creek. Portage Creek flows northward, following Burn Rd until the intersection of Old Burn Rd and Stillaguamish Ave where it crosses Burn Rd via a culvert. Flowpath 3 continues north, crossing under 207th St NE before veering west under Stillaguamish Ave and passing the 0.25 mile boundary of analysis.

Task 4. Drainage System Description and Problem Descriptions

Based on the information available and all the resources available including visual inspection of the downstream flow path to the ¼-mile boundary, there is no evidence of existing or anticipated downstream drainage problems. All flows are adequately carried through natural channels to the quarter mile buffer of analysis.

Task 5. Mitigation of Existing or Potential Drainage Problems

No evidence of existing or potential problems with downstream drainage conveyance infrastructure was found. Mitigation is not required.

SECTION 4: DETENTION AND WATER QUALITY TREATMENT DESIGN

4.1 Predeveloped TDAs and Basins

Predeveloped conditions on the site consist of forested area broken into two separate Threshold Discharge Areas (TDAs), designated TDA 1 and 2 respectively. TDA 1 is further subdivided into Basins 1-8. See the TDA Map in the Appendix 4. Table 1 breaks down the areas for the basins and TDAs and includes the detention system each basin will flow to. Basins that share a detention system will be combined for modeling purposes.

Table 1: Predeveloped TDAs and Basins

Drainage Basins			
TDA	Basin	Area (AC)	Detention #
1	1	45.00	Vault A
	2	10.60	Vault B
	3	14.45	Vault C
	4	6.53	Pond A
	5	4.73	Vault D
	6	4.26	Vault E
	7	7.95	Vault D
	8	3.42	Vault D
	Total	96.94	
2	9	3.12	Pond B

The pre-developed and developed conditions were modeled in WWHM for the purpose of matching predeveloped flow durations. Based on the site location, the WWHM used the Everett Gage with a Precipitation Scale factor of 1.2. For visual representation of the listed basins, see Figure 4.0, "Predeveloped Hydrology Map". Runoff from some of these basins will be combined in the developed condition, thus these basins have been combined in the predeveloped condition for the sake of modeling.

4.1.1 TDA-1

The following basins are tributary to Eagle Creek. Though each basin is tributary to the same threshold discharge basin with regard to the project site per DOE Manual definitions of a Threshold Discharge Basin, each subbasin has been split out with various flow control facilities to ensure that various critical areas are hydrated and historic downstream flowpaths for onsite streams and wetlands are adequately hydrated.

Basin 1:

The predeveloped condition applied to Basin 1 results in a forested land cover condition. The values as modeled in WWHM are as follows:

Table 2: Predeveloped Conditions for Basin 1

Basin 1	
<u>Ground Cover</u>	<u>Area (acre)</u>
Forest, steep	45.00
Total	45.00

Basin 2:

The predeveloped condition applied to the combined Basin 2 results in a forested land cover condition and routed to Vault B in the developed condition. The values as modeled in WWHM are as follows:

Table 3: Predeveloped Conditions for Basin 2

Basin 2	
<u>Ground Cover</u>	<u>Area (acre)</u>
Forest, steep	10.60
Total	10.60

Basin 3:

The predeveloped condition applied to Basin 3 results in a forested land cover condition and routed to Vault C in the developed condition. The values as modeled in WWHM are as follows:

Table 4: Predeveloped Conditions for Basin 3

Basin 3	
<u>Ground Cover</u>	<u>Area (acre)</u>
Forest, steep	14.45
Total	14.45

Basin 4:

The predeveloped condition applied to Basin 4 results in a forested land cover condition and routed to Pond A in the developed condition. The values as modeled in WWHM are as follows:

Table 5: Predeveloped Conditions for Basin 4

Basin 4	
<u>Ground Cover</u>	<u>Area (acre)</u>
Forest, steep	6.53
Total	6.53

Basins 5, 7, & 8:

The predeveloped condition applied to combined areas of Basins 5 (4.73 AC), 7 (7.95 AC), and 8 (3.42 AC) results in a forested land cover condition as they will be combined and routed to Vault D in the developed condition. The values as modeled in WWHM are as follows:

Table 6: Predeveloped Conditions for Basins 5, 7, & 8

Basins 5, 7, & 8	
<u>Ground Cover</u>	<u>Area (acre)</u>
Forest, steep	16.10
Total	16.10

Basin 6:

The predeveloped condition applied to Basin 6 results in a forested land cover condition and routed to Vault E in the developed condition. The values as modeled in WWHM are as follows:

Table 7: Predeveloped Conditions for Basin 6

Basin 6	
<u>Ground Cover</u>	<u>Area (acre)</u>
Forest, steep	4.26
Total	2.99

4.1.2 TDA-2

This basin is tributary to Eagle Creek. This basin drains north and east via wetland flow near the corner of 200th St NE and 95th Ave NE. Downstream flow from this basin does not converge within flowpaths from any portion of TDA-1 within 0.25 miles of the site and is thus considered a different TDA. A separate flow control system for this basin has been included in this report and will be detailed more fully in a separate submittal.

Basin 9:

The predeveloped condition applied to TDA 2 results in a forested land cover condition. The values as modeled in WWHM are as follows:

Table 8: Predeveloped Conditions for Basin 9

Basin 9	
<u>Ground Cover</u>	<u>Area (acre)</u>
Forest, steep	3.12
Total	3.12

4.2 Developed Site Hydrology

In the developed condition, the proposed development will construct approximately 670 single family homes along with a road network to provide access to the lots. The spine road permit documents and associated modeling for the arterial extension from Tveit Road to Burn Road is proposed under a separate permit.

In compliance with the 2024 DOE Manual, all runoff from onsite developed/disturbed surfaces will be collected, treated, and discharged directly to existing/historic flow paths.

Basin 1 :

The developed Basin 1 is 45.00 acres in total. In the developed condition, Basin 1 drains to Vault A and has been modeled using WWHM with the following areas and ground cover designations:

Table 9: Developed Conditions in Basin 1

Basin 1	
<u>Ground Cover</u>	<u>Area (acre)</u>
Roof, Flat	20.03
Roads, Mod	6.44
Sidewalks, Mod	2.07
Pasture, Mod	16.46
Total	45.00

Basin 2:

The developed Basin 2 is 10.60 acres. In the developed condition, Basin 2 flows to Vault B and was modeled using WWHM with the following areas and ground cover designations:

Table 10: Developed Conditions in Basin 2

Basin 2	
Ground Cover	Area (acre)
Roof, Flat	4.55
Roads, Mod	1.7
Sidewalks, Mod	0.48
Pasture, Mod	3.85
Total	10.60

Basin 3:

The developed Basin 3 is 14.45 acres in total. In the developed condition, Basin 3 flows to Vault C and was modeled using WWHM with the following areas and ground cover designations:

Table 11: Developed Conditions in Basin 3

Basin 3	
Ground Cover	Area (acre)
Roof, Flat	5.52
Roads, Mod	1.94
Sidewalks, Mod	0.54
Pasture, Mod	5.52
Total	14.45

Basin 4:

The developed Basin 4 is 6.53 acres in total. In the developed condition, Basin 4 is conveyed to Pond A and has been modeled using WWHM with the following areas and ground cover designations:

Table 12: Developed Conditions in Basin 4

Basin 4	
Ground Cover	Area (acre)
Roof, Flat	2.86
Roads, Mod	0.98
Sidewalks, Mod	0.29
Pasture, Mod	2.40
Total	6.53

Basins 5, 7, & 8:

The developed Basins 5, 7, and 8 are 16.10 acres in total. In the developed condition, Basins 5, 7, and 8 flow to Vault D and have been modeled using WWHM with the following areas and ground cover designations:

Table 13: Developed Conditions in Basins 5, 7, & 8

Basin 5, 7, 8	
Ground Cover	Area (acre)
Roof, Flat	6.16
Roads, Mod	2.35
Sidewalks, Mod	0.72
Pasture, Mod	6.87
Total	16.10

Basin 6:

The developed Basin 6 is 4.26 acres in total. In the developed condition, Basin 6 is conveyed to Vault E and has been modeled using WWHM with the following areas and ground cover designations:

Table 14: Developed Conditions in Basins 6

Basin 6	
Ground Cover	Area (acre)
Roof, Flat	1.67
Roads, Mod	0.60
Sidewalks, Mod	0.20
Pasture, Mod	1.79
Total	4.26

Basin 9:

The developed Basin 9 is 3.12 acres in total. In the developed condition, Basin 9 flows to Pond B and have been modeled using WWHM with the following areas and ground cover designations:

Table 15: Developed Conditions in Basin 9

Basin 9	
Ground Cover	Area (acre)
Roof, Flat	1.14
Roads, Flat	0.72
Sidewalks, Mod	0.24
Pasture, Mod	1.02
Total	3.12

4.3 Detention Facility Design

The proposed detention vault facilities used for mitigating developed condition flows were designed in compliance with the 2024 DOE requirements to model hydrologic conditions and detention in a continuous runoff model (WWHM2012) where the following evaluation parameters are employed:

“Flow duration is computed by counting the number of flow values that exceed a specified flow level. The specified flow levels used by WWHM in the flow duration analysis are listed below.

- 1. 50% of the 2-year predevelopment peak flow.*
- 2. 100% of the 2-year predevelopment peak flow.*
- 3. 100% of the 50-year predevelopment peak flow.*

There are three criteria by which flow duration values are compared:

- 1. If the postdevelopment flow duration values exceed any of the predevelopment flow levels between 50% and 100% of the 2-year predevelopment peak flow values (100 Percent Threshold) then the flow duration requirement has not been met.*
- 2. If the postdevelopment flow duration values exceed any of the predevelopment flow levels between 100% of the 2-year and 100% of the 50-year predevelopment peak flow values more than 10 percent of the time (110 Percent Threshold) then the flow duration requirement has not been met.*
- 3. If more than 50 percent of the flow duration levels exceed the 100 percent threshold then the flow duration requirement has not been met.”*

Detention Vault Facilities

The proposed cast in place concrete detention facility detains, and releases collected storm water runoff from the specified basin. Flows from the onsite basins are collected and conveyed to the detention vaults via a proposed network of catch basins and storm water conveyance pipes. Detailed WWHM outputs are provided in Appendix 4. A summary of the detailed statistics and inputs used for modeling the systems in WWHM2012 can be found below.

Vault A

Table 16: Detention Vault A Design Summary

Detention Vault A	
Live Storage Bottom Area (modeled)	44,100 SF
Live Storage Bottom Area (provided)	45,108 SF
Number of Cells	7
Cell Dimensions	(7 x 25' x 252')
Begin Live Storage Elevation	315.50
Riser Height	10.00
Volume (modeled)	485,100 CF
Volume (provided)	496,188 CF
Top of Riser Elevation	325.50
Top Outside of Vault Elevation	328.00

See table below for the flow rates and water surface elevations by storm event for Detention Vault A.

Table 17: Flow Rates and Water Surface Elevations by Storm Event

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	2.3712	1.5198	319.96
10-Year	5.1329	2.6846	321.83
50-Year	8.8300	4.0927	323.56
100-Year	10.8487	4.8208	324.41

Vault B

Table 18: Detention Vault B Design Summary

Detention Vault B	
Live Storage Bottom Area (modeled)	13,456 SF
Live Storage Bottom Area (provided)	14,154 SF
Number of Cells	5
Cell Dimensions	(8 x 14.5' x 116')
Begin Live Storage Elevation	318.00
Riser Height	7.5'
Volume (modeled)	114,376 CF
Volume (provided)	120,312 CF
Top of Riser Elevation	325.50
Top Outside of Vault Elevation	328.00

See table below for the flow rates and water surface elevations by storm event for the Detention Vault B.

Table 19: Flow Rates and Water Surface Elevations by Storm Event for Vault B

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.5586	0.3425	322.06
10-Year	1.2091	0.6456	322.61
50-Year	2.0800	1.0455	324.27
100-Year	2.5555	1.2631	325.26

Vault C

Table 20: Detention Vault C Design Summary

Detention Vault C	
Live Storage Bottom Area (modeled)	18,544 SF
Live Storage Bottom Area (provided)	19,459 SF
Number of Cells	8
Cell Dimensions	(8 x 15.25' x 152')
Begin Live Storage Elevation	400.50
Riser Height	6.00'
Volume (modeled)	129,808 CF
Volume (provided)	136,213 CF
Top of Riser Elevation	406.50
Top Outside of Vault Elevation	409.00

See table below for the flow rates and water surface elevations by storm event for the Detention Vault C.

Table 21: Flow Rates and Water Surface Elevations by Storm Event for Vault C

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.7614	0.4708	403.93
10-Year	1.6482	0.9005	404.34
50-Year	2.8354	1.4743	405.66
100-Year	3.4836	1.7889	406.50

Vault D

Table 22: Detention Vault D Design Summary

Detention Vault D	
Live Storage Bottom Area (modeled)	25,392 SF
Live Storage Bottom Area (provided)	25,396 SF
Number of Cells	4
Cell Dimensions	(4 x 23' x 276')
Begin Live Storage Elevation	339.50
Riser Height	6.00'
Volume (modeled)	177,744 CF
Volume (provided)	177,772 CF
Top of Riser Elevation	345.50
Top Outside of Vault Elevation	347.50

See table below for the flow rates and water surface elevations by storm event for the Detention Vault D.

Table 23: Flow Rates and Water Surface Elevations by Storm Event for Vault D

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.8484	0.5053	342.12
10-Year	1.3842	0.8567	343.28
50-Year	3.1592	1.2798	344.22
100-Year	3.8814	1.4980	344.71

Vault E

Table 24: Detention Vault E Design Summary

Detention Vault E	
Live Storage Bottom Area (modeled)	6,000 SF
Live Storage Bottom Area (provided)	6,401 SF
Number of Cells	4
Cell Dimensions	(4 x 15' x 100')
Begin Live Storage Elevation	430.50
Riser Height	6.00'
Volume (modeled)	177,744 CF
Volume (provided)	177,772 CF
Top of Riser Elevation	436.50
Top Outside of Vault Elevation	440.00

See table below for the flow rates and water surface elevations by storm event for the Detention Vault E.

Table 25: Flow Rates and Water Surface Elevations by Storm Event for Vault E

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.2245	0.1371	433.65
10-Year	0.4859	0.2549	434.27
50-Year	0.8359	0.4087	435.36
100-Year	1.0270	0.4918	436.24

Detention Pond Facilities

The proposed detention pond facilities detain and release collected storm water runoff from the specified basin. Flows from the onsite basins are collected and conveyed to the detention ponds via a proposed network of catch basins and storm water conveyance pipes. Detailed WWHM outputs are provided in Appendix 4. A summary of the detailed statistics and inputs used for modeling the systems in WWHM2012 can be found below.

Pond A

Table 26: Pond A Design Summary

Pond A	
Live Storage Bottom Area (modeled)	6,000 SF
Live Storage Bottom Area (provided)	6,000 SF
Side Slopes	0:1
Begin Live Storage Elevation	434.00
Riser Height	11.00'
Volume (modeled)	72,000 CF
Volume (provided)	72,00 CF
Top of Riser Elevation	445.00

See table below for the flow rates and water surface elevations by storm event for Pond A.

Table 27: Flow Rates and Water Surface Elevations by Storm Event for Pond A

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.3441	0.1974	438.91
10-Year	0.7448	0.3363	441.72
50-Year	1.2813	0.4990	442.34
100-Year	1.5743	0.5817	442.87

Pond B

Table 28: Pond B Design Summary

Pond B	
Live Storage Bottom Area (modeled)	5,950 SF
Live Storage Bottom Area (provided)	5,950 SF
Side Slopes	0:1
Begin Live Storage Elevation	428.00
Riser Height	8.00'
Volume (modeled)	53,550 CF
Volume (provided)	53,550 CF
Top of Riser Elevation	436.00

See table below for the flow rates and water surface elevations by storm event for Pond B.

Table 29: Flow Rates and Water Surface Elevations by Storm Event for Pond B

Storm Event	Predeveloped Rate (cfs)	Mitigated Rates (cfs)	Water Surface Elevation (ft)
2-Year	0.1048	0.06453	431.89
10-Year	0.2040	0.09871	433.34
50-Year	0.3172	0.2056	434.68
100-Year	0.3735	0.2485	435.24

4.4 Water Quality Treatment

Water Quality Treatment is planned for all basins downstream of detention. Further water quality analysis will be provided at a later submittal date.

4.5 Onsite Stormwater Management

The project does not meet the LID performance standard and minimum requirements 1-9 are required for the project but choose to implement List #2 to evaluate low impact design. The following BMP's below are assessed for implementation:

Lawn and Landscaped Areas:

1. *Post-Construction Soil Quality and Depth*
 - BMP T5.13 soils will be applied to all permeable and landscaped areas in developed condition.
 - i. **Conclusion: Feasible**

Roofs:

1. *Downspout Full Infiltration per BMP T5.10A or Downspout Full Dispersion per BMP T5.30*
 - Infiltration is not feasible on site which has been confirmed by testing found in the geotechnical report and thus BMP T5.10A is infeasible. The site does not meet the requirements for full dispersion as flowpath lengths are inadequate in the developed areas of the site.
 - i. **Conclusion: Infeasible**

2. *Bioretention*
 - Due to infiltration infeasibility confirmed by testing in the geotechnical report, a bioretention facility was determined to be infeasible.
 - i. **Conclusion: Infeasible**
3. *Downspout Dispersion per BMP T5.10B.*
 - Due to site specific constraints including the proximity of slopes and walls to the developed site improvements, there is inadequate flow path to disperse on site.
 - i. **Conclusion: Infeasible**
4. *Perforated Stub-Out Connections per BMP T5.10C.*
 - No stub-out connections will be implemented in the design as soils are not suitable for infiltration as well as the site's proximity to steep slopes.
 - i. **Conclusion: Infeasible**

Other Hard Surfaces:

1. *Full Dispersion per BMP T5.30*
 - Due to the lack of native vegetation coverage in the developed condition and proximity to steep slopes, BMP T5.30 is infeasible.
 - i. **Conclusion: Infeasible**
2. *BMP T5.15 Permeable Pavement*
 - Infiltration is not feasible on site, which has been confirmed by testing found in the geotechnical report.
 - i. **Conclusion: Infeasible**
3. *Bioretention*
 - Due to infiltration infeasibility as confirmed by testing in the geotechnical report, a bioretention facility was determined to be infeasible
 - i. **Conclusion: Infeasible**
4. *Sheet Flow Dispersion or Concentrated Flow Dispersion in accordance with BMP T5.12 or BMP T5.11*
 - Due to site specific constraints including the proximity of slopes and walls to the developed site improvements, there is inadequate flow path to disperse on site.
 - i. **Conclusion: Infeasible**

SECTION 5: CONVEYANCE DESIGN

The stormwater conveyance system is comprised of a network of open/closed grate catch basins, buried pipe, a concrete detention vaults, detention ponds, dispersion trenches, gabion basket outfalls and tees, and StormFilter water quality units. Catch basins have been located such that each section of storm drainage pipe may adequately convey associated tributary area flows.

A fully prepared conveyance capacity analysis of the proposed pipes onsite will be prepared at a future submittal.

SECTION 6: OPERATIONS AND MAINTENANCE MANUAL

The proposed storm drainage system consists of buried pipes, catch basins, detention vaults, detention ponds, dispersion trenches, gabion basket outfalls and tees, and StormFilter water quality treatment structures. These facilities will require periodic maintenance and inspection. Inspection and maintenance procedures are contained on the following pages.

SECTION 7: SPECIAL REPORTS AND STUDIES

The following studies were conducted in preparation of this Report:

- Technical Memorandum, Arlington 360 Wetland and Fish & Wildlife Habitat Assessment, Soundview Consultants, Inc, April, 2025
- Geotechnical Report, Arlington 360, Terra Associates, Inc, April 9, 2025

Appendix 1: Project Overview

1. Vicinity Map
2. Existing Conditions Map
3. Proposed Development Map
4. Parcel List

East Hill Parcel List
31051200300100
31051200300500
31051200400200
31051200403600
31051200403500
31051200403400
31051200402500
31051200401000
31051200403300
31051200400400
31051200403200
31051200402600
31051200403100
31051200402700
31051200403000
31051200402800
31051200402900
31051300100200
31051300100300

Appendix 2: Downstream Analysis

1. Downstream Analysis Map
2. Downstream Analysis Site Visit Pictures
3. USDA Soils Map & Description



- Legend**
- 100 foot contours
 - SW quad
 - NW quad
 - NE quad
 - SE quad
 - Airports
 - Fire Stations
 - Hospitals
 - Police Stations
 - Schools
 - Bus Stops
 - Community Transit Park and Ride
 - Ferry Terminals
 - Buildings
 - Ferry Routes
 - County Lines 4,800 - 10,000
 - Stllagamish Indian Reservation Boundary
 - Tulalip Indian Reservation Boundary
 - Cities 4,800 - 10,000
 - Streets 4,800 - 10,000
 - Interstate
 - State Route
 - Ramps
 - Major Road: Major Road
 - Minor Road: Minor Road
 - Access Road
 - Water Features
 - County Parks 4,800 - 10,000
 - Cities 4,800 - 10,000
 - National Forest 4,800 - 10,000
 - County Region
 - RELIEF_HILLSHADE



Projection: NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet
Planning and Development Services, Snohomish County

All maps, data, and information set forth herein ("Data"), are for illustrative purposes only and are not to be considered an official citation to, or representation of the Snohomish County Code. Amendments and updates to the Data, together with other applicable County Code provisions, may apply which are not depicted herein. Snohomish County makes no representation or warranty concerning the content, accuracy, currency, completeness or quality of the Data contained herein and expressly disclaims any warranty of merchantability or fitness for any particular purpose. All persons accessing or otherwise using this Data assume all responsibility for use thereof and agree to hold Snohomish County harmless from and against any damages, loss, claim or liability arising out of any error, defect or omission contained within said Data. Washington State Law, Ch. 42.56 RCW, prohibits state and local agencies from providing access to lists of individuals intended for use for commercial purposes and, thus, no

1: 5,020



Notes
This map was automatically generated using Geocortex Essentials.

Downstream Analysis Photographs



Images 1 & 2: Eagle Creek (Flowpaths 1A & 1B) on either side of Tveit Rd.



Images 3 & 4: Eagle Creek at the boundary of the 0.25 mile analysis, at the corner of 215th St NE and 88th Dr NE



Images 5 & 6: Eagle Creek (Flowpath 1C) on either side of Tveit Rd



Images 7 & 8: Flowpath 2 as it leaves the site and enters the drainage ditch along 95th Ave NE and 200th St NE



Image 9: Drainage ditch and culvert along the east side of Burn Rd, part of Flowpath 3



Image 10: Portage Creek along Burn Rd and outfall of Flowpath 3



Images 11 & 12: Portage Creek (part of Flowpath 3) crossing beneath 207th St NE prior to passing the 0.25 mile boundary of analysis



Image 13: Eagle Creek (Flowpath 1A) on site prior to joining Flowpath 1B



Images 14 & 15: Eagle Creek (Flowpath 1B) onsite prior to joining with Flowpath 1A



Image 16: Eagle Creek (Flowpath 1C) onsite prior to joining Flowpaths 1A and 1B



Image 17: Eagle Creek (Flowpath 1A) in the ravine along the western edge of the site

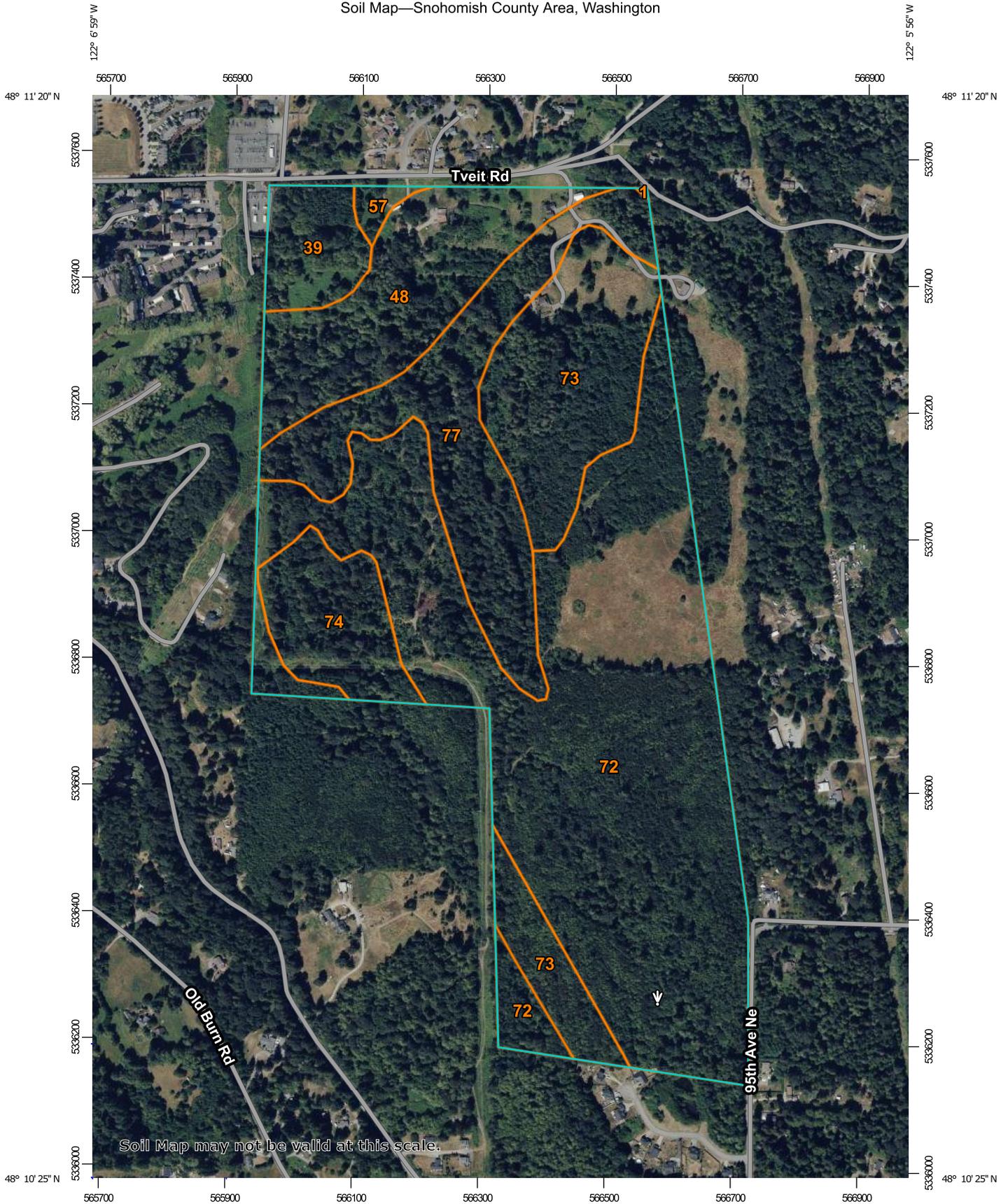


Images 18 & 19: Flowpath 1A on either side of PUD access road onsite



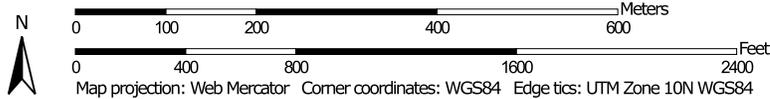
Images 20 & 21: Wetland tributary to Eagle Creek (Flowpath 1C)

Soil Map—Snohomish County Area, Washington



Soil Map may not be valid at this scale.

Map Scale: 1:8,320 if printed on A portrait (8.5" x 11") sheet.



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

1/9/2025
Page 1 of 3

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 1:24,000.

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: Snohomish County Area, Washington

Survey Area Data: Version 26, Aug 27, 2024

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

Date(s) aerial images were photographed: Aug 14, 2022—Sep 1, 2022

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
1	Alderwood gravelly sandy loam, 0 to 8 percent slopes	0.0	0.0%
39	Norma loam	7.0	3.7%
48	Pastik silt loam, 8 to 25 percent slopes	21.1	11.1%
57	Ragnar fine sandy loam, 0 to 8 percent slopes	1.2	0.7%
72	Tokul gravelly medial loam, 0 to 8 percent slopes	95.3	50.1%
73	Tokul gravelly medial loam, 8 to 15 percent slopes	27.6	14.5%
74	Tokul gravelly medial loam, 15 to 30 percent slopes	11.0	5.8%
77	Tokul-Winston gravelly loams, 25 to 65 percent slopes	26.9	14.1%
Totals for Area of Interest		190.1	100.0%

Appendix 3: Detention and Water Quality Design Analysis

1. Predeveloped Hydrology Map
2. Developed Hydrology Map
3. WWHM2012 Output – Detention Vault A
4. WWHM2012 Output – Detention Vault B
5. WWHM2012 Output – Detention Vault C
6. WWHM2012 Output – Detention Vault D
7. WWHM2012 Output – Detention Vault E
8. WWHM2012 Output – Detention Pond A
9. WWHM2012 Output – Detention Pond B

BASIN SR-1
2.89 AC
(FOR REFERENCE ONLY)

BASIN SR-2
2.97 AC
(FOR REFERENCE ONLY)

BASIN 9
3.12 AC
2 ac

BASIN 1
33.74 AC
45.00 AC
TOTAL

BASIN 1
11.26 AC
45.00 AC
TOTAL

BASIN 3
10.28 AC
14.45 AC
TOTAL

BASIN 4
6.53 AC

BASIN 3
4.17 AC
14.45 AC
TOTAL

BASIN 2
10.60 AC

BASIN 5
4.73 AC

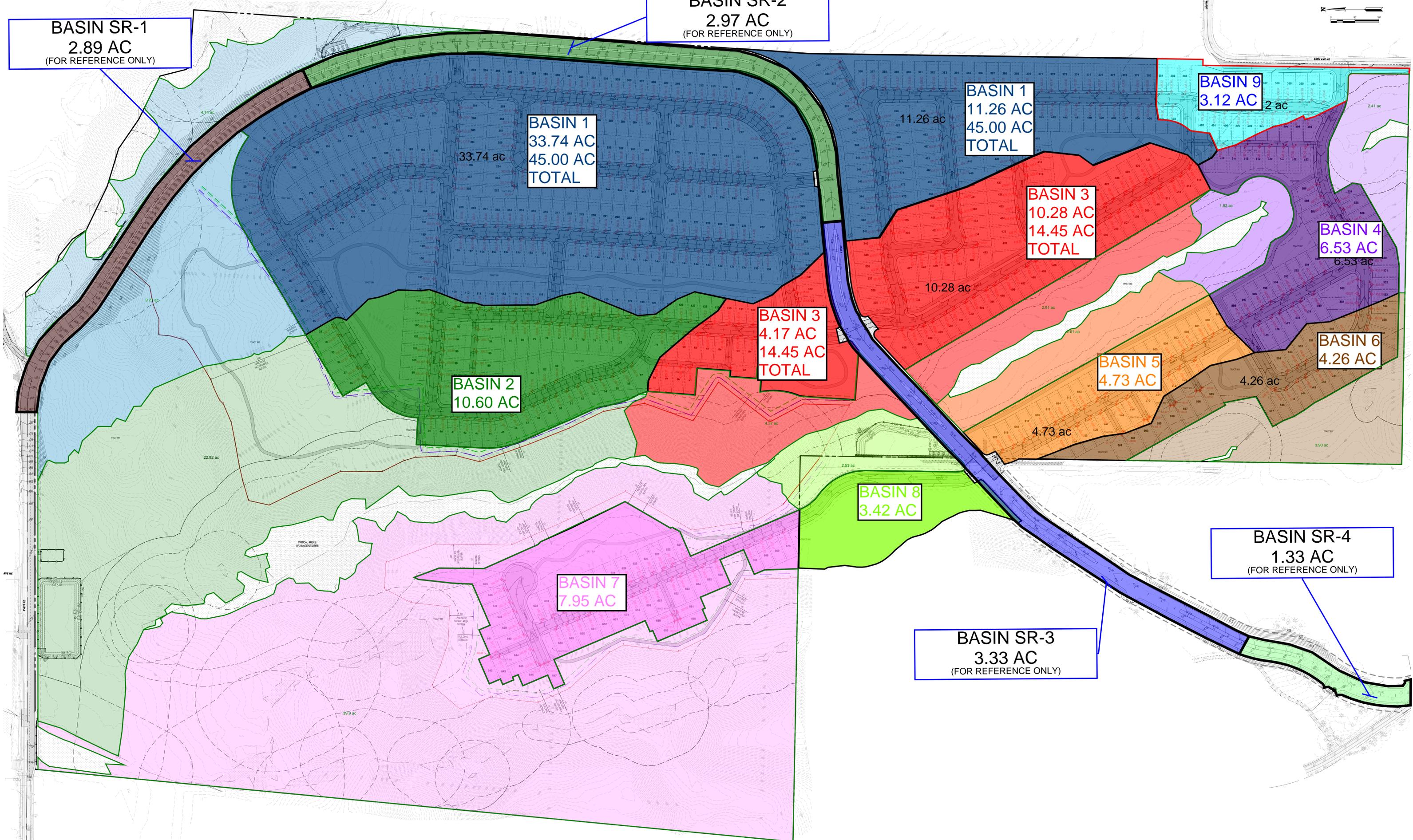
BASIN 6
4.26 AC

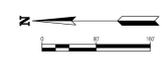
BASIN 8
3.42 AC

BASIN 7
7.95 AC

BASIN SR-4
1.33 AC
(FOR REFERENCE ONLY)

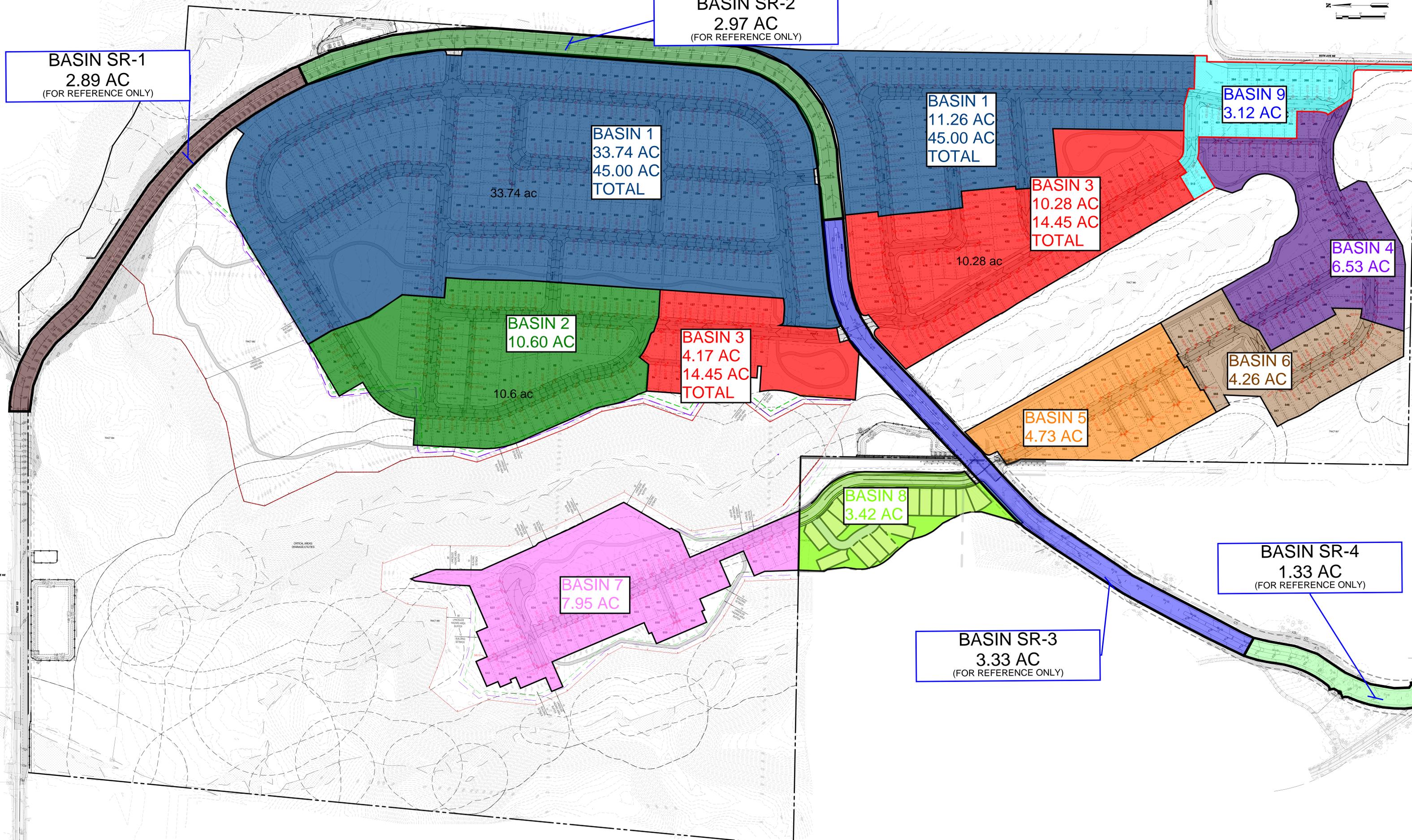
BASIN SR-3
3.33 AC
(FOR REFERENCE ONLY)





BASIN SR-1
2.89 AC
(FOR REFERENCE ONLY)

BASIN SR-2
2.97 AC
(FOR REFERENCE ONLY)



BASIN 1
33.74 AC
45.00 AC
TOTAL

BASIN 1
11.26 AC
45.00 AC
TOTAL

BASIN 9
3.12 AC

BASIN 3
10.28 AC
14.45 AC
TOTAL

BASIN 4
6.53 AC

BASIN 2
10.60 AC

BASIN 3
4.17 AC
14.45 AC
TOTAL

10.28 ac

BASIN 6
4.26 AC

BASIN 5
4.73 AC

BASIN 8
3.42 AC

BASIN 7
7.95 AC

BASIN SR-4
1.33 AC
(FOR REFERENCE ONLY)

BASIN SR-3
3.33 AC
(FOR REFERENCE ONLY)

WWHM2012
PROJECT REPORT

VAULT A

General Model Information

WWHM2012 Project Name: East Hill Basin 1

Site Name:

Site Address:

City:

Report Date: 9/9/2025

Gage: Everett

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.200

Version Date: 2023/01/27

Version: 4.2.19

POC Thresholds

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

High Flow Threshold for POC1: 50 Year

DRAFT

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Steep	acre 45
Pervious Total	45
Impervious Land Use	acre
Impervious Total	0
Basin Total	45

DRAFT

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	16.46
Pervious Total	16.46
Impervious Land Use	acre
ROADS MOD	6.44
ROOF TOPS FLAT	20.03
SIDEWALKS MOD	2.07
Impervious Total	28.54
Basin Total	45

DRAFT

Routing Elements
Predeveloped Routing

DRAFT

Mitigated Routing

Vault 1

Width: 175 ft.
 Length: 252 ft.
 Depth: 11 ft.
 Discharge Structure
 Riser Height: 10 ft.
 Riser Diameter: 36 in.
 Notch Type: Rectangular
 Notch Width: 0.061 ft.
 Notch Height: 5.000 ft.
 Orifice 1 Diameter: 4.875 in. Elevation:0 ft.
 Orifice 2 Diameter: 4.625 in. Elevation:4.375 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	1.012	0.000	0.000	0.000
0.1222	1.012	0.123	0.225	0.000
0.2444	1.012	0.247	0.318	0.000
0.3667	1.012	0.371	0.390	0.000
0.4889	1.012	0.494	0.450	0.000
0.6111	1.012	0.618	0.504	0.000
0.7333	1.012	0.742	0.552	0.000
0.8556	1.012	0.866	0.596	0.000
0.9778	1.012	0.989	0.637	0.000
1.1000	1.012	1.113	0.676	0.000
1.2222	1.012	1.237	0.713	0.000
1.3444	1.012	1.361	0.747	0.000
1.4667	1.012	1.484	0.781	0.000
1.5889	1.012	1.608	0.812	0.000
1.7111	1.012	1.732	0.843	0.000
1.8333	1.012	1.856	0.873	0.000
1.9556	1.012	1.979	0.901	0.000
2.0778	1.012	2.103	0.929	0.000
2.2000	1.012	2.227	0.956	0.000
2.3222	1.012	2.351	0.982	0.000
2.4444	1.012	2.474	1.008	0.000
2.5667	1.012	2.598	1.033	0.000
2.6889	1.012	2.722	1.057	0.000
2.8111	1.012	2.846	1.081	0.000
2.9333	1.012	2.969	1.104	0.000
3.0556	1.012	3.093	1.127	0.000
3.1778	1.012	3.217	1.149	0.000
3.3000	1.012	3.340	1.171	0.000
3.4222	1.012	3.464	1.193	0.000
3.5444	1.012	3.588	1.214	0.000
3.6667	1.012	3.712	1.234	0.000
3.7889	1.012	3.835	1.255	0.000
3.9111	1.012	3.959	1.275	0.000
4.0333	1.012	4.083	1.295	0.000
4.1556	1.012	4.207	1.314	0.000
4.2778	1.012	4.330	1.333	0.000

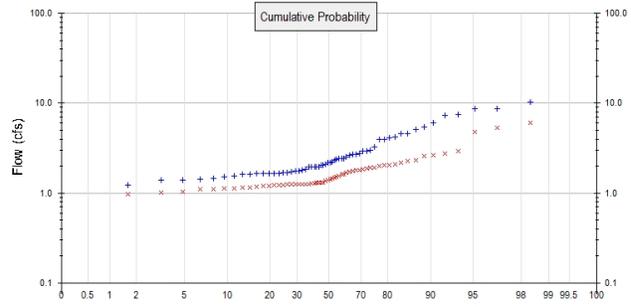
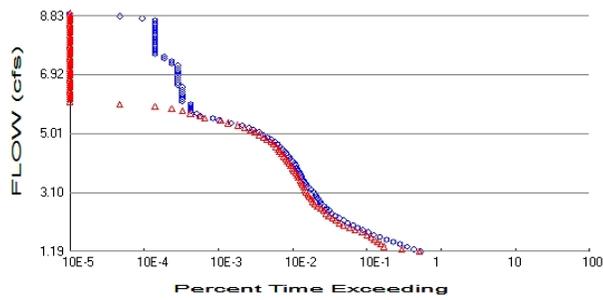
4.4000	1.012	4.454	1.444	0.000
4.5222	1.012	4.578	1.594	0.000
4.6444	1.012	4.702	1.691	0.000
4.7667	1.012	4.825	1.771	0.000
4.8889	1.012	4.949	1.842	0.000
5.0111	1.012	5.073	1.906	0.000
5.1333	1.012	5.197	1.976	0.000
5.2556	1.012	5.320	2.048	0.000
5.3778	1.012	5.444	2.120	0.000
5.5000	1.012	5.568	2.192	0.000
5.6222	1.012	5.691	2.264	0.000
5.7444	1.012	5.815	2.336	0.000
5.8667	1.012	5.939	2.406	0.000
5.9889	1.012	6.063	2.475	0.000
6.1111	1.012	6.186	2.549	0.000
6.2333	1.012	6.310	2.624	0.000
6.3556	1.012	6.434	2.699	0.000
6.4778	1.012	6.558	2.868	0.000
6.6000	1.012	6.681	2.956	0.000
6.7222	1.012	6.805	3.046	0.000
6.8444	1.012	6.929	3.136	0.000
6.9667	1.012	7.053	3.228	0.000
7.0889	1.012	7.176	3.321	0.000
7.2111	1.012	7.300	3.414	0.000
7.3333	1.012	7.424	3.509	0.000
7.4556	1.012	7.548	3.605	0.000
7.5778	1.012	7.671	3.702	0.000
7.7000	1.012	7.795	3.799	0.000
7.8222	1.012	7.919	3.898	0.000
7.9444	1.012	8.042	3.998	0.000
8.0667	1.012	8.166	4.099	0.000
8.1889	1.012	8.290	4.200	0.000
8.3111	1.012	8.414	4.303	0.000
8.4333	1.012	8.537	4.407	0.000
8.5556	1.012	8.661	4.511	0.000
8.6778	1.012	8.785	4.617	0.000
8.8000	1.012	8.909	4.723	0.000
8.9222	1.012	9.032	4.830	0.000
9.0444	1.012	9.156	4.938	0.000
9.1667	1.012	9.280	5.048	0.000
9.2889	1.012	9.404	5.157	0.000
9.4111	1.012	9.527	5.268	0.000
9.5333	1.012	9.651	5.380	0.000
9.6556	1.012	9.775	5.493	0.000
9.7778	1.012	9.899	5.606	0.000
9.9000	1.012	10.02	5.720	0.000
10.022	1.012	10.14	5.925	0.000
10.144	1.012	10.27	7.592	0.000
10.267	1.012	10.39	10.23	0.000
10.389	1.012	10.51	13.52	0.000
10.511	1.012	10.64	17.24	0.000
10.633	1.012	10.76	21.18	0.000
10.756	1.012	10.88	25.13	0.000
10.878	1.012	11.01	28.89	0.000
11.000	1.012	11.13	32.27	0.000
11.122	1.012	11.26	35.12	0.000
11.244	0.000	0.000	37.37	0.000

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Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 45
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 16.46
Total Impervious Area: 28.54

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	2.37124
5 year	3.868761
10 year	5.132898
25 year	7.086072
50 year	8.830026
100 year	10.848728

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	1.51979
5 year	2.169075
10 year	2.684562
25 year	3.443094
50 year	4.092711
100 year	4.820752

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	2.555	1.276
1950	2.921	1.314
1951	2.036	1.220
1952	1.940	1.028
1953	1.747	1.093
1954	8.767	1.474
1955	2.954	1.776
1956	2.426	1.883
1957	3.251	2.324
1958	8.696	1.247

1959	2.163	1.601
1960	2.302	1.917
1961	10.400	1.631
1962	2.406	1.318
1963	3.938	1.214
1964	2.728	1.207
1965	1.695	1.379
1966	1.240	1.132
1967	2.435	1.265
1968	3.020	2.294
1969	7.547	1.204
1970	1.529	1.166
1971	2.730	1.781
1972	1.964	1.512
1973	1.646	1.263
1974	4.604	1.259
1975	2.073	1.154
1976	1.722	1.676
1977	1.542	1.217
1978	1.636	1.023
1979	4.638	1.907
1980	2.190	1.136
1981	1.621	1.244
1982	2.231	2.579
1983	3.956	1.256
1984	1.974	2.058
1985	2.711	2.025
1986	6.047	4.813
1987	2.638	2.954
1988	1.641	1.728
1989	2.042	0.914
1990	1.808	1.812
1991	1.947	1.854
1992	1.664	1.304
1993	1.647	1.153
1994	1.400	1.408
1995	1.971	2.000
1996	4.219	2.202
1997	7.384	6.026
1998	1.417	1.108
1999	1.603	1.432
2000	1.401	2.107
2001	0.630	0.974
2002	1.843	1.561
2003	1.455	1.259
2004	2.370	2.758
2005	1.780	1.452
2006	5.094	2.641
2007	4.127	1.320
2008	5.443	5.337
2009	1.685	1.283

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	10.4003	6.0264
2	8.7670	5.3366
3	8.6958	4.8128

4	7.5468	2.9543
5	7.3843	2.7583
6	6.0466	2.6415
7	5.4428	2.5788
8	5.0945	2.3244
9	4.6377	2.2939
10	4.6044	2.2017
11	4.2190	2.1070
12	4.1266	2.0576
13	3.9555	2.0247
14	3.9381	2.0003
15	3.2514	1.9170
16	3.0202	1.9073
17	2.9544	1.8831
18	2.9209	1.8544
19	2.7305	1.8116
20	2.7280	1.7812
21	2.7108	1.7761
22	2.6384	1.7278
23	2.5551	1.6763
24	2.4352	1.6312
25	2.4262	1.6010
26	2.4059	1.5610
27	2.3702	1.5117
28	2.3015	1.4738
29	2.2310	1.4521
30	2.1899	1.4321
31	2.1627	1.4080
32	2.0734	1.3789
33	2.0419	1.3203
34	2.0364	1.3177
35	1.9742	1.3144
36	1.9706	1.3040
37	1.9642	1.2831
38	1.9471	1.2764
39	1.9396	1.2650
40	1.8427	1.2629
41	1.8082	1.2588
42	1.7799	1.2585
43	1.7473	1.2564
44	1.7222	1.2472
45	1.6954	1.2439
46	1.6851	1.2201
47	1.6636	1.2165
48	1.6472	1.2142
49	1.6458	1.2073
50	1.6414	1.2042
51	1.6361	1.1663
52	1.6206	1.1536
53	1.6034	1.1533
54	1.5422	1.1360
55	1.5289	1.1324
56	1.4554	1.1081
57	1.4172	1.0929
58	1.4007	1.0282
59	1.4001	1.0228
60	1.2401	0.9737
61	0.6301	0.9137

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
1.1856	11197	10786	96	Pass
1.2628	9112	6293	69	Pass
1.3401	7386	3634	49	Pass
1.4173	5938	3258	54	Pass
1.4945	4834	2939	60	Pass
1.5717	3927	2699	68	Pass
1.6489	3210	2458	76	Pass
1.7261	2642	2147	81	Pass
1.8033	2212	1826	82	Pass
1.8806	1864	1479	79	Pass
1.9578	1597	1252	78	Pass
2.0350	1389	1041	74	Pass
2.1122	1175	905	77	Pass
2.1894	1030	816	79	Pass
2.2666	897	730	81	Pass
2.3439	806	655	81	Pass
2.4211	718	599	83	Pass
2.4983	661	558	84	Pass
2.5755	608	509	83	Pass
2.6527	570	459	80	Pass
2.7299	526	422	80	Pass
2.8072	499	399	79	Pass
2.8844	472	379	80	Pass
2.9616	449	357	79	Pass
3.0388	430	341	79	Pass
3.1160	408	328	80	Pass
3.1932	379	315	83	Pass
3.2705	343	303	88	Pass
3.3477	329	290	88	Pass
3.4249	312	279	89	Pass
3.5021	300	268	89	Pass
3.5793	285	258	90	Pass
3.6565	275	249	90	Pass
3.7338	265	235	88	Pass
3.8110	255	223	87	Pass
3.8882	244	212	86	Pass
3.9654	236	202	85	Pass
4.0426	226	191	84	Pass
4.1198	213	182	85	Pass
4.1971	200	174	87	Pass
4.2743	191	163	85	Pass
4.3515	175	151	86	Pass
4.4287	166	143	86	Pass
4.5059	155	138	89	Pass
4.5831	144	129	89	Pass
4.6604	134	117	87	Pass
4.7376	122	110	90	Pass
4.8148	111	96	86	Pass
4.8920	98	86	87	Pass
4.9692	85	76	89	Pass
5.0464	76	66	86	Pass
5.1236	64	58	90	Pass
5.2009	55	48	87	Pass

5.2781	45	39	86	Pass
5.3553	32	29	90	Pass
5.4325	22	23	104	Pass
5.5097	18	14	77	Pass
5.5869	12	12	100	Pass
5.6642	11	9	81	Pass
5.7414	9	7	77	Pass
5.8186	9	5	55	Pass
5.8958	9	3	33	Pass
5.9730	9	1	11	Pass
6.0502	7	0	0	Pass
6.1275	7	0	0	Pass
6.2047	7	0	0	Pass
6.2819	7	0	0	Pass
6.3591	7	0	0	Pass
6.4363	7	0	0	Pass
6.5135	7	0	0	Pass
6.5908	6	0	0	Pass
6.6680	6	0	0	Pass
6.7452	6	0	0	Pass
6.8224	6	0	0	Pass
6.8996	6	0	0	Pass
6.9768	6	0	0	Pass
7.0541	6	0	0	Pass
7.1313	6	0	0	Pass
7.2085	6	0	0	Pass
7.2857	5	0	0	Pass
7.3629	5	0	0	Pass
7.4401	4	0	0	Pass
7.5174	4	0	0	Pass
7.5946	3	0	0	Pass
7.6718	3	0	0	Pass
7.7490	3	0	0	Pass
7.8262	3	0	0	Pass
7.9034	3	0	0	Pass
7.9806	3	0	0	Pass
8.0579	3	0	0	Pass
8.1351	3	0	0	Pass
8.2123	3	0	0	Pass
8.2895	3	0	0	Pass
8.3667	3	0	0	Pass
8.4439	3	0	0	Pass
8.5212	3	0	0	Pass
8.5984	3	0	0	Pass
8.6756	3	0	0	Pass
8.7528	2	0	0	Pass
8.8300	1	0	0	Pass

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Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

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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
Vault 1 POC	<input type="checkbox"/>	6185.14			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		6185.14	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

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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.

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Appendix
Predeveloped Schematic



Basin 1
45.00ac

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      East Hill Basin 1.wdm
MESSU    25      PreEast Hill Basin 1.MES
          27      PreEast Hill Basin 1.L61
          28      PreEast Hill Basin 1.L62
          30      POCEast Hill Basin 11.dat
END FILES
```

```
OPN SEQUENCE
  INGRP              INDELT 00:15
  PERLND             12
  COPY               501
  DISPLY             1
  END INGRP
END OPN SEQUENCE
```

```
DISPLY
  DISPLY-INFO1
  # - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
  1   Basin 1          MAX          1   2   30   9
  END DISPLY-INFO1
END DISPLY
```

```
COPY
  TIMESERIES
  # - # NPT NMN ***
  1   1   1
  501 1   1
  END TIMESERIES
END COPY
```

```
GENER
  OPCODE
  #   # OPCD ***
  END OPCODE
  PARM
  #   #           K ***
  END PARM
END GENER
```

```
PERLND
  GEN-INFO
  <PLS ><-----Name----->NBLKS  Unit-systems  Printer ***
  # - #                               User  t-series  Engl Metr ***
                               in  out          ***
  12   C, Forest, Steep          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  ***
  12   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  *****
  12   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 ***
12 0 0 0 0 0 0 0 0 0 0 0
END PWAT-PARM1

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILF LSUR SLSUR KVARY AGWRC
12 0 4.5 0.08 400 0.15 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
12 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
12 0.2 0.3 0.35 6 0.3 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
12 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->	<Name> #	<--Area-->	<-factor-->	<-Target->	MBLK	***
Basin	1				Tbl#	***
PERLND	12	45		COPY	501	12
PERLND	12	45		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	***
#	-	#	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	*****
#	-	#	HYDR	ADCA	CONS	HEAT	SED	GQL	OXRX	NUTR	PLNK	PHCB	PIVL	PYR	*****

END PRINT-INFO

HYDR-PARM1

RCHRES	Flags	for each	HYDR	Section	***	ODGTFG	for each	FUNCT	for each	***
# - #	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
	***	ac-ft	for each	possible	exit	for each

<-----><-----> <-----><-----><-----><-----> *** <-----><-----><-----><-----><----->

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name> #	tem	strg	<-factor-->strg	<Name> #	#	<Name> #
WDM	2	PREC	ENGL	1.2	PERLND	1	999	EXTNL
WDM	2	PREC	ENGL	1.2	IMPLND	1	999	EXTNL

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

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Mitigated UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 1.wdm	
MESSU	25	MitEast Hill Basin 1.MES	
	27	MitEast Hill Basin 1.L61	
	28	MitEast Hill Basin 1.L62	
	30	POCEast Hill Basin 11.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 14
IMPLND 2
IMPLND 4
IMPLND 9
RCHRES 1
COPY 1
COPY 501
DISPLY 1

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INF01

#	-	#	<-----Title----->	***	TRAN	PIVL	DIG1	FIL1	PYR	DIG2	FIL2	YRND
1			Vault 1		MAX				1	2	30	9

END DISPLY-INF01

END DISPLY

COPY

TIMESERIES
- # NPT NMN ***
1 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			***
14	C, Pasture, Mod	1	1	1	1	27	0

END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS >	***** Active Sections *****														***
#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
14			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  *****
14   0   0   4   0   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 VIRG  VLE INFC  HWT ***
14   0   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
14   0   4.5  0.06  400  0.1  0.5  0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3          ***
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
14   0   0   2   2   0   0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4          ***
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP ***
14   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
14   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 ***
2     ROADS/MOD             1  1  1  27  0
4     ROOF TOPS/FLAT       1  1  1  27  0
9     SIDEWALKS/MOD        1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
2     0   0   1   0   0   0
4     0   0   1   0   0   0
9     0   0   1   0   0   0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
2     0   0   4   0   0   4   1   9
4     0   0   4   0   0   0   1   9
9     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  ***
2     0   0   0   0   0
4     0   0   0   0   0
9     0   0   0   0   0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
2 400 0.05 0.1 0.08
4 400 0.01 0.1 0.1
9 400 0.05 0.1 0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
2 0 0
4 0 0
9 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
2 0 0
4 0 0
9 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 14 16.46 RCHRES 1 2
PERLND 14 16.46 RCHRES 1 3
IMPLND 2 6.44 RCHRES 1 5
IMPLND 4 20.03 RCHRES 1 5
IMPLND 9 2.07 RCHRES 1 5

```

*****Routing*****

```

PERLND 14 16.46 COPY 1 12
IMPLND 2 6.44 COPY 1 15
IMPLND 4 20.03 COPY 1 15
IMPLND 9 2.07 COPY 1 15
PERLND 14 16.46 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 Vault 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 ***

```


3.911111	1.012397	3.959596	1.275434
4.033333	1.012397	4.083333	1.295209
4.155556	1.012397	4.207071	1.314687
4.277778	1.012397	4.330808	1.333881
4.400000	1.012397	4.454545	1.444583
4.522222	1.012397	4.578283	1.594187
4.644444	1.012397	4.702020	1.691184
4.766667	1.012397	4.825758	1.771320
4.888889	1.012397	4.949495	1.842097
5.011111	1.012397	5.073232	1.906896
5.133333	1.012397	5.196970	1.976309
5.255556	1.012397	5.320707	2.048091
5.377778	1.012397	5.444444	2.120460
5.500000	1.012397	5.568182	2.192799
5.622222	1.012397	5.691919	2.264751
5.744444	1.012397	5.815657	2.336060
5.866667	1.012397	5.939394	2.406518
5.988889	1.012397	6.063131	2.475943
6.111111	1.012397	6.186869	2.549460
6.233333	1.012397	6.310606	2.624041
6.355556	1.012397	6.434343	2.699251
6.477778	1.012397	6.558081	2.868581
6.600000	1.012397	6.681818	2.956901
6.722222	1.012397	6.805556	3.046327
6.844444	1.012397	6.929293	3.136842
6.966667	1.012397	7.053030	3.228435
7.088889	1.012397	7.176768	3.321091
7.211111	1.012397	7.300505	3.414798
7.333333	1.012397	7.424242	3.509543
7.455556	1.012397	7.547980	3.605314
7.577778	1.012397	7.671717	3.702100
7.700000	1.012397	7.795455	3.799890
7.822222	1.012397	7.919192	3.898672
7.944444	1.012397	8.042929	3.998436
8.066667	1.012397	8.166667	4.099172
8.188889	1.012397	8.290404	4.200869
8.311111	1.012397	8.414141	4.303519
8.433333	1.012397	8.537879	4.407112
8.555556	1.012397	8.661616	4.511639
8.677778	1.012397	8.785354	4.617090
8.800000	1.012397	8.909091	4.723458
8.922222	1.012397	9.032828	4.830734
9.044444	1.012397	9.156566	4.938909
9.166667	1.012397	9.280303	5.047977
9.288889	1.012397	9.404040	5.157928
9.411111	1.012397	9.527778	5.268756
9.533333	1.012397	9.651515	5.380453
9.655556	1.012397	9.775253	5.493013
9.777778	1.012397	9.898990	5.606427
9.900000	1.012397	10.02273	5.720690
10.02222	1.012397	10.14646	5.925299
10.14444	1.012397	10.27020	7.592515
10.26667	1.012397	10.39394	10.23814
10.38889	1.012397	10.51768	13.52505
10.51111	1.012397	10.64141	17.24065
10.63333	1.012397	10.76515	21.18092
10.75556	1.012397	10.88889	25.13571
10.87778	1.012397	11.01263	28.89648
11.00000	1.012397	11.13636	32.27438
11.12222	1.012397	11.26010	35.12475

END FTABLE 1

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	tem strg<-factor->	strg	<Name>	# #
WDM	2	PREC	ENGL	1.2	PERLND	1 999 EXTNL	PREC
WDM	2	PREC	ENGL	1.2	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

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WWHM2012
PROJECT REPORT

VAULT B

General Model Information

WWHM2012 Project Name: East Hill Basin 2

Site Name:

Site Address:

City:

Report Date: 8/7/2025

Gage: Everett

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.200

Version Date: 2023/01/27

Version: 4.2.19

POC Thresholds

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

High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Steep	acre 10.6
Pervious Total	10.6
Impervious Land Use	acre
Impervious Total	0
Basin Total	10.6

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Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	3.85
Pervious Total	3.85
Impervious Land Use	acre
ROADS MOD	1.72
ROOF TOPS FLAT	4.55
SIDEWALKS MOD	0.48
Impervious Total	6.75
Basin Total	10.6

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Routing Elements
Predeveloped Routing

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Mitigated Routing

Vault 1

Width: 116 ft.
 Length: 116 ft.
 Depth: 8.5 ft.
 Discharge Structure
 Riser Height: 7.5 ft.
 Riser Diameter: 36 in.
 Orifice 1 Diameter: 2.500 in. Elevation:0 ft.
 Orifice 2 Diameter: 3.813 in. Elevation:4.1 ft.
 Orifice 3 Diameter: 1.906 in. Elevation:6.1 ft.
 Element Flows To:
 Outlet 1 Outlet 2

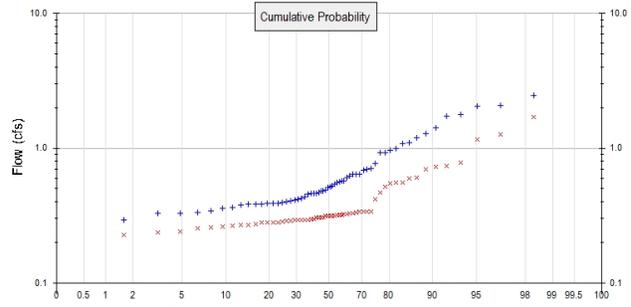
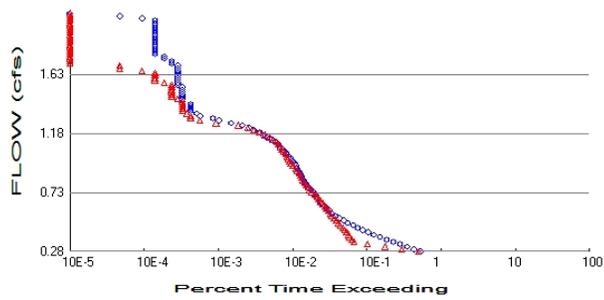
Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.308	0.000	0.000	0.000
0.0944	0.308	0.029	0.052	0.000
0.1889	0.308	0.058	0.073	0.000
0.2833	0.308	0.087	0.090	0.000
0.3778	0.308	0.116	0.104	0.000
0.4722	0.308	0.145	0.116	0.000
0.5667	0.308	0.175	0.127	0.000
0.6611	0.308	0.204	0.137	0.000
0.7556	0.308	0.233	0.147	0.000
0.8500	0.308	0.262	0.156	0.000
0.9444	0.308	0.291	0.164	0.000
1.0389	0.308	0.320	0.172	0.000
1.1333	0.308	0.350	0.180	0.000
1.2278	0.308	0.379	0.187	0.000
1.3222	0.308	0.408	0.195	0.000
1.4167	0.308	0.437	0.201	0.000
1.5111	0.308	0.466	0.208	0.000
1.6056	0.308	0.496	0.214	0.000
1.7000	0.308	0.525	0.221	0.000
1.7944	0.308	0.554	0.227	0.000
1.8889	0.308	0.583	0.233	0.000
1.9833	0.308	0.612	0.238	0.000
2.0778	0.308	0.641	0.244	0.000
2.1722	0.308	0.671	0.250	0.000
2.2667	0.308	0.700	0.255	0.000
2.3611	0.308	0.729	0.260	0.000
2.4556	0.308	0.758	0.265	0.000
2.5500	0.308	0.787	0.270	0.000
2.6444	0.308	0.816	0.275	0.000
2.7389	0.308	0.846	0.280	0.000
2.8333	0.308	0.875	0.285	0.000
2.9278	0.308	0.904	0.290	0.000
3.0222	0.308	0.933	0.294	0.000
3.1167	0.308	0.962	0.299	0.000
3.2111	0.308	0.991	0.303	0.000
3.3056	0.308	1.021	0.308	0.000
3.4000	0.308	1.050	0.312	0.000
3.4944	0.308	1.079	0.317	0.000

3.5889	0.308	1.108	0.321	0.000
3.6833	0.308	1.137	0.325	0.000
3.7778	0.308	1.167	0.329	0.000
3.8722	0.308	1.196	0.333	0.000
3.9667	0.308	1.225	0.337	0.000
4.0611	0.308	1.254	0.341	0.000
4.1556	0.308	1.283	0.438	0.000
4.2500	0.308	1.312	0.502	0.000
4.3444	0.308	1.342	0.548	0.000
4.4389	0.308	1.371	0.587	0.000
4.5333	0.308	1.400	0.620	0.000
4.6278	0.308	1.429	0.651	0.000
4.7222	0.308	1.458	0.679	0.000
4.8167	0.308	1.487	0.706	0.000
4.9111	0.308	1.517	0.731	0.000
5.0056	0.308	1.546	0.754	0.000
5.1000	0.308	1.575	0.777	0.000
5.1944	0.308	1.604	0.799	0.000
5.2889	0.308	1.633	0.820	0.000
5.3833	0.308	1.663	0.840	0.000
5.4778	0.308	1.692	0.859	0.000
5.5722	0.308	1.721	0.879	0.000
5.6667	0.308	1.750	0.897	0.000
5.7611	0.308	1.779	0.915	0.000
5.8556	0.308	1.808	0.933	0.000
5.9500	0.308	1.838	0.950	0.000
6.0444	0.308	1.867	0.967	0.000
6.1389	0.308	1.896	1.002	0.000
6.2333	0.308	1.925	1.035	0.000
6.3278	0.308	1.954	1.062	0.000
6.4222	0.308	1.983	1.086	0.000
6.5167	0.308	2.013	1.109	0.000
6.6111	0.308	2.042	1.131	0.000
6.7056	0.308	2.071	1.152	0.000
6.8000	0.308	2.100	1.172	0.000
6.8944	0.308	2.129	1.192	0.000
6.9889	0.308	2.158	1.211	0.000
7.0833	0.308	2.188	1.230	0.000
7.1778	0.308	2.217	1.248	0.000
7.2722	0.308	2.246	1.266	0.000
7.3667	0.308	2.275	1.284	0.000
7.4611	0.308	2.304	1.301	0.000
7.5556	0.308	2.334	1.735	0.000
7.6500	0.308	2.363	3.182	0.000
7.7444	0.308	2.392	5.184	0.000
7.8389	0.308	2.421	7.594	0.000
7.9333	0.308	2.450	10.31	0.000
8.0278	0.308	2.479	13.23	0.000
8.1222	0.308	2.509	16.28	0.000
8.2167	0.308	2.538	19.34	0.000
8.3111	0.308	2.567	22.33	0.000
8.4056	0.308	2.596	25.15	0.000
8.5000	0.308	2.625	27.71	0.000
8.5944	0.308	2.654	29.96	0.000
8.6889	0.000	0.000	31.86	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 10.6
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 3.85
Total Impervious Area: 6.75

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.558559
5 year	0.911308
10 year	1.209083
25 year	1.669164
50 year	2.079962
100 year	2.555479

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.342536
5 year	0.507759
10 year	0.645649
25 year	0.857263
50 year	1.045513
100 year	1.263135

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.602	0.297
1950	0.688	0.306
1951	0.480	0.283
1952	0.457	0.239
1953	0.412	0.255
1954	2.065	0.317
1955	0.696	0.330
1956	0.572	0.468
1957	0.766	0.602
1958	2.048	0.289

1959	0.509	0.320
1960	0.542	0.340
1961	2.450	0.322
1962	0.567	0.306
1963	0.928	0.282
1964	0.643	0.280
1965	0.399	0.313
1966	0.292	0.264
1967	0.574	0.294
1968	0.711	0.592
1969	1.778	0.280
1970	0.360	0.272
1971	0.643	0.334
1972	0.463	0.317
1973	0.388	0.295
1974	1.085	0.294
1975	0.488	0.268
1976	0.406	0.324
1977	0.363	0.283
1978	0.385	0.238
1979	1.092	0.337
1980	0.516	0.264
1981	0.382	0.289
1982	0.526	0.699
1983	0.932	0.292
1984	0.465	0.516
1985	0.639	0.418
1986	1.424	1.168
1987	0.621	0.776
1988	0.387	0.329
1989	0.481	0.213
1990	0.426	0.337
1991	0.459	0.337
1992	0.392	0.305
1993	0.388	0.268
1994	0.330	0.314
1995	0.464	0.552
1996	0.994	0.551
1997	1.739	1.715
1998	0.334	0.257
1999	0.378	0.315
2000	0.330	0.547
2001	0.148	0.226
2002	0.434	0.320
2003	0.343	0.294
2004	0.558	0.727
2005	0.419	0.316
2006	1.200	0.738
2007	0.972	0.308
2008	1.282	1.258
2009	0.397	0.299

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	2.4499	1.7147
2	2.0651	1.2584
3	2.0483	1.1678

4	1.7777	0.7755
5	1.7394	0.7381
6	1.4243	0.7270
7	1.2821	0.6985
8	1.2000	0.6020
9	1.0924	0.5923
10	1.0846	0.5515
11	0.9938	0.5513
12	0.9720	0.5474
13	0.9318	0.5161
14	0.9277	0.4685
15	0.7659	0.4184
16	0.7114	0.3401
17	0.6959	0.3372
18	0.6880	0.3369
19	0.6432	0.3366
20	0.6426	0.3344
21	0.6385	0.3297
22	0.6215	0.3291
23	0.6019	0.3243
24	0.5736	0.3221
25	0.5715	0.3202
26	0.5667	0.3200
27	0.5583	0.3171
28	0.5421	0.3166
29	0.5255	0.3156
30	0.5158	0.3150
31	0.5094	0.3137
32	0.4884	0.3127
33	0.4810	0.3078
34	0.4797	0.3063
35	0.4650	0.3060
36	0.4642	0.3048
37	0.4627	0.2986
38	0.4587	0.2967
39	0.4569	0.2946
40	0.4341	0.2941
41	0.4259	0.2937
42	0.4193	0.2935
43	0.4116	0.2919
44	0.4057	0.2893
45	0.3994	0.2891
46	0.3969	0.2834
47	0.3919	0.2827
48	0.3880	0.2815
49	0.3877	0.2802
50	0.3866	0.2798
51	0.3854	0.2717
52	0.3817	0.2685
53	0.3777	0.2683
54	0.3633	0.2640
55	0.3601	0.2636
56	0.3428	0.2574
57	0.3338	0.2545
58	0.3299	0.2393
59	0.3298	0.2384
60	0.2921	0.2265
61	0.1484	0.2125

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2793	11216	10566	94	Pass
0.2975	9133	6344	69	Pass
0.3157	7439	3773	50	Pass
0.3338	5991	2175	36	Pass
0.3520	4830	1433	29	Pass
0.3702	3927	1338	34	Pass
0.3884	3217	1254	38	Pass
0.4066	2656	1200	45	Pass
0.4248	2227	1141	51	Pass
0.4430	1886	1076	57	Pass
0.4612	1597	1014	63	Pass
0.4794	1390	935	67	Pass
0.4975	1179	879	74	Pass
0.5157	1031	824	79	Pass
0.5339	899	776	86	Pass
0.5521	805	710	88	Pass
0.5703	718	682	94	Pass
0.5885	663	644	97	Pass
0.6067	609	610	100	Pass
0.6249	573	582	101	Pass
0.6431	526	544	103	Pass
0.6612	499	515	103	Pass
0.6794	473	481	101	Pass
0.6976	449	450	100	Pass
0.7158	430	423	98	Pass
0.7340	410	385	93	Pass
0.7522	380	361	95	Pass
0.7704	344	342	99	Pass
0.7886	329	323	98	Pass
0.8068	312	310	99	Pass
0.8249	300	296	98	Pass
0.8431	285	282	98	Pass
0.8613	275	272	98	Pass
0.8795	266	260	97	Pass
0.8977	255	249	97	Pass
0.9159	245	237	96	Pass
0.9341	236	217	91	Pass
0.9523	226	202	89	Pass
0.9705	213	192	90	Pass
0.9886	201	184	91	Pass
1.0068	192	178	92	Pass
1.0250	175	171	97	Pass
1.0432	166	160	96	Pass
1.0614	155	151	97	Pass
1.0796	146	144	98	Pass
1.0978	135	137	101	Pass
1.1160	125	130	104	Pass
1.1341	111	116	104	Pass
1.1523	98	105	107	Pass
1.1705	85	90	105	Pass
1.1887	77	76	98	Pass
1.2069	64	64	100	Pass
1.2251	55	53	96	Pass

1.2433	45	40	88	Pass
1.2615	32	20	62	Pass
1.2797	22	12	54	Pass
1.2978	18	9	50	Pass
1.3160	12	9	75	Pass
1.3342	11	8	72	Pass
1.3524	9	7	77	Pass
1.3706	9	7	77	Pass
1.3888	9	7	77	Pass
1.4070	9	7	77	Pass
1.4252	7	7	100	Pass
1.4434	7	6	85	Pass
1.4615	7	5	71	Pass
1.4797	7	5	71	Pass
1.4979	7	5	71	Pass
1.5161	7	5	71	Pass
1.5343	7	5	71	Pass
1.5525	6	5	83	Pass
1.5707	6	4	66	Pass
1.5889	6	3	50	Pass
1.6071	6	3	50	Pass
1.6252	6	3	50	Pass
1.6434	6	3	50	Pass
1.6616	6	2	33	Pass
1.6798	6	1	16	Pass
1.6980	6	1	16	Pass
1.7162	5	0	0	Pass
1.7344	5	0	0	Pass
1.7526	4	0	0	Pass
1.7708	4	0	0	Pass
1.7889	3	0	0	Pass
1.8071	3	0	0	Pass
1.8253	3	0	0	Pass
1.8435	3	0	0	Pass
1.8617	3	0	0	Pass
1.8799	3	0	0	Pass
1.8981	3	0	0	Pass
1.9163	3	0	0	Pass
1.9345	3	0	0	Pass
1.9526	3	0	0	Pass
1.9708	3	0	0	Pass
1.9890	3	0	0	Pass
2.0072	3	0	0	Pass
2.0254	3	0	0	Pass
2.0436	3	0	0	Pass
2.0618	2	0	0	Pass
2.0800	1	0	0	Pass

DRAFT

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

DRAFT

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
Vault 1 POC	<input type="checkbox"/>	1460.40			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		1460.40	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

DRAFT

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.

DRAFT

Appendix
Predeveloped Schematic



Basin 1
10.60ac

Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 2.wdm	
MESSU	25	PreEast Hill Basin 2.MES	
	27	PreEast Hill Basin 2.L61	
	28	PreEast Hill Basin 2.L62	
	30	POCEast Hill Basin 21.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 12
COPY 501
DISPLY 1
END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

#	-	#	<-----Title----->	***	TRAN	PIVL	DIG1	FIL1	PYR	DIG2	FIL2	YRND
1			Basin 1		MAX				1	2	30	9

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

#	-	#	NPT	NMN	***
1			1	1	
501			1	1	

END TIMESERIES

END COPY

GENER

OPCODE

#	#	OPCD	***

END OPCODE

PARM

#	#	K	***

END PARM

END GENER

PERLND

GEN-INFO

<PLS >	<-----Name----->	NBLKS	Unit-systems	Printer	***		
#	-	#	User	t-series	Engl	Metr	***
				in	out		***

12	C, Forest, Steep	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	***
12			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	*****
12			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 ***
12 0 0 0 0 0 0 0 0 0 0 0
END PWAT-PARM1

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILF LSUR SLSUR KVARY AGWRC
12 0 4.5 0.08 400 0.15 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
12 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
12 0.2 0.3 0.35 6 0.3 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
12 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

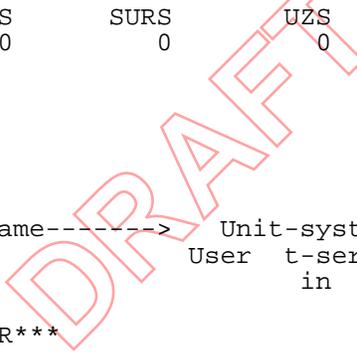
IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
END IWAT-PARM1

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->	<Name> #	<--Area-->	<-factor-->	<-Target->	MBLK	***
Basin	1	***			Tbl#	***
PERLND	12		10.6	COPY	501	12
PERLND	12		10.6	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	***	ODGTFG	for each	FUNCT	for each	***
# - #	VC A1 A2 A3	ODFVFG for each	***	ODGTFG	for each	FUNCT	for each	***
	FG FG FG FG	possible exit	***	possible exit		possible exit		***
	* * * *	* * * *		* * * *		* * * *		

END HYDR-PARM1

HYDR-PARM2

#	-	#	FTABNO	LEN	DELTH	STCOR	KS	DB50	***
<----->	<----->	<----->	<----->	<----->	<----->	<----->	<----->	<----->	***

END HYDR-PARM2

HYDR-INIT

RCHRES	Initial conditions	for each HYDR section	***
# - #	*** VOL	Initial value of COLIND	Initial value of OUTDGT
	*** ac-ft	for each possible exit	for each possible exit
<----->	<----->	<----->	<----->

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name> #	tem	strg	<-factor-->strg	<Name> #	#	<Name> #
WDM	2	PREC	ENGL	1.2	PERLND	1	999	EXTNL
WDM	2	PREC	ENGL	1.2	IMPLND	1	999	EXTNL

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

DRAFT

Mitigated UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 2.wdm	
MESSU	25	MitEast Hill Basin 2.MES	
	27	MitEast Hill Basin 2.L61	
	28	MitEast Hill Basin 2.L62	
	30	POCEast Hill Basin 21.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 14
IMPLND 2
IMPLND 4
IMPLND 9
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			Vault 1		MAX				1	2	30	9

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES
- # NPT NMN ***
1 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			***
14	C, Pasture, Mod	1	1	1	1	27	0

END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS >	***** Active Sections *****														***
#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
14			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  *****
14  0  0  4  0  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 VIRG  VLE INFC  HWT ***
14  0  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  LRSUR  SLSUR  KVARY  AGWRC
14  0  4.5  0.06  400  0.1  0.5  0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3 *****
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
14  0  0  2  2  0  0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4 *****
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP ***
14  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
14  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 ***
2  ROADS/MOD  1  1  1  27  0
4  ROOF TOPS/FLAT  1  1  1  27  0
9  SIDEWALKS/MOD  1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
2  0  0  1  0  0  0
4  0  0  1  0  0  0
9  0  0  1  0  0  0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
2  0  0  4  0  0  4  1  9
4  0  0  4  0  0  0  1  9
9  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  ***
2  0  0  0  0  0
4  0  0  0  0  0
9  0  0  0  0  0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
2 400 0.05 0.1 0.08
4 400 0.01 0.1 0.1
9 400 0.05 0.1 0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
2 0 0
4 0 0
9 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
2 0 0
4 0 0
9 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 14 3.85 RCHRES 1 2
PERLND 14 3.85 RCHRES 1 3
IMPLND 2 1.72 RCHRES 1 5
IMPLND 4 4.55 RCHRES 1 5
IMPLND 9 0.48 RCHRES 1 5

```

*****Routing*****

```

PERLND 14 3.85 COPY 1 12
IMPLND 2 1.72 COPY 1 15
IMPLND 4 4.55 COPY 1 15
IMPLND 9 0.48 COPY 1 15
PERLND 14 3.85 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 Vault 1 1 1 1 1 28 0 1

```

END GEN-INFO

*** Section RCHRES***

ACTIVITY

```

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

```


3.022222	0.308907	0.933586	0.294851
3.116667	0.308907	0.962761	0.299422
3.211111	0.308907	0.991936	0.303925
3.305556	0.308907	1.021110	0.308362
3.400000	0.308907	1.050285	0.312736
3.494444	0.308907	1.079459	0.317050
3.588889	0.308907	1.108634	0.321306
3.683333	0.308907	1.137808	0.325506
3.777778	0.308907	1.166983	0.329653
3.872222	0.308907	1.196158	0.333748
3.966667	0.308907	1.225332	0.337794
4.061111	0.308907	1.254507	0.341791
4.155556	0.308907	1.283681	0.438713
4.250000	0.308907	1.312856	0.502415
4.344444	0.308907	1.342030	0.548529
4.438889	0.308907	1.371205	0.586954
4.533333	0.308907	1.400380	0.620767
4.627778	0.308907	1.429554	0.651411
4.722222	0.308907	1.458729	0.679700
4.816667	0.308907	1.487903	0.706146
4.911111	0.308907	1.517078	0.731100
5.005556	0.308907	1.546252	0.754809
5.100000	0.308907	1.575427	0.777460
5.194444	0.308907	1.604602	0.799196
5.288889	0.308907	1.633776	0.820130
5.383333	0.308907	1.662951	0.840354
5.477778	0.308907	1.692125	0.859941
5.572222	0.308907	1.721300	0.878954
5.666667	0.308907	1.750474	0.897445
5.761111	0.308907	1.779649	0.915459
5.855556	0.308907	1.808824	0.933034
5.950000	0.308907	1.837998	0.950204
6.044444	0.308907	1.867173	0.966999
6.138889	0.308907	1.896347	1.002889
6.233333	0.308907	1.925522	1.035567
6.327778	0.308907	1.954696	1.062433
6.422222	0.308907	1.983871	1.086867
6.516667	0.308907	2.013046	1.109794
6.611111	0.308907	2.042220	1.131633
6.705556	0.308907	2.071395	1.152620
6.800000	0.308907	2.100569	1.172906
6.894444	0.308907	2.129744	1.192594
6.988889	0.308907	2.158918	1.211762
7.083333	0.308907	2.188093	1.230466
7.177778	0.308907	2.217268	1.248753
7.272222	0.308907	2.246442	1.266661
7.366667	0.308907	2.275617	1.284220
7.461111	0.308907	2.304791	1.301457
7.555556	0.308907	2.333966	1.735246
7.650000	0.308907	2.363140	3.182018
7.744444	0.308907	2.392315	5.184837
7.838889	0.308907	2.421490	7.594767
7.933333	0.308907	2.450664	10.31012
8.027778	0.308907	2.479839	13.23747
8.122222	0.308907	2.509013	16.28214
8.216667	0.308907	2.538188	19.34690
8.311111	0.308907	2.567363	22.33445
8.405556	0.308907	2.596537	25.15198
8.500000	0.308907	2.625712	27.71729
8.594444	0.308907	2.654886	29.96609

END FTABLE 1

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member-->	***			
<Name>	#	<Name>	#	tem	strg<-factor-->	strg	<Name>	#	#	***
WDM	2	PREC	ENGL	1.2	PERLND	1 999	EXTNL	PREC		
WDM	2	PREC	ENGL	1.2	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

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WWHM2012
PROJECT REPORT

VAULT C

General Model Information

WWHM2012 Project Name: East Hill Basin 3

Site Name:

Site Address:

City:

Report Date: 11/11/2025

Gage: Everett

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.200

Version Date: 2023/01/27

Version: 4.2.19

POC Thresholds

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

High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Steep	acre 14.45
Pervious Total	14.45
Impervious Land Use	acre
Impervious Total	0
Basin Total	14.45

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Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	6.45
Pervious Total	6.45
Impervious Land Use	acre
ROADS MOD	1.94
ROOF TOPS FLAT	5.52
SIDEWALKS MOD	0.54
Impervious Total	8
Basin Total	14.45

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Routing Elements
Predeveloped Routing

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Mitigated Routing

Vault 1

Width: 152 ft.
 Length: 122 ft.
 Depth: 7 ft.
 Discharge Structure
 Riser Height: 6 ft.
 Riser Diameter: 36 in.
 Orifice 1 Diameter: 3.063 in. Elevation:0 ft.
 Orifice 2 Diameter: 5.063 in. Elevation:3.5 ft.
 Element Flows To:
 Outlet 1 Outlet 2

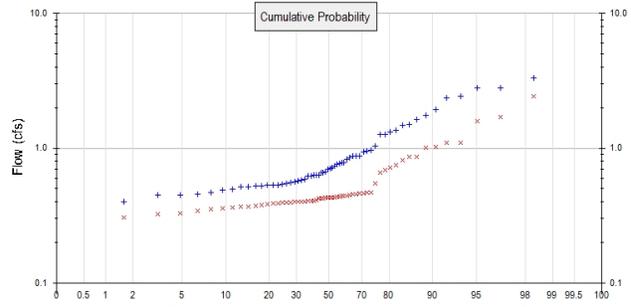
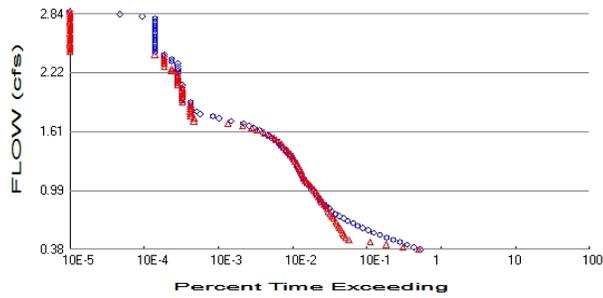
Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.425	0.000	0.000	0.000
0.0778	0.425	0.033	0.071	0.000
0.1556	0.425	0.066	0.100	0.000
0.2333	0.425	0.099	0.122	0.000
0.3111	0.425	0.132	0.142	0.000
0.3889	0.425	0.165	0.158	0.000
0.4667	0.425	0.198	0.173	0.000
0.5444	0.425	0.231	0.187	0.000
0.6222	0.425	0.264	0.200	0.000
0.7000	0.425	0.298	0.212	0.000
0.7778	0.425	0.331	0.224	0.000
0.8556	0.425	0.364	0.235	0.000
0.9333	0.425	0.397	0.245	0.000
1.0111	0.425	0.430	0.255	0.000
1.0889	0.425	0.463	0.265	0.000
1.1667	0.425	0.496	0.274	0.000
1.2444	0.425	0.529	0.283	0.000
1.3222	0.425	0.562	0.292	0.000
1.4000	0.425	0.596	0.301	0.000
1.4778	0.425	0.629	0.309	0.000
1.5556	0.425	0.662	0.317	0.000
1.6333	0.425	0.695	0.325	0.000
1.7111	0.425	0.728	0.332	0.000
1.7889	0.425	0.761	0.340	0.000
1.8667	0.425	0.794	0.347	0.000
1.9444	0.425	0.827	0.354	0.000
2.0222	0.425	0.860	0.361	0.000
2.1000	0.425	0.894	0.368	0.000
2.1778	0.425	0.927	0.375	0.000
2.2556	0.425	0.960	0.382	0.000
2.3333	0.425	0.993	0.388	0.000
2.4111	0.425	1.026	0.395	0.000
2.4889	0.425	1.059	0.401	0.000
2.5667	0.425	1.092	0.407	0.000
2.6444	0.425	1.125	0.413	0.000
2.7222	0.425	1.158	0.419	0.000
2.8000	0.425	1.192	0.425	0.000
2.8778	0.425	1.225	0.431	0.000
2.9556	0.425	1.258	0.437	0.000

3.0333	0.425	1.291	0.443	0.000
3.1111	0.425	1.324	0.448	0.000
3.1889	0.425	1.357	0.454	0.000
3.2667	0.425	1.390	0.460	0.000
3.3444	0.425	1.423	0.465	0.000
3.4222	0.425	1.456	0.470	0.000
3.5000	0.425	1.490	0.476	0.000
3.5778	0.425	1.523	0.675	0.000
3.6556	0.425	1.556	0.760	0.000
3.7333	0.425	1.589	0.827	0.000
3.8111	0.425	1.622	0.884	0.000
3.8889	0.425	1.655	0.935	0.000
3.9667	0.425	1.688	0.982	0.000
4.0444	0.425	1.721	1.025	0.000
4.1222	0.425	1.754	1.065	0.000
4.2000	0.425	1.788	1.103	0.000
4.2778	0.425	1.821	1.139	0.000
4.3556	0.425	1.854	1.174	0.000
4.4333	0.425	1.887	1.207	0.000
4.5111	0.425	1.920	1.239	0.000
4.5889	0.425	1.953	1.271	0.000
4.6667	0.425	1.986	1.301	0.000
4.7444	0.425	2.019	1.330	0.000
4.8222	0.425	2.052	1.358	0.000
4.9000	0.425	2.086	1.386	0.000
4.9778	0.425	2.119	1.413	0.000
5.0556	0.425	2.152	1.439	0.000
5.1333	0.425	2.185	1.465	0.000
5.2111	0.425	2.218	1.490	0.000
5.2889	0.425	2.251	1.515	0.000
5.3667	0.425	2.284	1.539	0.000
5.4444	0.425	2.317	1.563	0.000
5.5222	0.425	2.350	1.587	0.000
5.6000	0.425	2.384	1.610	0.000
5.6778	0.425	2.417	1.632	0.000
5.7556	0.425	2.450	1.655	0.000
5.8333	0.425	2.483	1.677	0.000
5.9111	0.425	2.516	1.698	0.000
5.9889	0.425	2.549	1.720	0.000
6.0667	0.425	2.582	2.289	0.000
6.1444	0.425	2.615	3.507	0.000
6.2222	0.425	2.648	5.107	0.000
6.3000	0.425	2.682	7.001	0.000
6.3778	0.425	2.715	9.129	0.000
6.4556	0.425	2.748	11.43	0.000
6.5333	0.425	2.781	13.87	0.000
6.6111	0.425	2.814	16.38	0.000
6.6889	0.425	2.847	18.92	0.000
6.7667	0.425	2.880	21.42	0.000
6.8444	0.425	2.913	23.84	0.000
6.9222	0.425	2.946	26.11	0.000
7.0000	0.425	2.980	28.21	0.000
7.0778	0.425	3.013	30.10	0.000
7.1556	0.000	0.000	31.74	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 14.45
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 6.45
Total Impervious Area: 8

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.761432
5 year	1.242302
10 year	1.648231
25 year	2.275417
50 year	2.835419
100 year	3.483647

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.470849
5 year	0.704273
10 year	0.900462
25 year	1.203367
50 year	1.474294
100 year	1.788884

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.820	0.407
1950	0.938	0.422
1951	0.654	0.390
1952	0.623	0.329
1953	0.561	0.344
1954	2.815	0.437
1955	0.949	0.456
1956	0.779	0.655
1957	1.044	0.863
1958	2.792	0.401

1959	0.694	0.441
1960	0.739	0.467
1961	3.340	0.448
1962	0.773	0.423
1963	1.265	0.393
1964	0.876	0.388
1965	0.544	0.430
1966	0.398	0.355
1967	0.782	0.408
1968	0.970	0.858
1969	2.423	0.379
1970	0.491	0.372
1971	0.877	0.458
1972	0.631	0.431
1973	0.528	0.400
1974	1.479	0.401
1975	0.666	0.369
1976	0.553	0.443
1977	0.495	0.383
1978	0.525	0.326
1979	1.489	0.468
1980	0.703	0.366
1981	0.520	0.398
1982	0.716	1.014
1983	1.270	0.399
1984	0.634	0.691
1985	0.870	0.546
1986	1.942	1.596
1987	0.847	1.095
1988	0.527	0.444
1989	0.656	0.289
1990	0.581	0.461
1991	0.625	0.464
1992	0.534	0.413
1993	0.529	0.364
1994	0.450	0.429
1995	0.633	0.752
1996	1.355	0.809
1997	2.371	2.428
1998	0.455	0.355
1999	0.515	0.430
2000	0.450	0.712
2001	0.202	0.305
2002	0.592	0.439
2003	0.467	0.392
2004	0.761	1.028
2005	0.572	0.432
2006	1.636	1.099
2007	1.325	0.423
2008	1.748	1.714
2009	0.541	0.409

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	3.3397	2.4283
2	2.8152	1.7137
3	2.7923	1.5964

4	2.4234	1.0992
5	2.3712	1.0954
6	1.9416	1.0279
7	1.7477	1.0144
8	1.6359	0.8628
9	1.4892	0.8576
10	1.4785	0.8089
11	1.3548	0.7520
12	1.3251	0.7115
13	1.2702	0.6910
14	1.2646	0.6553
15	1.0440	0.5462
16	0.9698	0.4681
17	0.9487	0.4666
18	0.9379	0.4636
19	0.8768	0.4609
20	0.8760	0.4580
21	0.8705	0.4565
22	0.8472	0.4480
23	0.8205	0.4437
24	0.7820	0.4434
25	0.7791	0.4411
26	0.7726	0.4385
27	0.7611	0.4368
28	0.7390	0.4323
29	0.7164	0.4310
30	0.7032	0.4300
31	0.6945	0.4299
32	0.6658	0.4288
33	0.6557	0.4231
34	0.6539	0.4225
35	0.6339	0.4218
36	0.6328	0.4126
37	0.6307	0.4087
38	0.6252	0.4085
39	0.6228	0.4070
40	0.5917	0.4014
41	0.5806	0.4013
42	0.5716	0.4004
43	0.5611	0.3988
44	0.5530	0.3976
45	0.5444	0.3928
46	0.5411	0.3924
47	0.5342	0.3900
48	0.5289	0.3880
49	0.5285	0.3831
50	0.5271	0.3788
51	0.5254	0.3721
52	0.5204	0.3687
53	0.5149	0.3661
54	0.4952	0.3638
55	0.4909	0.3555
56	0.4673	0.3549
57	0.4551	0.3443
58	0.4498	0.3288
59	0.4496	0.3262
60	0.3982	0.3045
61	0.2023	0.2892

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.3807	11244	10579	94	Pass
0.4055	9129	6509	71	Pass
0.4303	7405	3882	52	Pass
0.4551	5940	2383	40	Pass
0.4799	4864	1213	24	Pass
0.5047	3938	1111	28	Pass
0.5295	3215	1059	32	Pass
0.5543	2646	1006	38	Pass
0.5791	2209	968	43	Pass
0.6039	1877	927	49	Pass
0.6287	1600	886	55	Pass
0.6535	1390	846	60	Pass
0.6783	1176	814	69	Pass
0.7031	1030	762	73	Pass
0.7278	899	714	79	Pass
0.7526	807	683	84	Pass
0.7774	718	651	90	Pass
0.8022	662	623	94	Pass
0.8270	608	594	97	Pass
0.8518	572	562	98	Pass
0.8766	526	526	100	Pass
0.9014	499	501	100	Pass
0.9262	472	478	101	Pass
0.9510	448	461	102	Pass
0.9758	430	437	101	Pass
1.0006	408	410	100	Pass
1.0254	380	387	101	Pass
1.0502	343	368	107	Pass
1.0750	329	338	102	Pass
1.0998	312	318	101	Pass
1.1246	300	300	100	Pass
1.1494	285	291	102	Pass
1.1742	275	280	101	Pass
1.1990	266	270	101	Pass
1.2237	255	262	102	Pass
1.2485	245	253	103	Pass
1.2733	236	244	103	Pass
1.2981	226	233	103	Pass
1.3229	213	225	105	Pass
1.3477	201	217	107	Pass
1.3725	191	199	104	Pass
1.3973	175	187	106	Pass
1.4221	166	176	106	Pass
1.4469	155	162	104	Pass
1.4717	146	151	103	Pass
1.4965	135	142	105	Pass
1.5213	122	128	104	Pass
1.5461	111	119	107	Pass
1.5709	99	105	106	Pass
1.5957	85	89	104	Pass
1.6205	77	72	93	Pass
1.6453	64	60	93	Pass
1.6701	55	45	81	Pass

1.6948	46	29	63	Pass
1.7196	32	10	31	Pass
1.7444	22	10	45	Pass
1.7692	18	9	50	Pass
1.7940	12	9	75	Pass
1.8188	11	9	81	Pass
1.8436	9	9	100	Pass
1.8684	9	9	100	Pass
1.8932	9	9	100	Pass
1.9180	9	7	77	Pass
1.9428	7	7	100	Pass
1.9676	7	7	100	Pass
1.9924	7	7	100	Pass
2.0172	7	7	100	Pass
2.0420	7	7	100	Pass
2.0668	7	7	100	Pass
2.0916	7	6	85	Pass
2.1164	6	6	100	Pass
2.1412	6	6	100	Pass
2.1660	6	6	100	Pass
2.1907	6	6	100	Pass
2.2155	6	6	100	Pass
2.2403	6	5	83	Pass
2.2651	6	5	83	Pass
2.2899	6	4	66	Pass
2.3147	6	4	66	Pass
2.3395	5	4	80	Pass
2.3643	5	4	80	Pass
2.3891	4	4	100	Pass
2.4139	4	3	75	Pass
2.4387	3	0	0	Pass
2.4635	3	0	0	Pass
2.4883	3	0	0	Pass
2.5131	3	0	0	Pass
2.5379	3	0	0	Pass
2.5627	3	0	0	Pass
2.5875	3	0	0	Pass
2.6123	3	0	0	Pass
2.6371	3	0	0	Pass
2.6619	3	0	0	Pass
2.6866	3	0	0	Pass
2.7114	3	0	0	Pass
2.7362	3	0	0	Pass
2.7610	3	0	0	Pass
2.7858	3	0	0	Pass
2.8106	2	0	0	Pass
2.8354	1	0	0	Pass

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Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

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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
Vault 1 POC	<input type="checkbox"/>	1859.92			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		1859.92	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

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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.

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Appendix
Predeveloped Schematic



Basin 1
14.45ac

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      East Hill Basin 3.wdm
MESSU    25      PreEast Hill Basin 3.MES
          27      PreEast Hill Basin 3.L61
          28      PreEast Hill Basin 3.L62
          30      POCEast Hill Basin 31.dat
END FILES
```

```
OPN SEQUENCE
  INGRP              INDELT 00:15
  PERLND            12
  COPY              501
  DISPLY            1
  END INGRP
END OPN SEQUENCE
```

```
DISPLY
  DISPLY-INFO1
  # - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
  1   Basin 1          MAX          1   2   30   9
  END DISPLY-INFO1
END DISPLY
```

```
COPY
  TIMESERIES
  # - # NPT NMN ***
  1   1   1
  501 1   1
  END TIMESERIES
END COPY
```

```
GENER
  OPCODE
  #   # OPCD ***
  END OPCODE
  PARM
  #   #           K ***
  END PARM
END GENER
```

```
PERLND
  GEN-INFO
  <PLS ><-----Name----->NBLKS  Unit-systems  Printer ***
  # - #                               User  t-series  Engl Metr ***
                               in  out          ***
  12   C, Forest, Steep          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 ***
  12   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 *****
  12   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 ***
12 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 LRSUR SLSUR KVARY AGWRC
12 0 4.5 0.08 400 0.15 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
12 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
12 0.2 0.3 0.35 6 0.3 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
12 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 ***
# - # *** LRSUR 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->	<Name> #	<--Area-->	<-factor-->	<-Target->	MBLK	***
Basin	1	***			Tbl#	***
PERLND	12		14.45	COPY	501	12
PERLND	12		14.45	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	***	ODGTFG	for each	FUNCT	for each	***
# - #	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
	***	ac-ft	for each	possible	exit	for each

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name> #	tem	strg	<-factor-->strg	<Name> #	#	<Name> #
WDM	2	PREC	ENGL	1.2	PERLND	1	999	EXTNL
								PREC
WDM	2	PREC	ENGL	1.2	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

DRAFT

Mitigated UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 3.wdm	
MESSU	25	MitEast Hill Basin 3.MES	
	27	MitEast Hill Basin 3.L61	
	28	MitEast Hill Basin 3.L62	
	30	POCEast Hill Basin 31.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 14
IMPLND 2
IMPLND 4
IMPLND 9
RCHRES 1
COPY 1
COPY 501
DISPLY 1

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INF01

#	-	#	<-----Title----->	***	TRAN	PIVL	DIG1	FIL1	PYR	DIG2	FIL2	YRND
1			Vault 1		MAX				1	2	30	9

END DISPLY-INF01

END DISPLY

COPY

TIMESERIES
- # NPT NMN ***
1 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			***
14	C, Pasture, Mod	1	1	1	1	27	0

END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS >	***** Active Sections *****														***
#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
14			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  *****
14   0   0   4   0   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 VIRG  VLE INFC  HWT ***
14   0   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  LRSUR  SLSUR  KVARY  AGWRC
14   0   4.5  0.06  400   0.1   0.5   0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3          ***
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
14   0   0   2   2   0   0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4          ***
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP ***
14   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
14   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 ***
2     ROADS/MOD             1  1  1  27  0
4     ROOF TOPS/FLAT       1  1  1  27  0
9     SIDEWALKS/MOD        1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
2     0   0   1   0   0   0
4     0   0   1   0   0   0
9     0   0   1   0   0   0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
2     0   0   4   0   0   4   1   9
4     0   0   4   0   0   0   1   9
9     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  ***
2     0   0   0   0   0
4     0   0   0   0   0
9     0   0   0   0   0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
2 400 0.05 0.1 0.08
4 400 0.01 0.1 0.1
9 400 0.05 0.1 0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
2 0 0
4 0 0
9 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
2 0 0
4 0 0
9 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 14 6.45 RCHRES 1 2
PERLND 14 6.45 RCHRES 1 3
IMPLND 2 1.94 RCHRES 1 5
IMPLND 4 5.52 RCHRES 1 5
IMPLND 9 0.54 RCHRES 1 5

```

*****Routing*****

```

PERLND 14 6.45 COPY 1 12
IMPLND 2 1.94 COPY 1 15
IMPLND 4 5.52 COPY 1 15
IMPLND 9 0.54 COPY 1 15
PERLND 14 6.45 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 Vault 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 ***

```


2.488889	0.425712	1.059549	0.401526
2.566667	0.425712	1.092660	0.407752
2.644444	0.425712	1.125771	0.413884
2.722222	0.425712	1.158882	0.419926
2.800000	0.425712	1.191993	0.425883
2.877778	0.425712	1.225104	0.431757
2.955556	0.425712	1.258214	0.437553
3.033333	0.425712	1.291325	0.443273
3.111111	0.425712	1.324436	0.448920
3.188889	0.425712	1.357547	0.454497
3.266667	0.425712	1.390658	0.460006
3.344444	0.425712	1.423769	0.465450
3.422222	0.425712	1.456880	0.470831
3.500000	0.425712	1.489991	0.476151
3.577778	0.425712	1.523102	0.675375
3.655556	0.425712	1.556213	0.760921
3.733333	0.425712	1.589324	0.827719
3.811111	0.425712	1.622434	0.884787
3.888889	0.425712	1.655545	0.935620
3.966667	0.425712	1.688656	0.982010
4.044444	0.425712	1.721767	1.025022
4.122222	0.425712	1.754878	1.065353
4.200000	0.425712	1.787989	1.103483
4.277778	0.425712	1.821100	1.139767
4.355556	0.425712	1.854211	1.174468
4.433333	0.425712	1.887322	1.207794
4.511111	0.425712	1.920433	1.239911
4.588889	0.425712	1.953544	1.270950
4.666667	0.425712	1.986654	1.301024
4.744444	0.425712	2.019765	1.330223
4.822222	0.425712	2.052876	1.358626
4.900000	0.425712	2.085987	1.386301
4.977778	0.425712	2.119098	1.413304
5.055556	0.425712	2.152209	1.439687
5.133333	0.425712	2.185320	1.465493
5.211111	0.425712	2.218431	1.490762
5.288889	0.425712	2.251542	1.515529
5.366667	0.425712	2.284653	1.539823
5.444444	0.425712	2.317763	1.563675
5.522222	0.425712	2.350874	1.587108
5.600000	0.425712	2.383985	1.610145
5.677778	0.425712	2.417096	1.632807
5.755556	0.425712	2.450207	1.655114
5.833333	0.425712	2.483318	1.677082
5.911111	0.425712	2.516429	1.698728
5.988889	0.425712	2.549540	1.720065
6.066667	0.425712	2.582651	2.288990
6.144444	0.425712	2.615762	3.507341
6.222222	0.425712	2.648873	5.107491
6.300000	0.425712	2.681983	7.001666
6.377778	0.425712	2.715094	9.129627
6.455556	0.425712	2.748205	11.43841
6.533333	0.425712	2.781316	13.87600
6.611111	0.425712	2.814427	16.38929
6.688889	0.425712	2.847538	18.92395
6.766667	0.425712	2.880649	21.42537
6.844444	0.425712	2.913760	23.84028
6.922222	0.425712	2.946871	26.11883
7.000000	0.425712	2.979982	28.21718
7.077778	0.425712	3.013093	30.10034

END FTABLE 1
 END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	tem strg<-factor->	strg	<Name>	# #
WDM	2	PREC	ENGL	1.2	PERLND	1 999 EXTNL	PREC
WDM	2	PREC	ENGL	1.2	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

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WWHM2012
PROJECT REPORT

VAULT D

General Model Information

WWHM2012 Project Name: East Hill Basin 5, 7, 8

Site Name:

Site Address:

City:

Report Date: 9/18/2025

Gage: Everett

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.200

Version Date: 2023/01/27

Version: 4.2.19

POC Thresholds

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

High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Steep	acre 16.1
Pervious Total	16.1
Impervious Land Use	acre
Impervious Total	0
Basin Total	16.1

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Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	6.87
Pervious Total	6.87
Impervious Land Use	acre
ROADS MOD	2.35
ROOF TOPS FLAT	6.16
SIDEWALKS MOD	0.72
Impervious Total	9.23
Basin Total	16.1

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Routing Elements
Predeveloped Routing

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Mitigated Routing

Vault 1

Width: 92 ft.
 Length: 276 ft.
 Depth: 7 ft.
 Discharge Structure
 Riser Height: 6 ft.
 Riser Diameter: 24 in.
 Notch Type: Rectangular
 Notch Width: 0.041 ft.
 Notch Height: 3.500 ft.
 Orifice 2 Diameter: 3.375 in. Elevation:0 ft.
 Orifice 3 Diameter: 1.875 in. Elevation:2.75 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Vault Hydraulic Table

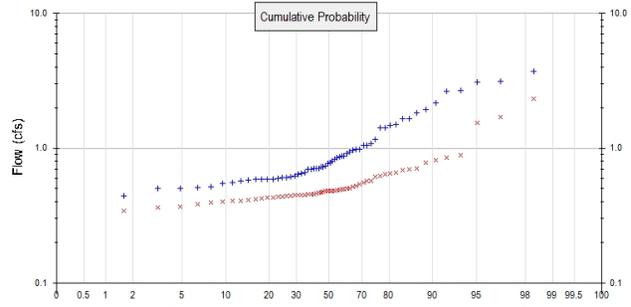
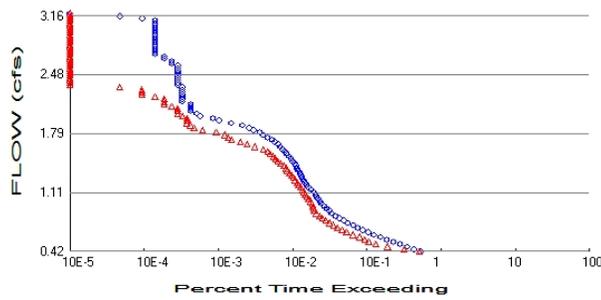
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.582	0.000	0.000	0.000
0.0778	0.582	0.045	0.086	0.000
0.1556	0.582	0.090	0.121	0.000
0.2333	0.582	0.136	0.149	0.000
0.3111	0.582	0.181	0.172	0.000
0.3889	0.582	0.226	0.192	0.000
0.4667	0.582	0.272	0.211	0.000
0.5444	0.582	0.317	0.228	0.000
0.6222	0.582	0.362	0.243	0.000
0.7000	0.582	0.408	0.258	0.000
0.7778	0.582	0.453	0.272	0.000
0.8556	0.582	0.498	0.285	0.000
0.9333	0.582	0.544	0.298	0.000
1.0111	0.582	0.589	0.310	0.000
1.0889	0.582	0.634	0.322	0.000
1.1667	0.582	0.680	0.333	0.000
1.2444	0.582	0.725	0.344	0.000
1.3222	0.582	0.770	0.355	0.000
1.4000	0.582	0.816	0.365	0.000
1.4778	0.582	0.861	0.375	0.000
1.5556	0.582	0.906	0.385	0.000
1.6333	0.582	0.952	0.395	0.000
1.7111	0.582	0.997	0.404	0.000
1.7889	0.582	1.042	0.413	0.000
1.8667	0.582	1.088	0.422	0.000
1.9444	0.582	1.133	0.431	0.000
2.0222	0.582	1.178	0.439	0.000
2.1000	0.582	1.224	0.447	0.000
2.1778	0.582	1.269	0.456	0.000
2.2556	0.582	1.314	0.464	0.000
2.3333	0.582	1.360	0.472	0.000
2.4111	0.582	1.405	0.480	0.000
2.4889	0.582	1.450	0.487	0.000
2.5667	0.582	1.496	0.497	0.000
2.6444	0.582	1.541	0.509	0.000
2.7222	0.582	1.586	0.523	0.000

2.8000	0.582	1.632	0.559	0.000
2.8778	0.582	1.677	0.587	0.000
2.9556	0.582	1.722	0.612	0.000
3.0333	0.582	1.768	0.636	0.000
3.1111	0.582	1.813	0.659	0.000
3.1889	0.582	1.858	0.682	0.000
3.2667	0.582	1.904	0.704	0.000
3.3444	0.582	1.949	0.726	0.000
3.4222	0.582	1.994	0.748	0.000
3.5000	0.582	2.040	0.770	0.000
3.5778	0.582	2.085	0.793	0.000
3.6556	0.582	2.130	0.817	0.000
3.7333	0.582	2.176	0.841	0.000
3.8111	0.582	2.221	0.865	0.000
3.8889	0.582	2.266	0.890	0.000
3.9667	0.582	2.312	0.977	0.000
4.0444	0.582	2.357	1.007	0.000
4.1222	0.582	2.402	1.037	0.000
4.2000	0.582	2.448	1.068	0.000
4.2778	0.582	2.493	1.099	0.000
4.3556	0.582	2.538	1.130	0.000
4.4333	0.582	2.584	1.162	0.000
4.5111	0.582	2.629	1.194	0.000
4.5889	0.582	2.675	1.226	0.000
4.6667	0.582	2.720	1.259	0.000
4.7444	0.582	2.765	1.292	0.000
4.8222	0.582	2.811	1.326	0.000
4.9000	0.582	2.856	1.360	0.000
4.9778	0.582	2.901	1.394	0.000
5.0556	0.582	2.947	1.429	0.000
5.1333	0.582	2.992	1.463	0.000
5.2111	0.582	3.037	1.499	0.000
5.2889	0.582	3.083	1.534	0.000
5.3667	0.582	3.128	1.570	0.000
5.4444	0.582	3.173	1.606	0.000
5.5222	0.582	3.219	1.642	0.000
5.6000	0.582	3.264	1.679	0.000
5.6778	0.582	3.309	1.716	0.000
5.7556	0.582	3.355	1.754	0.000
5.8333	0.582	3.400	1.791	0.000
5.9111	0.582	3.445	1.829	0.000
5.9889	0.582	3.491	1.867	0.000
6.0667	0.582	3.536	2.244	0.000
6.1444	0.582	3.581	3.048	0.000
6.2222	0.582	3.627	4.098	0.000
6.3000	0.582	3.672	5.321	0.000
6.3778	0.582	3.717	6.652	0.000
6.4556	0.582	3.763	8.025	0.000
6.5333	0.582	3.808	9.376	0.000
6.6111	0.582	3.853	10.63	0.000
6.6889	0.582	3.899	11.75	0.000
6.7667	0.582	3.944	12.69	0.000
6.8444	0.582	3.989	13.42	0.000
6.9222	0.582	4.035	13.98	0.000
7.0000	0.582	4.080	14.42	0.000
7.0778	0.582	4.125	15.04	0.000
7.1556	0.000	0.000	15.51	0.000

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Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 16.1
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 6.87
Total Impervious Area: 9.23

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.848377
5 year	1.384157
10 year	1.836437
25 year	2.53524
50 year	3.159189
100 year	3.881436

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.505304
5 year	0.701318
10 year	0.856652
25 year	1.084757
50 year	1.279762
100 year	1.498016

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.914	0.455
1950	1.045	0.471
1951	0.729	0.436
1952	0.694	0.367
1953	0.625	0.386
1954	3.137	0.487
1955	1.057	0.519
1956	0.868	0.626
1957	1.163	0.707
1958	3.111	0.448

1959	0.774	0.494
1960	0.823	0.571
1961	3.721	0.504
1962	0.861	0.472
1963	1.409	0.437
1964	0.976	0.433
1965	0.607	0.480
1966	0.444	0.398
1967	0.871	0.455
1968	1.081	0.697
1969	2.700	0.425
1970	0.547	0.416
1971	0.977	0.528
1972	0.703	0.483
1973	0.589	0.448
1974	1.647	0.448
1975	0.742	0.412
1976	0.616	0.499
1977	0.552	0.430
1978	0.585	0.364
1979	1.659	0.575
1980	0.784	0.408
1981	0.580	0.444
1982	0.798	0.785
1983	1.415	0.446
1984	0.706	0.636
1985	0.970	0.614
1986	2.163	1.537
1987	0.944	0.883
1988	0.587	0.501
1989	0.731	0.324
1990	0.647	0.543
1991	0.697	0.555
1992	0.595	0.462
1993	0.589	0.407
1994	0.501	0.479
1995	0.705	0.651
1996	1.509	0.684
1997	2.642	2.334
1998	0.507	0.397
1999	0.574	0.481
2000	0.501	0.654
2001	0.225	0.342
2002	0.659	0.490
2003	0.521	0.441
2004	0.848	0.851
2005	0.637	0.483
2006	1.823	0.815
2007	1.476	0.472
2008	1.947	1.706
2009	0.603	0.457

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	3.7210	2.3336
2	3.1366	1.7058
3	3.1112	1.5366

4	2.7001	0.8831
5	2.6419	0.8512
6	2.1634	0.8147
7	1.9473	0.7849
8	1.8227	0.7070
9	1.6593	0.6967
10	1.6473	0.6844
11	1.5095	0.6543
12	1.4764	0.6506
13	1.4152	0.6355
14	1.4090	0.6262
15	1.1633	0.6145
16	1.0806	0.5749
17	1.0570	0.5708
18	1.0451	0.5550
19	0.9769	0.5426
20	0.9760	0.5278
21	0.9699	0.5190
22	0.9440	0.5038
23	0.9141	0.5008
24	0.8713	0.4988
25	0.8680	0.4936
26	0.8608	0.4903
27	0.8480	0.4872
28	0.8234	0.4829
29	0.7982	0.4827
30	0.7835	0.4806
31	0.7738	0.4797
32	0.7418	0.4793
33	0.7305	0.4721
34	0.7286	0.4716
35	0.7063	0.4706
36	0.7050	0.4618
37	0.7028	0.4569
38	0.6966	0.4552
39	0.6940	0.4549
40	0.6593	0.4483
41	0.6469	0.4480
42	0.6368	0.4477
43	0.6251	0.4464
44	0.6161	0.4443
45	0.6066	0.4410
46	0.6029	0.4375
47	0.5952	0.4357
48	0.5893	0.4329
49	0.5888	0.4297
50	0.5873	0.4251
51	0.5854	0.4158
52	0.5798	0.4118
53	0.5737	0.4083
54	0.5518	0.4072
55	0.5470	0.3984
56	0.5207	0.3968
57	0.5071	0.3861
58	0.5011	0.3671
59	0.5009	0.3644
60	0.4437	0.3422
61	0.2254	0.3240

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4242	11197	10844	96	Pass
0.4518	9137	6748	73	Pass
0.4794	7409	4092	55	Pass
0.5071	5935	2834	47	Pass
0.5347	4855	2274	46	Pass
0.5623	3927	2001	50	Pass
0.5899	3223	1726	53	Pass
0.6176	2648	1402	52	Pass
0.6452	2212	1132	51	Pass
0.6728	1876	994	52	Pass
0.7005	1597	855	53	Pass
0.7281	1389	762	54	Pass
0.7557	1178	672	57	Pass
0.7833	1031	596	57	Pass
0.8110	899	540	60	Pass
0.8386	806	492	61	Pass
0.8662	718	445	61	Pass
0.8938	663	413	62	Pass
0.9215	609	406	66	Pass
0.9491	569	399	70	Pass
0.9767	527	393	74	Pass
1.0043	499	374	74	Pass
1.0320	473	350	73	Pass
1.0596	449	332	73	Pass
1.0872	430	318	73	Pass
1.1148	409	305	74	Pass
1.1425	380	290	76	Pass
1.1701	343	272	79	Pass
1.1977	329	258	78	Pass
1.2254	312	246	78	Pass
1.2530	300	232	77	Pass
1.2806	285	220	77	Pass
1.3082	275	207	75	Pass
1.3359	266	193	72	Pass
1.3635	255	183	71	Pass
1.3911	244	174	71	Pass
1.4187	236	162	68	Pass
1.4464	226	146	64	Pass
1.4740	213	135	63	Pass
1.5016	201	126	62	Pass
1.5292	191	117	61	Pass
1.5569	175	106	60	Pass
1.5845	166	99	59	Pass
1.6121	155	86	55	Pass
1.6397	146	66	45	Pass
1.6674	135	52	38	Pass
1.6950	122	42	34	Pass
1.7226	112	32	28	Pass
1.7502	98	29	29	Pass
1.7779	85	26	30	Pass
1.8055	77	20	25	Pass
1.8331	64	13	20	Pass
1.8608	55	10	18	Pass

1.8884	45	9	20	Pass
1.9160	32	8	25	Pass
1.9436	22	8	36	Pass
1.9713	18	8	44	Pass
1.9989	12	7	58	Pass
2.0265	11	6	54	Pass
2.0541	9	6	66	Pass
2.0818	9	6	66	Pass
2.1094	9	5	55	Pass
2.1370	9	4	44	Pass
2.1646	7	4	57	Pass
2.1923	7	4	57	Pass
2.2199	7	3	42	Pass
2.2475	7	2	28	Pass
2.2751	7	2	28	Pass
2.3028	7	2	28	Pass
2.3304	7	1	14	Pass
2.3580	6	0	0	Pass
2.3857	6	0	0	Pass
2.4133	6	0	0	Pass
2.4409	6	0	0	Pass
2.4685	6	0	0	Pass
2.4962	6	0	0	Pass
2.5238	6	0	0	Pass
2.5514	6	0	0	Pass
2.5790	6	0	0	Pass
2.6067	5	0	0	Pass
2.6343	5	0	0	Pass
2.6619	4	0	0	Pass
2.6895	4	0	0	Pass
2.7172	3	0	0	Pass
2.7448	3	0	0	Pass
2.7724	3	0	0	Pass
2.8000	3	0	0	Pass
2.8277	3	0	0	Pass
2.8553	3	0	0	Pass
2.8829	3	0	0	Pass
2.9106	3	0	0	Pass
2.9382	3	0	0	Pass
2.9658	3	0	0	Pass
2.9934	3	0	0	Pass
3.0211	3	0	0	Pass
3.0487	3	0	0	Pass
3.0763	3	0	0	Pass
3.1039	3	0	0	Pass
3.1316	2	0	0	Pass
3.1592	1	0	0	Pass

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Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

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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
Vault 1 POC	<input type="checkbox"/>	2107.13			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		2107.13	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

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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.

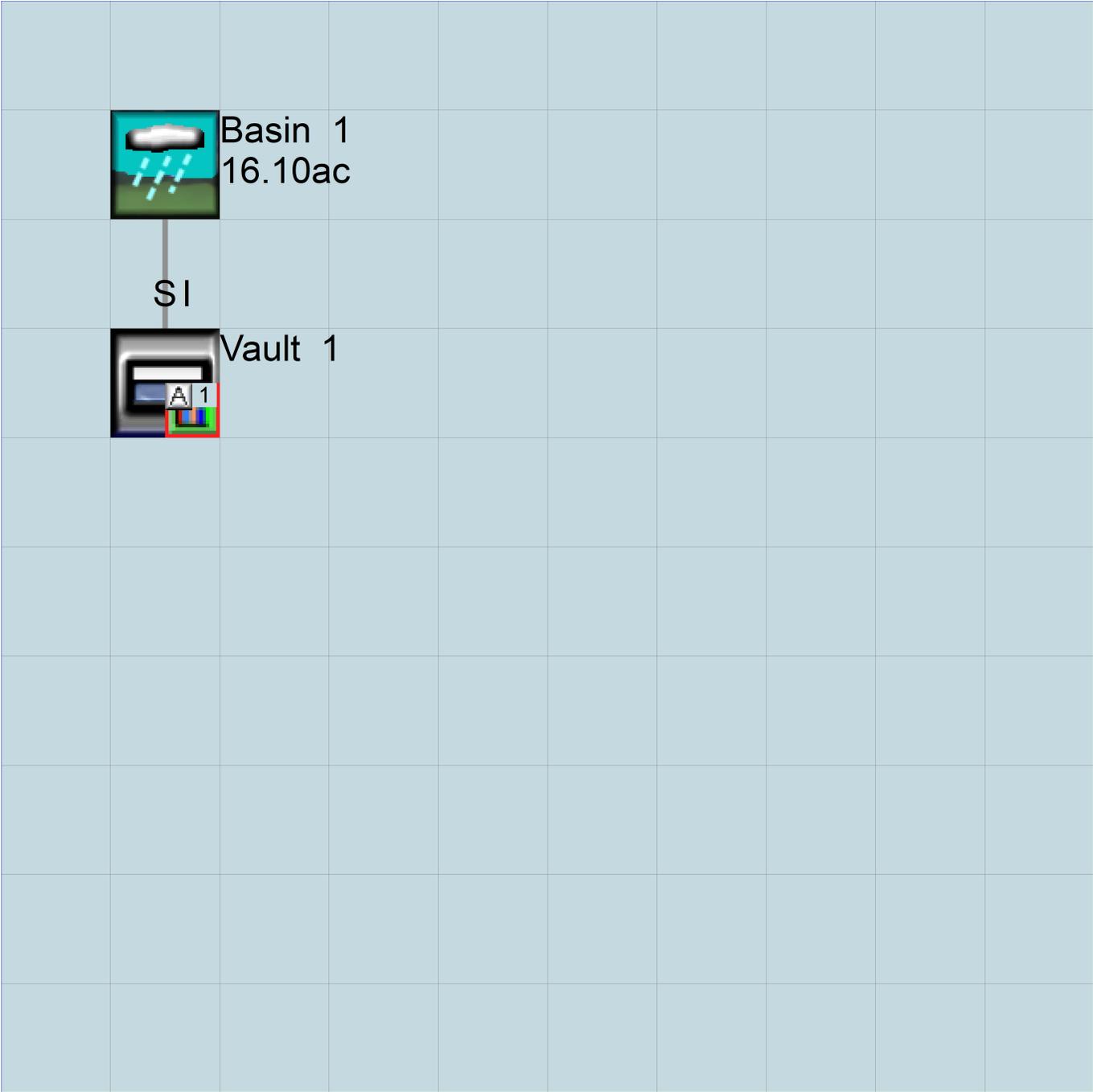
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Appendix
Predeveloped Schematic



Basin 1
16.10ac

Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 5, 7, 8.wdm	
MESSU	25	PreEast Hill Basin 5, 7, 8.MES	
	27	PreEast Hill Basin 5, 7, 8.L61	
	28	PreEast Hill Basin 5, 7, 8.L62	
	30	POEast Hill Basin 5, 7, 81.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 12
COPY 501
DISPLY 1
END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

#	-	#	<-----Title----->	***	TRAN	PIVL	DIG1	FIL1	PYR	DIG2	FIL2	YRND
1			Basin 1		MAX				1	2	30	9

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

#	-	#	NPT	NMN	***
1			1	1	
501			1	1	

END TIMESERIES

END COPY

GENER

OPCODE

OPCD ***

END OPCODE

PARM

K ***

END PARM

END GENER

PERLND

GEN-INFO

<PLS >	<-----Name----->	NBLKS	Unit-systems	Printer	***	
#	-	#	User	t-series	Engl Metr	***
			in	out		***

12	C, Forest, Steep	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	***
12			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	*****
12			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 ***
12 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
12 0 4.5 0.08 400 0.15 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
12 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
12 0.2 0.3 0.35 6 0.3 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
12 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

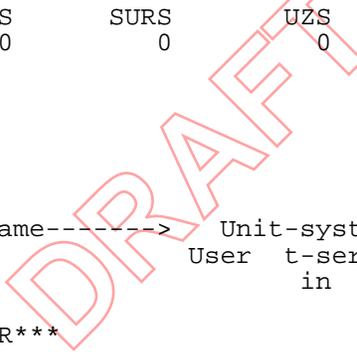
IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
END IWAT-PARM1

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->	<Name> #	<--Area-->	<-factor-->	<-Target->	MBLK	***
Basin	1***				Tbl#	***
PERLND	12	16.1		COPY	501	12
PERLND	12	16.1		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	***	ODGTFG	for each	FUNCT	for each	***
# - #	VC A1 A2 A3	ODFVFG for each	***	ODGTFG	for each	FUNCT	for each	***
	FG FG FG FG	possible exit	***	possible exit		possible exit		***
	* * * *	* * * *		* * * *		* * * *		

END HYDR-PARM1

HYDR-PARM2

#	-	#	FTABNO	LEN	DELTH	STCOR	KS	DB50	***
<----->	<----->	<----->	<----->	<----->	<----->	<----->	<----->	<----->	***

END HYDR-PARM2

HYDR-INIT

RCHRES	Initial conditions	for each HYDR section	***
# - #	*** VOL	Initial value of COLIND	Initial value of OUTDGT
	*** ac-ft	for each possible exit	for each possible exit
<----->	<----->	<----->	<----->

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name> #	tem	strg	<-factor-->strg	<Name> #	#	<Name> #
WDM	2	PREC	ENGL	1.2	PERLND	1	999	EXTNL
WDM	2	PREC	ENGL	1.2	IMPLND	1	999	EXTNL

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

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Mitigated UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 5, 7, 8.wdm	
MESSU	25	MitEast Hill Basin 5, 7, 8.MES	
	27	MitEast Hill Basin 5, 7, 8.L61	
	28	MitEast Hill Basin 5, 7, 8.L62	
	30	POCEast Hill Basin 5, 7, 81.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 14
IMPLND 2
IMPLND 4
IMPLND 9
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			Vault 1		MAX				1	2	30	9

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES
- # NPT NMN ***
1 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			***
14	C, Pasture, Mod	1	1	1	1	27	0

END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS >	***** Active Sections *****														
#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
14			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  *****
14   0   0   4   0   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 VIRG  VLE INFC  HWT ***
14   0   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  LRSUR  SLSUR  KVARY  AGWRC
14   0   4.5  0.06  400   0.1   0.5   0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3 *****
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
14   0   0   2   2   0   0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4 *****
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP ***
14   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
14   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 ***
2     ROADS/MOD             1  1  1  27  0
4     ROOF TOPS/FLAT       1  1  1  27  0
9     SIDEWALKS/MOD        1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
2     0   0   1   0   0   0
4     0   0   1   0   0   0
9     0   0   1   0   0   0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
2     0   0   4   0   0   4   1   9
4     0   0   4   0   0   0   1   9
9     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  ***
2     0   0   0   0   0
4     0   0   0   0   0
9     0   0   0   0   0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
2 400 0.05 0.1 0.08
4 400 0.01 0.1 0.1
9 400 0.05 0.1 0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
2 0 0
4 0 0
9 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
2 0 0
4 0 0
9 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 14 6.87 RCHRES 1 2
PERLND 14 6.87 RCHRES 1 3
IMPLND 2 2.35 RCHRES 1 5
IMPLND 4 6.16 RCHRES 1 5
IMPLND 9 0.72 RCHRES 1 5

```

*****Routing*****

```

PERLND 14 6.87 COPY 1 12
IMPLND 2 2.35 COPY 1 15
IMPLND 4 6.16 COPY 1 15
IMPLND 9 0.72 COPY 1 15
PERLND 14 6.87 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 Vault 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 ***

```


2.488889	0.582920	1.450823	0.487651
2.566667	0.582920	1.496162	0.497531
2.644444	0.582920	1.541500	0.509938
2.722222	0.582920	1.586838	0.523664
2.800000	0.582920	1.632176	0.559653
2.877778	0.582920	1.677515	0.587776
2.955556	0.582920	1.722853	0.612814
3.033333	0.582920	1.768191	0.636639
3.111111	0.582920	1.813529	0.659793
3.188889	0.582920	1.858867	0.682495
3.266667	0.582920	1.904206	0.704847
3.344444	0.582920	1.949544	0.726895
3.422222	0.582920	1.994882	0.748655
3.500000	0.582920	2.040220	0.770128
3.577778	0.582920	2.085559	0.793684
3.655556	0.582920	2.130897	0.817456
3.733333	0.582920	2.176235	0.841455
3.811111	0.582920	2.221573	0.865687
3.888889	0.582920	2.266912	0.890156
3.966667	0.582920	2.312250	0.976994
4.044444	0.582920	2.357588	1.006954
4.122222	0.582920	2.402926	1.037284
4.200000	0.582920	2.448264	1.067983
4.277778	0.582920	2.493603	1.099047
4.355556	0.582920	2.538941	1.130472
4.433333	0.582920	2.584279	1.162255
4.511111	0.582920	2.629617	1.194392
4.588889	0.582920	2.674956	1.226880
4.666667	0.582920	2.720294	1.259716
4.744444	0.582920	2.765632	1.292895
4.822222	0.582920	2.810970	1.326414
4.900000	0.582920	2.856309	1.360270
4.977778	0.582920	2.901647	1.394460
5.055556	0.582920	2.946985	1.428980
5.133333	0.582920	2.992323	1.463827
5.211111	0.582920	3.037661	1.498997
5.288889	0.582920	3.083000	1.534488
5.366667	0.582920	3.128338	1.570297
5.444444	0.582920	3.173676	1.606421
5.522222	0.582920	3.219014	1.642856
5.600000	0.582920	3.264353	1.679601
5.677778	0.582920	3.309691	1.716652
5.755556	0.582920	3.355029	1.754006
5.833333	0.582920	3.400367	1.791662
5.911111	0.582920	3.445706	1.829616
5.988889	0.582920	3.491044	1.867866
6.066667	0.582920	3.536382	2.244397
6.144444	0.582920	3.581720	3.048063
6.222222	0.582920	3.627058	4.098292
6.300000	0.582920	3.672397	5.321002
6.377778	0.582920	3.717735	6.651977
6.455556	0.582920	3.763073	8.025890
6.533333	0.582920	3.808411	9.376051
6.611111	0.582920	3.853750	10.63817
6.688889	0.582920	3.899088	11.75634
6.766667	0.582920	3.944426	12.69063
6.844444	0.582920	3.989764	13.42589
6.922222	0.582920	4.035103	13.98160
7.000000	0.582920	4.080441	14.42265
7.077778	0.582920	4.125779	15.04432

END FTABLE 1
 END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***			
<Name>	#	<Name>	#	tem	strg<-factor->	strg	<Name>	#	#	***
WDM	2	PREC	ENGL	1.2	PERLND	1	999	EXTNL	PREC	
WDM	2	PREC	ENGL	1.2	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

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WWHM2012
PROJECT REPORT

VAULT E

General Model Information

WWHM2012 Project Name: East Hill Basin 6

Site Name:

Site Address:

City:

Report Date: 8/11/2025

Gage: Everett

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.200

Version Date: 2023/01/27

Version: 4.2.19

POC Thresholds

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

High Flow Threshold for POC1: 50 Year

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Landuse Basin Data
Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Steep	acre 4.26
Pervious Total	4.26
Impervious Land Use	acre
Impervious Total	0
Basin Total	4.26

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Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	1.79
Pervious Total	1.79
Impervious Land Use	acre
ROADS MOD	0.6
ROOF TOPS FLAT	1.67
SIDEWALKS MOD	0.2
Impervious Total	2.47
Basin Total	4.26

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Routing Elements
Predeveloped Routing

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Mitigated Routing

Vault 1

Width: 100 ft.
 Length: 60 ft.
 Depth: 7 ft.
 Discharge Structure
 Riser Height: 6 ft.
 Riser Diameter: 36 in.
 Orifice 1 Diameter: 1.688 in. Elevation:0 ft.
 Orifice 2 Diameter: 2.750 in. Elevation:3.5 ft.
 Element Flows To:
 Outlet 1 Outlet 2

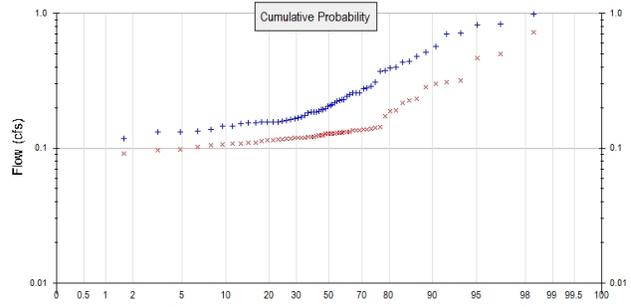
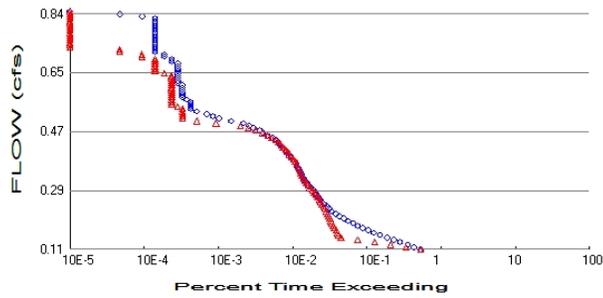
Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.137	0.000	0.000	0.000
0.0778	0.137	0.010	0.021	0.000
0.1556	0.137	0.021	0.030	0.000
0.2333	0.137	0.032	0.037	0.000
0.3111	0.137	0.042	0.043	0.000
0.3889	0.137	0.053	0.048	0.000
0.4667	0.137	0.064	0.052	0.000
0.5444	0.137	0.075	0.057	0.000
0.6222	0.137	0.085	0.061	0.000
0.7000	0.137	0.096	0.064	0.000
0.7778	0.137	0.107	0.068	0.000
0.8556	0.137	0.117	0.071	0.000
0.9333	0.137	0.128	0.074	0.000
1.0111	0.137	0.139	0.077	0.000
1.0889	0.137	0.150	0.080	0.000
1.1667	0.137	0.160	0.083	0.000
1.2444	0.137	0.171	0.086	0.000
1.3222	0.137	0.182	0.088	0.000
1.4000	0.137	0.192	0.091	0.000
1.4778	0.137	0.203	0.093	0.000
1.5556	0.137	0.214	0.096	0.000
1.6333	0.137	0.225	0.098	0.000
1.7111	0.137	0.235	0.101	0.000
1.7889	0.137	0.246	0.103	0.000
1.8667	0.137	0.257	0.105	0.000
1.9444	0.137	0.267	0.107	0.000
2.0222	0.137	0.278	0.109	0.000
2.1000	0.137	0.289	0.112	0.000
2.1778	0.137	0.300	0.114	0.000
2.2556	0.137	0.310	0.116	0.000
2.3333	0.137	0.321	0.118	0.000
2.4111	0.137	0.332	0.120	0.000
2.4889	0.137	0.342	0.121	0.000
2.5667	0.137	0.353	0.123	0.000
2.6444	0.137	0.364	0.125	0.000
2.7222	0.137	0.375	0.127	0.000
2.8000	0.137	0.385	0.129	0.000
2.8778	0.137	0.396	0.131	0.000
2.9556	0.137	0.407	0.132	0.000

3.0333	0.137	0.417	0.134	0.000
3.1111	0.137	0.428	0.136	0.000
3.1889	0.137	0.439	0.138	0.000
3.2667	0.137	0.450	0.139	0.000
3.3444	0.137	0.460	0.141	0.000
3.4222	0.137	0.471	0.143	0.000
3.5000	0.137	0.482	0.144	0.000
3.5778	0.137	0.492	0.203	0.000
3.6556	0.137	0.503	0.228	0.000
3.7333	0.137	0.514	0.248	0.000
3.8111	0.137	0.524	0.265	0.000
3.8889	0.137	0.535	0.280	0.000
3.9667	0.137	0.546	0.294	0.000
4.0444	0.137	0.557	0.306	0.000
4.1222	0.137	0.567	0.318	0.000
4.2000	0.137	0.578	0.330	0.000
4.2778	0.137	0.589	0.340	0.000
4.3556	0.137	0.599	0.351	0.000
4.4333	0.137	0.610	0.361	0.000
4.5111	0.137	0.621	0.370	0.000
4.5889	0.137	0.632	0.379	0.000
4.6667	0.137	0.642	0.388	0.000
4.7444	0.137	0.653	0.397	0.000
4.8222	0.137	0.664	0.405	0.000
4.9000	0.137	0.674	0.413	0.000
4.9778	0.137	0.685	0.421	0.000
5.0556	0.137	0.696	0.429	0.000
5.1333	0.137	0.707	0.437	0.000
5.2111	0.137	0.717	0.444	0.000
5.2889	0.137	0.728	0.452	0.000
5.3667	0.137	0.739	0.459	0.000
5.4444	0.137	0.749	0.466	0.000
5.5222	0.137	0.760	0.473	0.000
5.6000	0.137	0.771	0.480	0.000
5.6778	0.137	0.782	0.487	0.000
5.7556	0.137	0.792	0.493	0.000
5.8333	0.137	0.803	0.500	0.000
5.9111	0.137	0.814	0.506	0.000
5.9889	0.137	0.824	0.512	0.000
6.0667	0.137	0.835	1.067	0.000
6.1444	0.137	0.846	2.270	0.000
6.2222	0.137	0.857	3.856	0.000
6.3000	0.137	0.867	5.736	0.000
6.3778	0.137	0.878	7.850	0.000
6.4556	0.137	0.889	10.14	0.000
6.5333	0.137	0.899	12.56	0.000
6.6111	0.137	0.910	15.06	0.000
6.6889	0.137	0.921	17.59	0.000
6.7667	0.137	0.932	20.07	0.000
6.8444	0.137	0.942	22.48	0.000
6.9222	0.137	0.953	24.74	0.000
7.0000	0.137	0.964	26.83	0.000
7.0778	0.137	0.974	28.70	0.000
7.1556	0.000	0.000	30.33	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 4.26
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 1.79
Total Impervious Area: 2.47

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.224477
5 year	0.366243
10 year	0.485914
25 year	0.670815
50 year	0.835909
100 year	1.027013

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.137057
5 year	0.201501
10 year	0.254936
25 year	0.336491
50 year	0.408682
100 year	0.491799

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.242	0.121
1950	0.277	0.125
1951	0.193	0.116
1952	0.184	0.098
1953	0.165	0.103
1954	0.830	0.129
1955	0.280	0.135
1956	0.230	0.172
1957	0.308	0.232
1958	0.823	0.119

1959	0.205	0.131
1960	0.218	0.139
1961	0.985	0.133
1962	0.228	0.125
1963	0.373	0.116
1964	0.258	0.115
1965	0.160	0.127
1966	0.117	0.106
1967	0.231	0.121
1968	0.286	0.227
1969	0.714	0.113
1970	0.145	0.110
1971	0.258	0.136
1972	0.186	0.128
1973	0.156	0.119
1974	0.436	0.119
1975	0.196	0.109
1976	0.163	0.132
1977	0.146	0.114
1978	0.155	0.097
1979	0.439	0.139
1980	0.207	0.109
1981	0.153	0.118
1982	0.211	0.283
1983	0.374	0.119
1984	0.187	0.144
1985	0.257	0.142
1986	0.572	0.464
1987	0.250	0.317
1988	0.155	0.132
1989	0.193	0.086
1990	0.171	0.137
1991	0.184	0.137
1992	0.157	0.123
1993	0.156	0.108
1994	0.133	0.127
1995	0.187	0.190
1996	0.399	0.218
1997	0.699	0.729
1998	0.134	0.105
1999	0.152	0.128
2000	0.133	0.188
2001	0.060	0.091
2002	0.174	0.130
2003	0.138	0.117
2004	0.224	0.301
2005	0.169	0.128
2006	0.482	0.307
2007	0.391	0.125
2008	0.515	0.499
2009	0.160	0.121

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.9846	0.7285
2	0.8299	0.4995
3	0.8232	0.4644

4	0.7144	0.3171
5	0.6990	0.3075
6	0.5724	0.3008
7	0.5152	0.2833
8	0.4823	0.2321
9	0.4390	0.2271
10	0.4359	0.2179
11	0.3994	0.1900
12	0.3906	0.1882
13	0.3745	0.1718
14	0.3728	0.1442
15	0.3078	0.1419
16	0.2859	0.1388
17	0.2797	0.1386
18	0.2765	0.1375
19	0.2585	0.1367
20	0.2583	0.1358
21	0.2566	0.1349
22	0.2498	0.1326
23	0.2419	0.1323
24	0.2305	0.1319
25	0.2297	0.1307
26	0.2278	0.1301
27	0.2244	0.1294
28	0.2179	0.1284
29	0.2112	0.1283
30	0.2073	0.1277
31	0.2047	0.1274
32	0.1963	0.1274
33	0.1933	0.1254
34	0.1928	0.1253
35	0.1869	0.1250
36	0.1865	0.1227
37	0.1859	0.1214
38	0.1843	0.1210
39	0.1836	0.1209
40	0.1744	0.1190
41	0.1712	0.1190
42	0.1685	0.1190
43	0.1654	0.1188
44	0.1630	0.1181
45	0.1605	0.1173
46	0.1595	0.1163
47	0.1575	0.1159
48	0.1559	0.1151
49	0.1558	0.1144
50	0.1554	0.1132
51	0.1549	0.1105
52	0.1534	0.1094
53	0.1518	0.1085
54	0.1460	0.1084
55	0.1447	0.1060
56	0.1378	0.1055
57	0.1342	0.1027
58	0.1326	0.0976
59	0.1325	0.0968
60	0.1174	0.0911
61	0.0596	0.0862

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1122	11253	11336	100	Pass
0.1195	9216	7191	78	Pass
0.1269	7569	4492	59	Pass
0.1342	5959	2716	45	Pass
0.1415	4898	1601	32	Pass
0.1488	4010	956	23	Pass
0.1561	3210	892	27	Pass
0.1634	2667	854	32	Pass
0.1707	2244	820	36	Pass
0.1780	1862	775	41	Pass
0.1853	1601	752	46	Pass
0.1926	1399	723	51	Pass
0.2000	1191	702	58	Pass
0.2073	1031	680	65	Pass
0.2146	901	655	72	Pass
0.2219	819	627	76	Pass
0.2292	718	601	83	Pass
0.2365	665	578	86	Pass
0.2438	616	557	90	Pass
0.2511	571	534	93	Pass
0.2584	528	510	96	Pass
0.2657	502	488	97	Pass
0.2731	472	460	97	Pass
0.2804	449	435	96	Pass
0.2877	430	417	96	Pass
0.2950	411	395	96	Pass
0.3023	380	363	95	Pass
0.3096	346	343	99	Pass
0.3169	330	326	98	Pass
0.3242	312	308	98	Pass
0.3315	300	297	99	Pass
0.3388	285	286	100	Pass
0.3462	275	277	100	Pass
0.3535	266	268	100	Pass
0.3608	256	261	101	Pass
0.3681	244	252	103	Pass
0.3754	236	242	102	Pass
0.3827	230	232	100	Pass
0.3900	213	220	103	Pass
0.3973	201	205	101	Pass
0.4046	192	194	101	Pass
0.4119	175	183	104	Pass
0.4193	166	172	103	Pass
0.4266	155	158	101	Pass
0.4339	147	149	101	Pass
0.4412	135	137	101	Pass
0.4485	125	128	102	Pass
0.4558	113	111	98	Pass
0.4631	98	99	101	Pass
0.4704	85	84	98	Pass
0.4777	77	68	88	Pass
0.4850	64	54	84	Pass
0.4923	55	42	76	Pass

0.4997	47	20	42	Pass
0.5070	32	11	34	Pass
0.5143	22	7	31	Pass
0.5216	18	7	38	Pass
0.5289	15	7	46	Pass
0.5362	11	7	63	Pass
0.5435	9	7	77	Pass
0.5508	9	6	66	Pass
0.5581	9	5	55	Pass
0.5654	9	5	55	Pass
0.5728	8	5	62	Pass
0.5801	7	5	71	Pass
0.5874	7	5	71	Pass
0.5947	7	5	71	Pass
0.6020	7	5	71	Pass
0.6093	7	5	71	Pass
0.6166	7	5	71	Pass
0.6239	6	5	83	Pass
0.6312	6	5	83	Pass
0.6385	6	5	83	Pass
0.6459	6	5	83	Pass
0.6532	6	4	66	Pass
0.6605	6	3	50	Pass
0.6678	6	3	50	Pass
0.6751	6	3	50	Pass
0.6824	6	3	50	Pass
0.6897	5	3	60	Pass
0.6970	5	3	60	Pass
0.7043	4	2	50	Pass
0.7116	4	2	50	Pass
0.7190	3	1	33	Pass
0.7263	3	1	33	Pass
0.7336	3	0	0	Pass
0.7409	3	0	0	Pass
0.7482	3	0	0	Pass
0.7555	3	0	0	Pass
0.7628	3	0	0	Pass
0.7701	3	0	0	Pass
0.7774	3	0	0	Pass
0.7847	3	0	0	Pass
0.7921	3	0	0	Pass
0.7994	3	0	0	Pass
0.8067	3	0	0	Pass
0.8140	3	0	0	Pass
0.8213	3	0	0	Pass
0.8286	2	0	0	Pass
0.8359	1	0	0	Pass

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Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

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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
Vault 1 POC	<input type="checkbox"/>	560.49			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		560.49	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

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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.

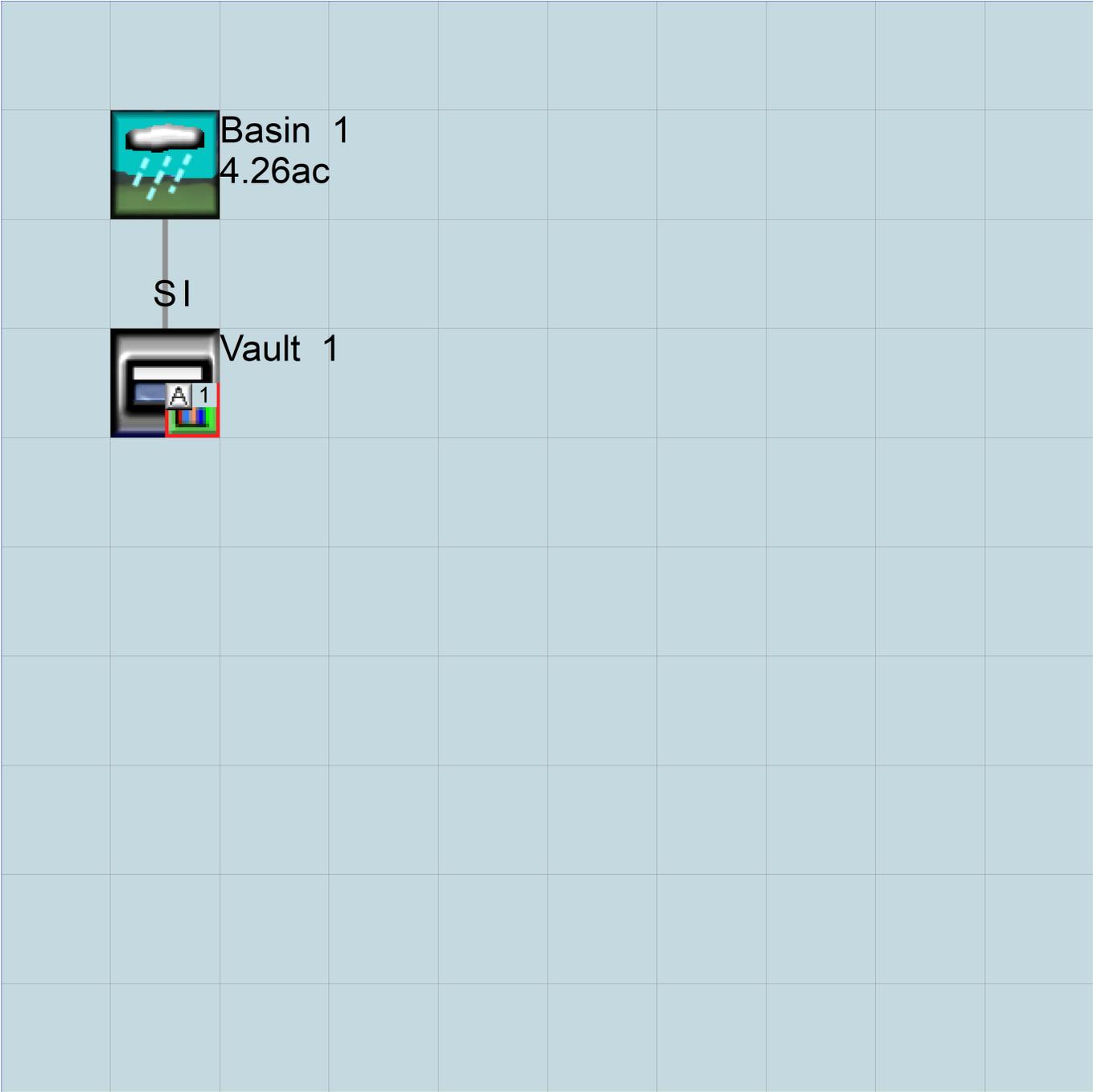
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Appendix
Predeveloped Schematic



Basin 1
4.26ac

Mitigated Schematic




```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
12 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 LRSUR SLSUR KVARY AGWRC
12 0 4.5 0.08 400 0.15 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
12 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
12 0.2 0.3 0.35 6 0.3 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
12 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 ***
# - # *** LRSUR 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->	<Name> #	<--Area-->	<-factor-->	<-Target->	<Name> #	MBLK	Tbl#	***
Basin	1							
PERLND	12		4.26	COPY	501		12	
PERLND	12		4.26	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	***	ODGTFG	for each	FUNCT	for each	***
# - #	VC A1 A2 A3	ODFVFG for each	***	ODGTFG	for each	FUNCT	for each	***
	FG FG FG FG	possible exit	***	possible exit		possible exit		***
	* * * *	* * * *		* * * *		* * * *		

END HYDR-PARM1

HYDR-PARM2

#	-	#	FTABNO	LEN	DELTH	STCOR	KS	DB50	***

END HYDR-PARM2

HYDR-INIT

RCHRES	Initial conditions	for each HYDR section	***
# - #	*** VOL	Initial value of COLIND	Initial value of OUTDGT
	*** ac-ft	for each possible exit	for each possible exit
	<----->	<----->	*** <----->

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #	<Name> #	tem	strg	<-factor-->strg	<Name> #	#	<Name> #	***
WDM	2	PREC	ENGL	1.2	PERLND	1 999	EXTNL	PREC
WDM	2	PREC	ENGL	1.2	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

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Mitigated UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 6.wdm	
MESU	25	MitEast Hill Basin 6.MES	
	27	MitEast Hill Basin 6.L61	
	28	MitEast Hill Basin 6.L62	
	30	POCEast Hill Basin 61.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 14
IMPLND 2
IMPLND 4
IMPLND 9
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			Vault 1		MAX				1	2	30	9

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES
- # NPT NMN ***
1 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			***
14	C, Pasture, Mod	1	1	1	1	27	0

END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS >	***** Active Sections *****														***
#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
14			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  *****
14   0   0   4   0   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 VIRG  VLE INFC  HWT ***
14   0   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
14   0   4.5  0.06  400  0.1  0.5  0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3          ***
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
14   0   0   2   2   0   0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4          ***
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP ***
14   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
14   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 ***
2     ROADS/MOD          1  1  1  27  0
4     ROOF TOPS/FLAT    1  1  1  27  0
9     SIDEWALKS/MOD     1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
2     0   0   1   0   0   0
4     0   0   1   0   0   0
9     0   0   1   0   0   0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
2     0   0   4   0   0   4   1   9
4     0   0   4   0   0   0   1   9
9     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  ***
2     0   0   0   0   0
4     0   0   0   0   0
9     0   0   0   0   0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
2 400 0.05 0.1 0.08
4 400 0.01 0.1 0.1
9 400 0.05 0.1 0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
2 0 0
4 0 0
9 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
2 0 0
4 0 0
9 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 14 1.79 RCHRES 1 2
PERLND 14 1.79 RCHRES 1 3
IMPLND 2 0.6 RCHRES 1 5
IMPLND 4 1.67 RCHRES 1 5
IMPLND 9 0.2 RCHRES 1 5

```

*****Routing*****

```

PERLND 14 1.79 COPY 1 12
IMPLND 2 0.6 COPY 1 15
IMPLND 4 1.67 COPY 1 15
IMPLND 9 0.2 COPY 1 15
PERLND 14 1.79 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 Vault 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 ***

```


2.488889	0.137741	0.342822	0.121913
2.566667	0.137741	0.353535	0.123803
2.644444	0.137741	0.364249	0.125665
2.722222	0.137741	0.374962	0.127499
2.800000	0.137741	0.385675	0.129308
2.877778	0.137741	0.396388	0.131092
2.955556	0.137741	0.407101	0.132851
3.033333	0.137741	0.417815	0.134588
3.111111	0.137741	0.428528	0.136303
3.188889	0.137741	0.439241	0.137996
3.266667	0.137741	0.449954	0.139669
3.344444	0.137741	0.460667	0.141322
3.422222	0.137741	0.471380	0.142955
3.500000	0.137741	0.482094	0.144571
3.577778	0.137741	0.492807	0.203402
3.655556	0.137741	0.503520	0.228689
3.733333	0.137741	0.514233	0.248444
3.811111	0.137741	0.524946	0.265327
3.888889	0.137741	0.535660	0.280369
3.966667	0.137741	0.546373	0.294101
4.044444	0.137741	0.557086	0.306835
4.122222	0.137741	0.567799	0.318777
4.200000	0.137741	0.578512	0.330070
4.277778	0.137741	0.589226	0.340818
4.355556	0.137741	0.599939	0.351098
4.433333	0.137741	0.610652	0.360972
4.511111	0.137741	0.621365	0.370489
4.588889	0.137741	0.632078	0.379688
4.666667	0.137741	0.642792	0.388601
4.744444	0.137741	0.653505	0.397256
4.822222	0.137741	0.664218	0.405676
4.900000	0.137741	0.674931	0.413880
4.977778	0.137741	0.685644	0.421887
5.055556	0.137741	0.696358	0.429709
5.133333	0.137741	0.707071	0.437362
5.211111	0.137741	0.717784	0.444855
5.288889	0.137741	0.728497	0.452200
5.366667	0.137741	0.739210	0.459406
5.444444	0.137741	0.749923	0.466480
5.522222	0.137741	0.760637	0.473431
5.600000	0.137741	0.771350	0.480264
5.677778	0.137741	0.782063	0.486987
5.755556	0.137741	0.792776	0.493604
5.833333	0.137741	0.803489	0.500122
5.911111	0.137741	0.814203	0.506544
5.988889	0.137741	0.824916	0.512875
6.066667	0.137741	0.835629	1.067000
6.144444	0.137741	0.846342	2.270750
6.222222	0.137741	0.857055	3.856488
6.300000	0.137741	0.867769	5.736434
6.377778	0.137741	0.878482	7.850342
6.455556	0.137741	0.889195	10.14524
6.533333	0.137741	0.899908	12.56911
6.611111	0.137741	0.910621	15.06883
6.688889	0.137741	0.921335	17.59007
6.766667	0.137741	0.932048	20.07823
6.844444	0.137741	0.942761	22.48000
6.922222	0.137741	0.953474	24.74556
7.000000	0.137741	0.964187	26.83106
7.077778	0.137741	0.974901	28.70148

END FTABLE 1
 END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	tem strg<-factor->	strg	<Name>	# #
WDM	2	PREC	ENGL	1.2	PERLND	1 999 EXTNL	PREC
WDM	2	PREC	ENGL	1.2	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

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WWHM2012
PROJECT REPORT

POND A

General Model Information

WWHM2012 Project Name: East Hill Basin 4

Site Name:

Site Address:

City:

Report Date: 11/11/2025

Gage: Everett

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.200

Version Date: 2023/01/27

Version: 4.2.19

POC Thresholds

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

High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Steep	acre 6.53
Pervious Total	6.53
Impervious Land Use	acre
Impervious Total	0
Basin Total	6.53

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Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Mod	2.4
Pervious Total	2.4
Impervious Land Use	acre
ROADS MOD	0.98
ROOF TOPS FLAT	2.86
SIDEWALKS MOD	0.29
Impervious Total	4.13
Basin Total	6.53

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Routing Elements
Predeveloped Routing

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Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 150.00 ft.
 Bottom Width: 40.00 ft.
 Depth: 12 ft.
 Volume at riser head: 1.5243 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: 11 ft.
 Riser Diameter: 24 in.
 Orifice 1 Diameter: 1.813 in. Elevation:0 ft.
 Orifice 2 Diameter: 3.219 in. Elevation:7.6 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Pond Hydraulic Table

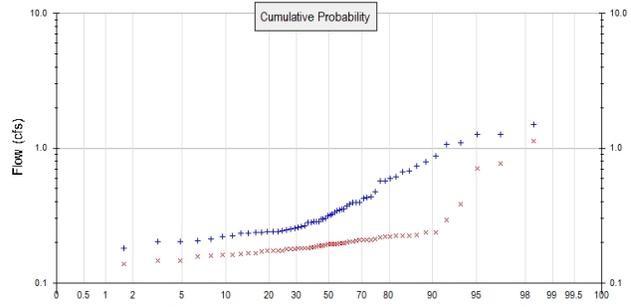
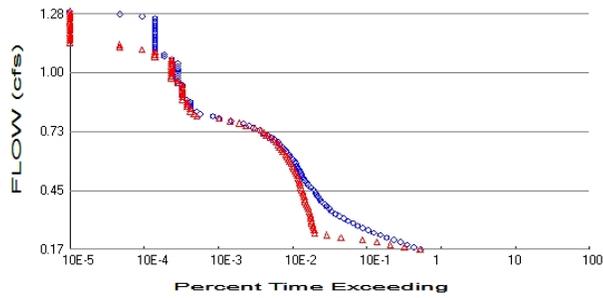
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.137	0.000	0.000	0.000
0.1333	0.137	0.018	0.032	0.000
0.2667	0.137	0.036	0.046	0.000
0.4000	0.137	0.055	0.056	0.000
0.5333	0.137	0.073	0.065	0.000
0.6667	0.137	0.091	0.072	0.000
0.8000	0.137	0.110	0.079	0.000
0.9333	0.137	0.128	0.086	0.000
1.0667	0.137	0.146	0.092	0.000
1.2000	0.137	0.165	0.097	0.000
1.3333	0.137	0.183	0.102	0.000
1.4667	0.137	0.202	0.108	0.000
1.6000	0.137	0.220	0.112	0.000
1.7333	0.137	0.238	0.117	0.000
1.8667	0.137	0.257	0.121	0.000
2.0000	0.137	0.275	0.126	0.000
2.1333	0.137	0.293	0.130	0.000
2.2667	0.137	0.312	0.134	0.000
2.4000	0.137	0.330	0.138	0.000
2.5333	0.137	0.348	0.141	0.000
2.6667	0.137	0.367	0.145	0.000
2.8000	0.137	0.385	0.149	0.000
2.9333	0.137	0.404	0.152	0.000
3.0667	0.137	0.422	0.156	0.000
3.2000	0.137	0.440	0.159	0.000
3.3333	0.137	0.459	0.162	0.000
3.4667	0.137	0.477	0.166	0.000
3.6000	0.137	0.495	0.169	0.000
3.7333	0.137	0.514	0.172	0.000
3.8667	0.137	0.532	0.175	0.000
4.0000	0.137	0.551	0.178	0.000
4.1333	0.137	0.569	0.181	0.000
4.2667	0.137	0.587	0.184	0.000
4.4000	0.137	0.606	0.187	0.000

4.5333	0.137	0.624	0.189	0.000
4.6667	0.137	0.642	0.192	0.000
4.8000	0.137	0.661	0.195	0.000
4.9333	0.137	0.679	0.198	0.000
5.0667	0.137	0.697	0.200	0.000
5.2000	0.137	0.716	0.203	0.000
5.3333	0.137	0.734	0.205	0.000
5.4667	0.137	0.753	0.208	0.000
5.6000	0.137	0.771	0.211	0.000
5.7333	0.137	0.789	0.213	0.000
5.8667	0.137	0.808	0.215	0.000
6.0000	0.137	0.826	0.218	0.000
6.1333	0.137	0.844	0.220	0.000
6.2667	0.137	0.863	0.223	0.000
6.4000	0.137	0.881	0.225	0.000
6.5333	0.137	0.899	0.227	0.000
6.6667	0.137	0.918	0.230	0.000
6.8000	0.137	0.936	0.232	0.000
6.9333	0.137	0.955	0.234	0.000
7.0667	0.137	0.973	0.237	0.000
7.2000	0.137	0.991	0.239	0.000
7.3333	0.137	1.010	0.241	0.000
7.4667	0.137	1.028	0.243	0.000
7.6000	0.137	1.046	0.245	0.000
7.7333	0.137	1.065	0.350	0.000
7.8667	0.137	1.083	0.395	0.000
8.0000	0.137	1.101	0.430	0.000
8.1333	0.137	1.120	0.459	0.000
8.2667	0.137	1.138	0.485	0.000
8.4000	0.137	1.157	0.509	0.000
8.5333	0.137	1.175	0.532	0.000
8.6667	0.137	1.193	0.552	0.000
8.8000	0.137	1.212	0.572	0.000
8.9333	0.137	1.230	0.591	0.000
9.0667	0.137	1.248	0.608	0.000
9.2000	0.137	1.267	0.626	0.000
9.3333	0.137	1.285	0.642	0.000
9.4667	0.137	1.303	0.658	0.000
9.6000	0.137	1.322	0.673	0.000
9.7333	0.137	1.340	0.688	0.000
9.8667	0.137	1.359	0.703	0.000
10.000	0.137	1.377	0.717	0.000
10.133	0.137	1.395	0.731	0.000
10.267	0.137	1.414	0.744	0.000
10.400	0.137	1.432	0.757	0.000
10.533	0.137	1.450	0.770	0.000
10.667	0.137	1.469	0.783	0.000
10.800	0.137	1.487	0.795	0.000
10.933	0.137	1.506	0.808	0.000
11.067	0.137	1.524	1.185	0.000
11.200	0.137	1.542	2.718	0.000
11.333	0.137	1.561	4.822	0.000
11.467	0.137	1.579	7.162	0.000
11.600	0.137	1.597	9.405	0.000
11.733	0.137	1.616	11.25	0.000
11.867	0.137	1.634	12.54	0.000
12.000	0.137	1.652	13.36	0.000
12.133	0.137	1.671	14.32	0.000

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Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 6.53
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 2.4
Total Impervious Area: 4.13

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.344093
5 year	0.5614
10 year	0.744841
25 year	1.028268
50 year	1.281336
100 year	1.574272

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.197404
5 year	0.275414
10 year	0.336259
25 year	0.424473
50 year	0.499023
100 year	0.581682

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.371	0.183
1950	0.424	0.188
1951	0.296	0.174
1952	0.281	0.147
1953	0.254	0.157
1954	1.272	0.195
1955	0.429	0.203
1956	0.352	0.222
1957	0.472	0.225
1958	1.262	0.178

1959	0.314	0.197
1960	0.334	0.209
1961	1.509	0.198
1962	0.349	0.189
1963	0.571	0.173
1964	0.396	0.173
1965	0.246	0.193
1966	0.180	0.162
1967	0.353	0.181
1968	0.438	0.226
1969	1.095	0.172
1970	0.222	0.167
1971	0.396	0.206
1972	0.285	0.195
1973	0.239	0.181
1974	0.668	0.181
1975	0.301	0.165
1976	0.250	0.200
1977	0.224	0.174
1978	0.237	0.147
1979	0.673	0.208
1980	0.318	0.162
1981	0.235	0.178
1982	0.324	0.237
1983	0.574	0.180
1984	0.286	0.219
1985	0.393	0.213
1986	0.877	0.706
1987	0.383	0.381
1988	0.238	0.202
1989	0.296	0.131
1990	0.262	0.207
1991	0.283	0.207
1992	0.241	0.188
1993	0.239	0.165
1994	0.203	0.193
1995	0.286	0.224
1996	0.612	0.221
1997	1.072	1.136
1998	0.206	0.158
1999	0.233	0.194
2000	0.203	0.224
2001	0.091	0.139
2002	0.267	0.197
2003	0.211	0.181
2004	0.344	0.294
2005	0.258	0.194
2006	0.739	0.238
2007	0.599	0.189
2008	0.790	0.768
2009	0.245	0.184

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	1.5092	1.1357
2	1.2722	0.7681
3	1.2619	0.7065

4	1.0951	0.3813
5	1.0715	0.2941
6	0.8774	0.2380
7	0.7898	0.2365
8	0.7393	0.2259
9	0.6730	0.2253
10	0.6681	0.2243
11	0.6122	0.2237
12	0.5988	0.2218
13	0.5740	0.2215
14	0.5715	0.2192
15	0.4718	0.2129
16	0.4383	0.2093
17	0.4287	0.2076
18	0.4239	0.2074
19	0.3962	0.2072
20	0.3959	0.2059
21	0.3934	0.2030
22	0.3829	0.2024
23	0.3708	0.1996
24	0.3534	0.1984
25	0.3521	0.1971
26	0.3491	0.1970
27	0.3439	0.1951
28	0.3340	0.1949
29	0.3237	0.1942
30	0.3178	0.1938
31	0.3138	0.1931
32	0.3009	0.1925
33	0.2963	0.1895
34	0.2955	0.1886
35	0.2865	0.1884
36	0.2860	0.1876
37	0.2850	0.1838
38	0.2825	0.1826
39	0.2815	0.1813
40	0.2674	0.1808
41	0.2624	0.1808
42	0.2583	0.1808
43	0.2536	0.1796
44	0.2499	0.1781
45	0.2460	0.1780
46	0.2445	0.1744
47	0.2414	0.1738
48	0.2390	0.1734
49	0.2388	0.1725
50	0.2382	0.1721
51	0.2374	0.1672
52	0.2352	0.1653
53	0.2327	0.1650
54	0.2238	0.1624
55	0.2219	0.1623
56	0.2112	0.1585
57	0.2057	0.1566
58	0.2033	0.1473
59	0.2032	0.1467
60	0.1800	0.1392
61	0.0914	0.1308

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1720	11195	11103	99	Pass
0.1833	9129	6868	75	Pass
0.1945	7443	4402	59	Pass
0.2057	6004	2924	48	Pass
0.2169	4907	1865	38	Pass
0.2281	3925	960	24	Pass
0.2393	3219	620	19	Pass
0.2505	2659	423	15	Pass
0.2617	2231	415	18	Pass
0.2729	1892	406	21	Pass
0.2841	1597	398	24	Pass
0.2953	1390	388	27	Pass
0.3065	1183	386	32	Pass
0.3177	1032	378	36	Pass
0.3289	901	373	41	Pass
0.3401	806	368	45	Pass
0.3513	719	361	50	Pass
0.3625	664	348	52	Pass
0.3737	611	338	55	Pass
0.3849	577	327	56	Pass
0.3961	526	318	60	Pass
0.4074	500	311	62	Pass
0.4186	473	305	64	Pass
0.4298	449	297	66	Pass
0.4410	430	292	67	Pass
0.4522	408	284	69	Pass
0.4634	380	277	72	Pass
0.4746	345	269	77	Pass
0.4858	330	265	80	Pass
0.4970	313	259	82	Pass
0.5082	300	252	84	Pass
0.5194	285	245	85	Pass
0.5306	275	238	86	Pass
0.5418	266	228	85	Pass
0.5530	255	218	85	Pass
0.5642	245	212	86	Pass
0.5754	236	204	86	Pass
0.5866	229	196	85	Pass
0.5978	213	188	88	Pass
0.6090	200	179	89	Pass
0.6202	191	171	89	Pass
0.6314	175	158	90	Pass
0.6427	167	151	90	Pass
0.6539	155	143	92	Pass
0.6651	144	137	95	Pass
0.6763	135	129	95	Pass
0.6875	122	118	96	Pass
0.6987	112	106	94	Pass
0.7099	99	94	94	Pass
0.7211	85	88	103	Pass
0.7323	77	80	103	Pass
0.7435	64	66	103	Pass
0.7547	55	51	92	Pass

0.7659	47	41	87	Pass
0.7771	32	31	96	Pass
0.7883	22	22	100	Pass
0.7995	18	11	61	Pass
0.8107	12	10	83	Pass
0.8219	11	9	81	Pass
0.8331	9	9	100	Pass
0.8443	9	8	88	Pass
0.8555	9	8	88	Pass
0.8668	9	8	88	Pass
0.8780	8	7	87	Pass
0.8892	7	7	100	Pass
0.9004	7	7	100	Pass
0.9116	7	7	100	Pass
0.9228	7	7	100	Pass
0.9340	7	7	100	Pass
0.9452	7	7	100	Pass
0.9564	6	6	100	Pass
0.9676	6	6	100	Pass
0.9788	6	5	83	Pass
0.9900	6	5	83	Pass
1.0012	6	5	83	Pass
1.0124	6	5	83	Pass
1.0236	6	5	83	Pass
1.0348	6	5	83	Pass
1.0460	6	5	83	Pass
1.0572	5	5	100	Pass
1.0684	5	5	100	Pass
1.0796	4	3	75	Pass
1.0909	4	3	75	Pass
1.1021	3	3	100	Pass
1.1133	3	2	66	Pass
1.1245	3	1	33	Pass
1.1357	3	1	33	Pass
1.1469	3	0	0	Pass
1.1581	3	0	0	Pass
1.1693	3	0	0	Pass
1.1805	3	0	0	Pass
1.1917	3	0	0	Pass
1.2029	3	0	0	Pass
1.2141	3	0	0	Pass
1.2253	3	0	0	Pass
1.2365	3	0	0	Pass
1.2477	3	0	0	Pass
1.2589	3	0	0	Pass
1.2701	2	0	0	Pass
1.2813	1	0	0	Pass

DRAFT

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

DRAFT

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
Trapezoidal Pond 1 POC	<input type="checkbox"/>	896.40			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		896.40	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

DRAFT

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.

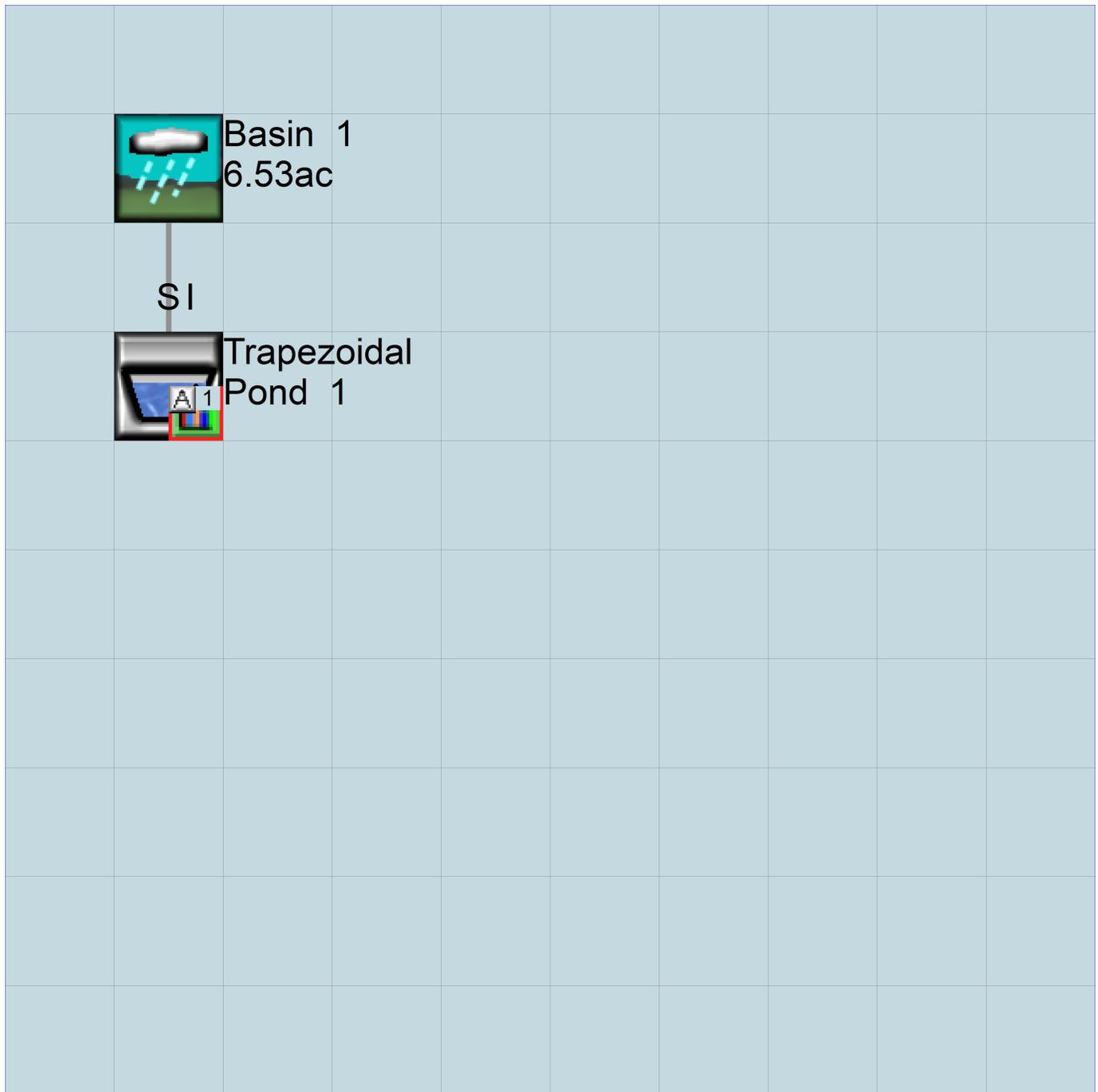
DRAFT

Appendix
Predeveloped Schematic



Basin 1
6.53ac

Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 4.wdm	
MESSU	25	PreEast Hill Basin 4.MES	
	27	PreEast Hill Basin 4.L61	
	28	PreEast Hill Basin 4.L62	
	30	POCEast Hill Basin 41.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 12
COPY 501
DISPLY 1

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

#	-	#	<-----Title----->	***	TRAN	PIVL	DIG1	FIL1	PYR	DIG2	FIL2	YRND
1			Basin 1		MAX				1	2	30	9

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

#	-	#	NPT	NMN	***
1			1	1	
501			1	1	

END TIMESERIES

END COPY

GENER

OPCODE

#	#	OPCD	***

END OPCODE

PARM

#	#	K	***

END PARM

END GENER

PERLND

GEN-INFO

<PLS >	<-----Name----->	NBLKS	Unit-systems	Printer	***		
#	-	#	User	t-series	Engl	Metr	***
				in	out		***

12	C, Forest, Steep	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	***
12			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	*****
12			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 ***
12 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
12 0 4.5 0.08 400 0.15 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
12 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
12 0.2 0.3 0.35 6 0.3 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
12 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

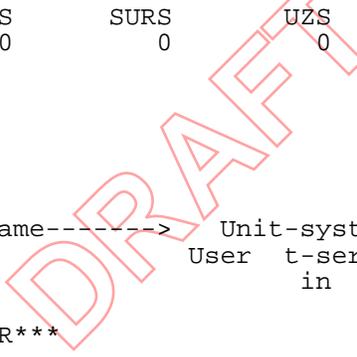
IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
END IWAT-PARM1

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->	<Name> #	<--Area-->	<-factor-->	<-Target->	<Name> #	MBLK	Tbl#	***
Basin	1							
PERLND	12		6.53	COPY	501		12	
PERLND	12		6.53	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	***	ODGTFG	for each	FUNCT	for each
# - #	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
	***	ac-ft	for each	possible	exit	for each

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #	<Name> #	tem	strg	<-factor-->strg	<Name> #	#	<Name> #	***
WDM	2	PREC	ENGL	1.2	PERLND	1 999	EXTNL	PREC
WDM	2	PREC	ENGL	1.2	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

DRAFT

Mitigated UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 4.wdm	
MESSU	25	MitEast Hill Basin 4.MES	
	27	MitEast Hill Basin 4.L61	
	28	MitEast Hill Basin 4.L62	
	30	POCEast Hill Basin 41.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 14
IMPLND 2
IMPLND 4
IMPLND 9
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			Trapezoidal Pond	1	MAX				1	2	30	9

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES
- # NPT NMN ***
1 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		***
14	C, Pasture, Mod	1	1	1	1	27 0

END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS >	***** Active Sections *****														
#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
14			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  *****
14   0   0   4   0   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 VIRG  VLE INFC  HWT ***
14   0   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  LRSUR  SLSUR  KVARY  AGWRC
14   0   4.5  0.06  400   0.1   0.5   0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3          ***
# - # ***PETMAX  PETMIN  INFEXP  INFILD  DEEPFR  BASETP  AGWETP
14   0   0   2   2   0   0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4          ***
# - # CEPSC  UZSN  NSUR  INTFW  IRC  LZETP ***
14   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
14   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 ***
2     ROADS/MOD             1  1  1  27  0
4     ROOF TOPS/FLAT       1  1  1  27  0
9     SIDEWALKS/MOD        1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
2     0   0   1   0   0   0
4     0   0   1   0   0   0
9     0   0   1   0   0   0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
2     0   0   4   0   0   4   1   9
4     0   0   4   0   0   0   1   9
9     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  ***
2     0   0   0   0   0
4     0   0   0   0   0
9     0   0   0   0   0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
2 400 0.05 0.1 0.08
4 400 0.01 0.1 0.1
9 400 0.05 0.1 0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
2 0 0
4 0 0
9 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
2 0 0
4 0 0
9 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 14 2.4 RCHRES 1 2
PERLND 14 2.4 RCHRES 1 3
IMPLND 2 0.98 RCHRES 1 5
IMPLND 4 2.86 RCHRES 1 5
IMPLND 9 0.29 RCHRES 1 5

```

*****Routing*****

```

PERLND 14 2.4 COPY 1 12
IMPLND 2 0.98 COPY 1 15
IMPLND 4 2.86 COPY 1 15
IMPLND 9 0.29 COPY 1 15
PERLND 14 2.4 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> # # ***

```

RCHRES

GEN-INFO

```

RCHRES Name Nexits Unit Systems Printer ***
# - #<-----><----> User T-series Engl Metr LKFG ***
1 Trapezoidal Pond-006 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 ***

```


4.266667	0.137741	0.587695	0.184145
4.400000	0.137741	0.606061	0.187000
4.533333	0.137741	0.624426	0.189812
4.666667	0.137741	0.642792	0.192583
4.800000	0.137741	0.661157	0.195315
4.933333	0.137741	0.679522	0.198009
5.066667	0.137741	0.697888	0.200667
5.200000	0.137741	0.716253	0.203290
5.333333	0.137741	0.734619	0.205880
5.466667	0.137741	0.752984	0.208438
5.600000	0.137741	0.771350	0.210964
5.733333	0.137741	0.789715	0.213461
5.866667	0.137741	0.808081	0.215929
6.000000	0.137741	0.826446	0.218369
6.133333	0.137741	0.844812	0.220782
6.266667	0.137741	0.863177	0.223169
6.400000	0.137741	0.881543	0.225530
6.533333	0.137741	0.899908	0.227867
6.666667	0.137741	0.918274	0.230181
6.800000	0.137741	0.936639	0.232471
6.933333	0.137741	0.955005	0.234739
7.066667	0.137741	0.973370	0.236986
7.200000	0.137741	0.991736	0.239211
7.333333	0.137741	1.010101	0.241416
7.466667	0.137741	1.028466	0.243600
7.600000	0.137741	1.046832	0.245766
7.733333	0.137741	1.065197	0.350573
7.866667	0.137741	1.083563	0.395224
8.000000	0.137741	1.101928	0.429963
8.133333	0.137741	1.120294	0.459564
8.266667	0.137741	1.138659	0.485874
8.400000	0.137741	1.157025	0.509843
8.533333	0.137741	1.175390	0.532034
8.666667	0.137741	1.193756	0.552814
8.800000	0.137741	1.212121	0.572439
8.933333	0.137741	1.230487	0.591094
9.066667	0.137741	1.248852	0.608920
9.200000	0.137741	1.267218	0.626027
9.333333	0.137741	1.285583	0.642501
9.466667	0.137741	1.303949	0.658412
9.600000	0.137741	1.322314	0.673819
9.733333	0.137741	1.340680	0.688770
9.866667	0.137741	1.359045	0.703306
10.000000	0.137741	1.377410	0.717464
10.133333	0.137741	1.395776	0.731272
10.266667	0.137741	1.414141	0.744758
10.400000	0.137741	1.432507	0.757944
10.533333	0.137741	1.450872	0.770852
10.666667	0.137741	1.469238	0.783500
10.800000	0.137741	1.487603	0.795903
10.933333	0.137741	1.505969	0.808077
11.066667	0.137741	1.524334	1.185127
11.200000	0.137741	1.542700	2.718464
11.333333	0.137741	1.561065	4.822558
11.466667	0.137741	1.579431	7.162314
11.600000	0.137741	1.597796	9.405917
11.733333	0.137741	1.616162	11.25463
11.866667	0.137741	1.634527	12.54116
12.000000	0.137741	1.652893	13.36250

END FTABLE 1

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	tem strg<-factor->	strg	<Name>	# #
WDM	2	PREC		ENGL	1.2	PERLND	1 999 EXTNL
WDM	2	PREC		ENGL	1.2	IMPLND	1 999 EXTNL
WDM	1	EVAP		ENGL	0.76	PERLND	1 999 EXTNL
WDM	1	EVAP		ENGL	0.76	IMPLND	1 999 EXTNL

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	1002	FLOW	ENGL	REPL
RCHRES	1	HYDR	STAGE	1	1	1	WDM	1003	STAG	ENGL	REPL
COPY	1	OUTPUT	MEAN	1	1	48.4	WDM	701	FLOW	ENGL	REPL
COPY	501	OUTPUT	MEAN	1	1	48.4	WDM	801	FLOW	ENGL	REPL

END EXT TARGETS

MASS-LINK

<Volume>	<-Grp>	<-Member->	<--Mult-->	<Target>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	<-factor->	<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

DRAFT

DRAFT

Disclaimer

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WWHM2012
PROJECT REPORT

POND B

General Model Information

WWHM2012 Project Name: East Hill Basin 9 Pond

Site Name:

Site Address:

City:

Report Date: 8/7/2025

Gage: Everett

Data Start: 1948/10/01

Data End: 2009/09/30

Timestep: 15 Minute

Precip Scale: 1.200

Version Date: 2023/01/27

Version: 4.2.19

POC Thresholds

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

High Flow Threshold for POC1: 50 Year

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Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Flat	acre 3.12
Pervious Total	3.12
Impervious Land Use	acre
Impervious Total	0
Basin Total	3.12

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Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Pasture, Flat	1.02
Pervious Total	1.02
Impervious Land Use	acre
ROADS FLAT	0.72
ROOF TOPS FLAT	1.14
SIDEWALKS MOD	0.24
Impervious Total	2.1
Basin Total	3.12

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Routing Elements
Predeveloped Routing

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Mitigated Routing

Trapezoidal Pond 1

Bottom Length: 70.00 ft.
 Bottom Width: 85.00 ft.
 Depth: 9 ft.
 Volume at riser head: 1.1064 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: 8 ft.
 Riser Diameter: 18 in.
 Orifice 1 Diameter: 1.031 in. Elevation:0 ft.
 Orifice 2 Diameter: 1.781 in. Elevation:6.35 ft.
 Orifice 3 Diameter: 1.344 in. Elevation:3.85 ft.
 Element Flows To:
 Outlet 1 Outlet 2

Pond Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.136	0.000	0.000	0.000
0.1000	0.136	0.013	0.009	0.000
0.2000	0.136	0.027	0.012	0.000
0.3000	0.136	0.041	0.015	0.000
0.4000	0.136	0.054	0.018	0.000
0.5000	0.136	0.068	0.020	0.000
0.6000	0.136	0.082	0.022	0.000
0.7000	0.136	0.095	0.024	0.000
0.8000	0.136	0.109	0.025	0.000
0.9000	0.136	0.122	0.027	0.000
1.0000	0.136	0.136	0.028	0.000
1.1000	0.136	0.150	0.030	0.000
1.2000	0.136	0.163	0.031	0.000
1.3000	0.136	0.177	0.032	0.000
1.4000	0.136	0.191	0.034	0.000
1.5000	0.136	0.204	0.035	0.000
1.6000	0.136	0.218	0.036	0.000
1.7000	0.136	0.232	0.037	0.000
1.8000	0.136	0.245	0.038	0.000
1.9000	0.136	0.259	0.039	0.000
2.0000	0.136	0.273	0.040	0.000
2.1000	0.136	0.286	0.041	0.000
2.2000	0.136	0.300	0.042	0.000
2.3000	0.136	0.314	0.043	0.000
2.4000	0.136	0.327	0.044	0.000
2.5000	0.136	0.341	0.045	0.000
2.6000	0.136	0.355	0.046	0.000
2.7000	0.136	0.368	0.047	0.000
2.8000	0.136	0.382	0.048	0.000
2.9000	0.136	0.396	0.049	0.000
3.0000	0.136	0.409	0.050	0.000
3.1000	0.136	0.423	0.050	0.000
3.2000	0.136	0.437	0.051	0.000

3.3000	0.136	0.450	0.052	0.000
3.4000	0.136	0.464	0.053	0.000
3.5000	0.136	0.478	0.054	0.000
3.6000	0.136	0.491	0.054	0.000
3.7000	0.136	0.505	0.055	0.000
3.8000	0.136	0.519	0.056	0.000
3.9000	0.136	0.532	0.067	0.000
4.0000	0.136	0.546	0.076	0.000
4.1000	0.136	0.560	0.082	0.000
4.2000	0.136	0.573	0.088	0.000
4.3000	0.136	0.587	0.092	0.000
4.4000	0.136	0.601	0.096	0.000
4.5000	0.136	0.614	0.100	0.000
4.6000	0.136	0.628	0.104	0.000
4.7000	0.136	0.642	0.107	0.000
4.8000	0.136	0.655	0.111	0.000
4.9000	0.136	0.669	0.114	0.000
5.0000	0.136	0.683	0.117	0.000
5.1000	0.136	0.696	0.120	0.000
5.2000	0.136	0.710	0.122	0.000
5.3000	0.136	0.723	0.125	0.000
5.4000	0.136	0.737	0.128	0.000
5.5000	0.136	0.751	0.130	0.000
5.6000	0.136	0.764	0.133	0.000
5.7000	0.136	0.778	0.135	0.000
5.8000	0.136	0.792	0.137	0.000
5.9000	0.136	0.805	0.140	0.000
6.0000	0.136	0.819	0.142	0.000
6.1000	0.136	0.833	0.144	0.000
6.2000	0.136	0.846	0.147	0.000
6.3000	0.136	0.860	0.149	0.000
6.4000	0.136	0.874	0.170	0.000
6.5000	0.136	0.887	0.186	0.000
6.6000	0.136	0.901	0.198	0.000
6.7000	0.136	0.915	0.208	0.000
6.8000	0.136	0.928	0.217	0.000
6.9000	0.136	0.942	0.225	0.000
7.0000	0.136	0.956	0.232	0.000
7.1000	0.136	0.969	0.239	0.000
7.2000	0.136	0.983	0.246	0.000
7.3000	0.136	0.997	0.252	0.000
7.4000	0.136	1.010	0.259	0.000
7.5000	0.136	1.024	0.265	0.000
7.6000	0.136	1.038	0.270	0.000
7.7000	0.136	1.051	0.276	0.000
7.8000	0.136	1.065	0.281	0.000
7.9000	0.136	1.079	0.286	0.000
8.0000	0.136	1.092	0.292	0.000
8.1000	0.136	1.106	0.799	0.000
8.2000	0.136	1.120	1.706	0.000
8.3000	0.136	1.133	2.808	0.000
8.4000	0.136	1.147	3.943	0.000
8.5000	0.136	1.161	4.955	0.000
8.6000	0.136	1.174	5.721	0.000
8.7000	0.136	1.188	6.217	0.000
8.8000	0.136	1.202	6.667	0.000
8.9000	0.136	1.215	7.056	0.000
9.0000	0.136	1.229	7.424	0.000

9.1000

0.136

1.243

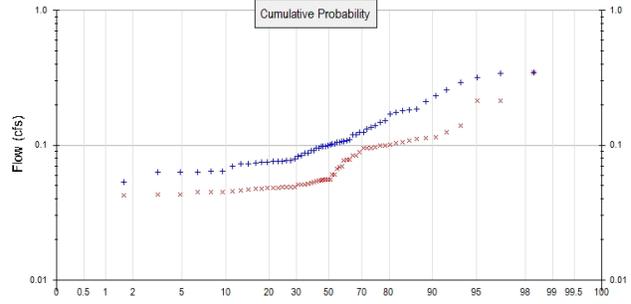
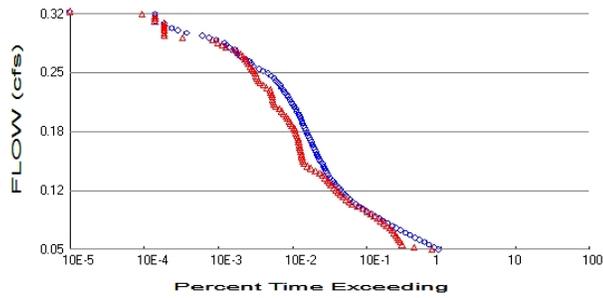
7.774

0.000

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Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 3.12
 Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 1.02
 Total Impervious Area: 2.1

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.104833
5 year	0.160817
10 year	0.203994
25 year	0.265767
50 year	0.317215
100 year	0.37348

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.065427
5 year	0.098709
10 year	0.1263
25 year	0.168401
50 year	0.205645
100 year	0.248495

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.105	0.051
1950	0.107	0.061
1951	0.096	0.048
1952	0.076	0.045
1953	0.063	0.045
1954	0.342	0.055
1955	0.135	0.099
1956	0.119	0.105
1957	0.148	0.088
1958	0.107	0.051

1959	0.106	0.056
1960	0.099	0.070
1961	0.186	0.096
1962	0.092	0.048
1963	0.151	0.049
1964	0.109	0.043
1965	0.091	0.069
1966	0.053	0.047
1967	0.108	0.049
1968	0.131	0.083
1969	0.320	0.051
1970	0.075	0.049
1971	0.119	0.114
1972	0.088	0.053
1973	0.083	0.056
1974	0.180	0.054
1975	0.073	0.045
1976	0.075	0.053
1977	0.063	0.048
1978	0.075	0.046
1979	0.210	0.051
1980	0.098	0.045
1981	0.077	0.047
1982	0.100	0.101
1983	0.170	0.049
1984	0.103	0.124
1985	0.125	0.095
1986	0.293	0.213
1987	0.140	0.139
1988	0.072	0.095
1989	0.074	0.043
1990	0.098	0.095
1991	0.101	0.066
1992	0.077	0.078
1993	0.064	0.043
1994	0.070	0.060
1995	0.102	0.108
1996	0.175	0.103
1997	0.347	0.345
1998	0.064	0.047
1999	0.083	0.077
2000	0.063	0.112
2001	0.025	0.038
2002	0.095	0.083
2003	0.075	0.055
2004	0.125	0.113
2005	0.087	0.056
2006	0.232	0.100
2007	0.184	0.078
2008	0.258	0.214
2009	0.079	0.056

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Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.3473	0.3454
2	0.3424	0.2135
3	0.3195	0.2133

4	0.2928	0.1392
5	0.2581	0.1244
6	0.2324	0.1145
7	0.2097	0.1129
8	0.1862	0.1116
9	0.1839	0.1077
10	0.1797	0.1046
11	0.1746	0.1031
12	0.1703	0.1009
13	0.1515	0.1000
14	0.1476	0.0995
15	0.1397	0.0962
16	0.1349	0.0952
17	0.1314	0.0951
18	0.1254	0.0946
19	0.1245	0.0883
20	0.1191	0.0834
21	0.1190	0.0832
22	0.1090	0.0785
23	0.1081	0.0775
24	0.1071	0.0767
25	0.1066	0.0699
26	0.1057	0.0686
27	0.1047	0.0664
28	0.1028	0.0607
29	0.1023	0.0603
30	0.1006	0.0559
31	0.0999	0.0558
32	0.0985	0.0557
33	0.0983	0.0555
34	0.0977	0.0548
35	0.0957	0.0546
36	0.0952	0.0543
37	0.0919	0.0533
38	0.0910	0.0527
39	0.0878	0.0514
40	0.0873	0.0513
41	0.0835	0.0510
42	0.0831	0.0507
43	0.0787	0.0492
44	0.0770	0.0491
45	0.0767	0.0488
46	0.0755	0.0486
47	0.0754	0.0485
48	0.0754	0.0483
49	0.0753	0.0479
50	0.0746	0.0474
51	0.0737	0.0472
52	0.0732	0.0470
53	0.0724	0.0459
54	0.0698	0.0454
55	0.0639	0.0448
56	0.0635	0.0448
57	0.0635	0.0446
58	0.0633	0.0431
59	0.0627	0.0428
60	0.0533	0.0426
61	0.0251	0.0380

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Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0524	19605	16131	82	Pass
0.0551	16987	9178	54	Pass
0.0578	14668	6387	43	Pass
0.0604	12722	6051	47	Pass
0.0631	10923	5751	52	Pass
0.0658	9437	5505	58	Pass
0.0685	8166	5240	64	Pass
0.0711	7078	4904	69	Pass
0.0738	6126	4601	75	Pass
0.0765	5311	4318	81	Pass
0.0792	4654	3955	84	Pass
0.0818	4066	3638	89	Pass
0.0845	3548	3283	92	Pass
0.0872	3136	3003	95	Pass
0.0899	2757	2701	97	Pass
0.0925	2447	2400	98	Pass
0.0952	2145	2137	99	Pass
0.0979	1893	1875	99	Pass
0.1006	1657	1601	96	Pass
0.1032	1509	1350	89	Pass
0.1059	1370	1224	89	Pass
0.1086	1253	1117	89	Pass
0.1113	1155	1022	88	Pass
0.1139	1070	935	87	Pass
0.1166	1009	874	86	Pass
0.1193	951	827	86	Pass
0.1220	890	773	86	Pass
0.1246	825	702	85	Pass
0.1273	777	663	85	Pass
0.1300	735	625	85	Pass
0.1327	687	582	84	Pass
0.1353	648	540	83	Pass
0.1380	622	496	79	Pass
0.1407	603	433	71	Pass
0.1434	583	377	64	Pass
0.1460	561	336	59	Pass
0.1487	538	302	56	Pass
0.1514	508	293	57	Pass
0.1541	488	290	59	Pass
0.1567	473	285	60	Pass
0.1594	457	281	61	Pass
0.1621	440	275	62	Pass
0.1648	424	269	63	Pass
0.1674	410	266	64	Pass
0.1701	394	262	66	Pass
0.1728	380	258	67	Pass
0.1755	368	254	69	Pass
0.1781	353	250	70	Pass
0.1808	341	244	71	Pass
0.1835	333	237	71	Pass
0.1862	322	230	71	Pass
0.1888	313	223	71	Pass
0.1915	302	210	69	Pass

0.1942	293	202	68	Pass
0.1969	284	191	67	Pass
0.1995	276	183	66	Pass
0.2022	265	173	65	Pass
0.2049	257	161	62	Pass
0.2076	241	154	63	Pass
0.2102	234	141	60	Pass
0.2129	224	126	56	Pass
0.2156	212	120	56	Pass
0.2182	205	117	57	Pass
0.2209	195	115	58	Pass
0.2236	187	114	60	Pass
0.2263	177	112	63	Pass
0.2289	166	109	65	Pass
0.2316	160	107	66	Pass
0.2343	151	96	63	Pass
0.2370	146	86	58	Pass
0.2396	135	78	57	Pass
0.2423	128	74	57	Pass
0.2450	120	72	60	Pass
0.2477	111	69	62	Pass
0.2503	99	67	67	Pass
0.2530	85	63	74	Pass
0.2557	75	60	80	Pass
0.2584	63	57	90	Pass
0.2610	59	54	91	Pass
0.2637	56	52	92	Pass
0.2664	50	49	98	Pass
0.2691	42	46	109	Pass
0.2717	39	42	107	Pass
0.2744	37	39	105	Pass
0.2771	36	34	94	Pass
0.2798	30	27	90	Pass
0.2824	28	24	85	Pass
0.2851	26	21	80	Pass
0.2878	20	18	90	Pass
0.2905	16	7	43	Pass
0.2931	13	4	30	Pass
0.2958	8	4	50	Pass
0.2985	6	4	66	Pass
0.3012	5	4	80	Pass
0.3038	4	4	100	Pass
0.3065	4	4	100	Pass
0.3092	3	3	100	Pass
0.3119	3	3	100	Pass
0.3145	3	3	100	Pass
0.3172	3	2	66	Pass

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Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

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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
Trapezoidal Pond 1 POC	<input type="checkbox"/>	440.86			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		440.86	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

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Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

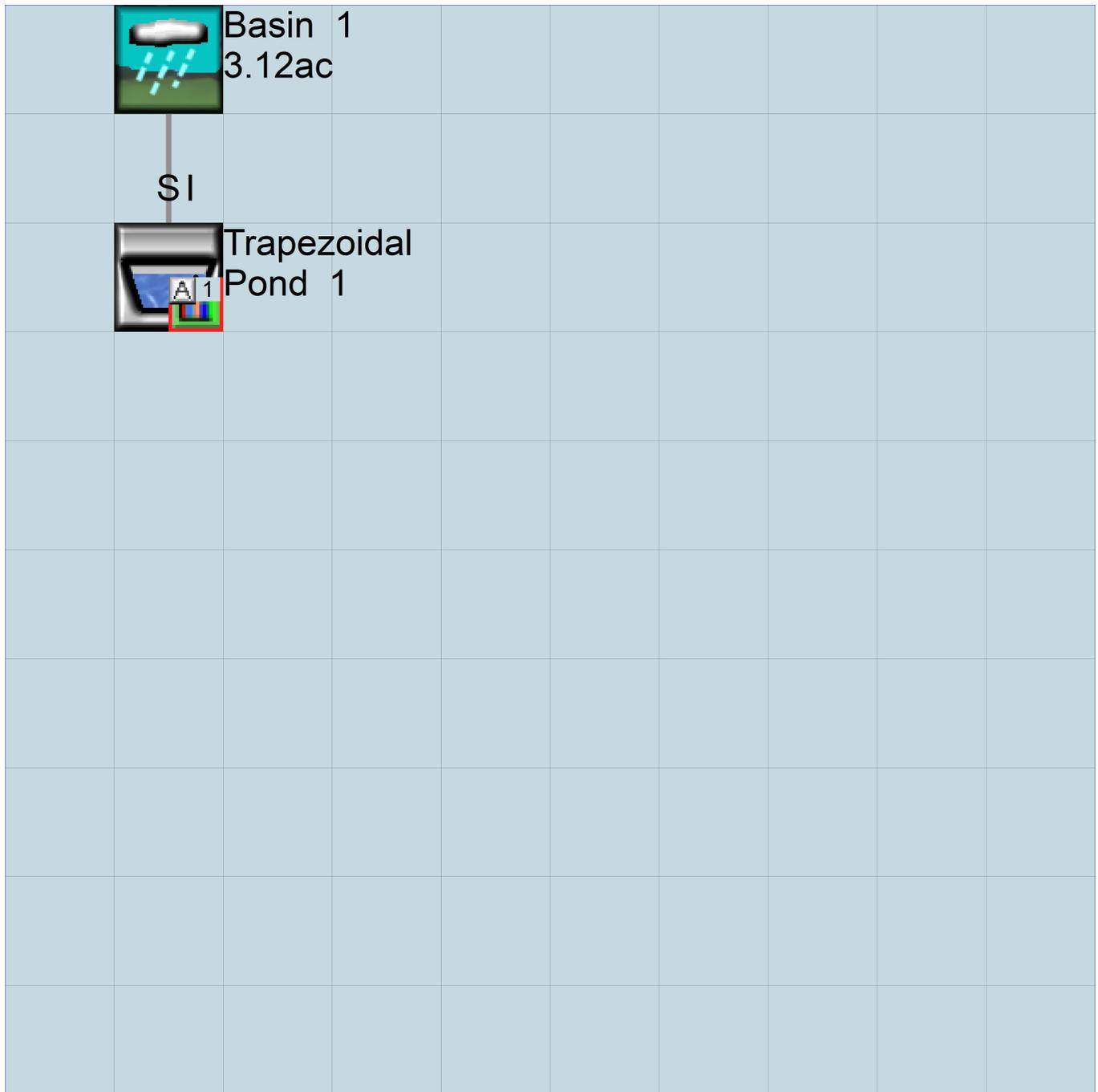
No IMPLND changes have been made.

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Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

WVHM4 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 East Hill Basin 9 Pond.wdm  
MESSU 25 PreEast Hill Basin 9 Pond.MES  
27 PreEast Hill Basin 9 Pond.L61  
28 PreEast Hill Basin 9 Pond.L62  
30 POCEast Hill Basin 9 Pond1.dat
```

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 10
COPY 501
DISPLY 1
END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

```
# - #<-----Title----->***TRAN PIVL DIG1 FIL1 PYR DIG2 FIL2 YRND  
1 Basin 1 MAX 1 2 30 9
```

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

```
# - # NPT NMN ***  
1 1 1  
501 1 1
```

END TIMESERIES

END COPY

GENER

OPCODE

```
# # OPCODE ***
```

END OPCODE

PARAM

```
# # K ***
```

END PARAM

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 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 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->	<Name> #	<--Area-->	<-factor-->	<-Target->	<Name> #	MBLK	Tbl#	***
Basin	1							
PERLND	10		3.12	COPY	501		12	
PERLND	10		3.12	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	***	ODGTFG for each	FUNCT for each	***
# - #	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
	*** ac-ft	for each possible exit
		Initial value of OUTDGT
		for each possible exit
	<----->	<----->

END HYDR-INIT

END RCHRES

SPEC-ACTIONS

END SPEC-ACTIONS

FTABLES

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name> #	<Name> #	tem	strg	<-factor-->strg	<Name> #	#	<Name> #	***
WDM	2	PREC	ENGL	1.2	PERLND	1 999	EXTNL	PREC
WDM	2	PREC	ENGL	1.2	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

DRAFT

Mitigated UCI File

RUN

GLOBAL

WVHM4 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	East Hill Basin 9 Pond.wdm	
MESSU	25	MitEast Hill Basin 9 Pond.MES	
	27	MitEast Hill Basin 9 Pond.L61	
	28	MitEast Hill Basin 9 Pond.L62	
	30	POCEast Hill Basin 9 Pond1.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:15
PERLND 13
IMPLND 1
IMPLND 4
IMPLND 9
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			Trapezoidal 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   0   1   9
END PRINT-INFO

```

```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRG  VLE INFC  HWT ***
13   0   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
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
9     SIDEWALKS/MOD      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
9   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   4   1   9
4   0   0   4   0   0   0   1   9
9   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
9   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
9 400 0.05 0.1 0.08

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
1 0 0
4 0 0
9 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
1 0 0
4 0 0
9 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 13 1.02 RCHRES 1 2
PERLND 13 1.02 RCHRES 1 3
IMPLND 1 0.72 RCHRES 1 5
IMPLND 4 1.14 RCHRES 1 5
IMPLND 9 0.24 RCHRES 1 5

```

*****Routing*****

```

PERLND 13 1.02 COPY 1 12
IMPLND 1 0.72 COPY 1 15
IMPLND 4 1.14 COPY 1 15
IMPLND 9 0.24 COPY 1 15
PERLND 13 1.02 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 Engr Metr LKFG ***
1 Trapezoidal Pond-012 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 ***

```


3.200000	0.136593	0.437098	0.051625
3.300000	0.136593	0.450758	0.052426
3.400000	0.136593	0.464417	0.053214
3.500000	0.136593	0.478076	0.053991
3.600000	0.136593	0.491736	0.054757
3.700000	0.136593	0.505395	0.055512
3.800000	0.136593	0.519054	0.056257
3.900000	0.136593	0.532713	0.067949
4.000000	0.136593	0.546373	0.076696
4.100000	0.136593	0.560032	0.082936
4.200000	0.136593	0.573691	0.088133
4.300000	0.136593	0.587351	0.092714
4.400000	0.136593	0.601010	0.096875
4.500000	0.136593	0.614669	0.100725
4.600000	0.136593	0.628329	0.104332
4.700000	0.136593	0.641988	0.107741
4.800000	0.136593	0.655647	0.110987
4.900000	0.136593	0.669307	0.114093
5.000000	0.136593	0.682966	0.117078
5.100000	0.136593	0.696625	0.119957
5.200000	0.136593	0.710285	0.122742
5.300000	0.136593	0.723944	0.125443
5.400000	0.136593	0.737603	0.128068
5.500000	0.136593	0.751263	0.130623
5.600000	0.136593	0.764922	0.133115
5.700000	0.136593	0.778581	0.135548
5.800000	0.136593	0.792241	0.137927
5.900000	0.136593	0.805900	0.140256
6.000000	0.136593	0.819559	0.142539
6.100000	0.136593	0.833219	0.144777
6.200000	0.136593	0.846878	0.146975
6.300000	0.136593	0.860537	0.149133
6.400000	0.136593	0.874197	0.170508
6.500000	0.136593	0.887856	0.186690
6.600000	0.136593	0.901515	0.198449
6.700000	0.136593	0.915174	0.208360
6.800000	0.136593	0.928834	0.217175
6.900000	0.136593	0.942493	0.225236
7.000000	0.136593	0.956152	0.232738
7.100000	0.136593	0.969812	0.239800
7.200000	0.136593	0.983471	0.246504
7.300000	0.136593	0.997130	0.252908
7.400000	0.136593	1.010790	0.259056
7.500000	0.136593	1.024449	0.264982
7.600000	0.136593	1.038108	0.270712
7.700000	0.136593	1.051768	0.276267
7.800000	0.136593	1.065427	0.281665
7.900000	0.136593	1.079086	0.286920
8.000000	0.136593	1.092746	0.292046
8.100000	0.136593	1.106405	0.799230
8.200000	0.136593	1.120064	1.706412
8.300000	0.136593	1.133724	2.808004
8.400000	0.136593	1.147383	3.943642
8.500000	0.136593	1.161042	4.955142
8.600000	0.136593	1.174702	5.721797
8.700000	0.136593	1.188361	6.217558
8.800000	0.136593	1.202020	6.667906
8.900000	0.136593	1.215680	7.056705
9.000000	0.136593	1.229339	7.424607

END FTABLE 1

END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	tem strg<-factor->	strg	<Name>	# #
WDM	2	PREC	ENGL	1.2	PERLND	1 999 EXTNL	PREC
WDM	2	PREC	ENGL	1.2	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	1002	FLOW	ENGL	REPL
RCHRES	1	HYDR	STAGE	1	1	1	WDM	1003	STAG	ENGL	REPL
COPY	1	OUTPUT	MEAN	1	1	48.4	WDM	701	FLOW	ENGL	REPL
COPY	501	OUTPUT	MEAN	1	1	48.4	WDM	801	FLOW	ENGL	REPL

END EXT TARGETS

MASS-LINK

<Volume>	<-Grp>	<-Member->	<--Mult-->	<Target>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	<-factor->	<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

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Appendix 4: Conveyance Analysis

Nothing is necessary for this appendix at this time

Appendix 5: Operations and Maintenance Manual

1. Operations and Maintenance Manual

Appendix V-A: BMP Maintenance Tables

Ecology intends the facility-specific maintenance standards contained in this section to be conditions for determining if maintenance actions are required as identified through inspection. Recognizing that Permittees have limited maintenance funds and time, Ecology does not require that a Permittee perform all these maintenance activities on all their stormwater BMPs. We leave the determination of importance of each maintenance activity and its priority within the stormwater program to the Permittee. We do expect, however, that sufficient maintenance will occur to ensure that the BMPs continue to operate as designed to protect ground and surface waters.

Ecology doesn't intend that these measures identify the facility's required condition at all times between inspections. In other words, exceedance of these conditions at any time between inspections and/or maintenance does not automatically constitute a violation of these standards. However, based upon inspection observations, the Permittee shall adjust inspection and maintenance schedules to minimize the length of time that a facility is in a condition that requires a maintenance action.

Table V-A.1: Maintenance Standards - Detention Ponds

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	Any trash and debris which exceed 1 cubic feet per 1,000 square feet. In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site
	Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or local regulations. (Apply requirements of adopted IPM policies for the use of herbicides).	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with local health department) Complete eradication of noxious weeds may not be possible. Compliance with State or local eradication policies required
	Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants (Coordinate removal/cleanup with local water quality response agency).	No contaminants or pollutants present.
	Rodent Holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordinate with local health department; coordinate with Ecology Dam Safety Office if pond exceeds 10 acre-feet.)
	Beaver Dams	Dam results in change or function of the facility.	Facility is returned to design function. (Coordinate trapping of beavers and removal of dams with appropriate permitting agencies)
	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted IPM policies
	Tree Growth and Hazard Trees	Tree growth does not allow maintenance and inspection access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access or maintenance, do not remove If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements)	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood). Remove hazard Trees
Side Slopes of Pond	Erosion Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed engineer in the state of Washington should be consulted to resolve source of erosion.	
Storage Area	Sediment Accumulated sediment that exceeds 10% of the designed pond depth unless otherwise specified or affects inletting or outletting condition of the facility.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.	

Table V-A.1: Maintenance Standards - Detention Ponds (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
	Liner (if Applicable)	Liner is visible and has more than three 1/4-inch holes in it.	Liner repaired or replaced. Liner is fully covered.
Ponds Berms (Dikes)	Settlements	Any part of berm which has settled 4 inches lower than the design elevation If settlement is apparent, measure berm to determine amount of settlement Settling can be an indication of more severe problems with the berm or outlet works. A licensed engineer in the state of Washington should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.
	Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.)	Piping eliminated. Erosion potential resolved.
Emergency Overflow/Spillway and Berms over 4 feet in height	Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping. Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed engineer in the state of Washington should be consulted for proper berm/spillway restoration.
	Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.)	Piping eliminated. Erosion potential resolved.
Emergency Overflow/Spillway	Emergency Overflow/Spillway	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway. (Rip-rap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
	Erosion	See "Side Slopes of Pond"	

Table V-A.2: Maintenance Standards - Infiltration

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
General	Trash & Debris	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Poisonous/Noxious Vegetation	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Contaminants and Pollution	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Rodent Holes	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Storage Area	Sediment	Water ponding in infiltration pond after rainfall ceases and appropriate time allowed for infiltration. Treatment basins should infiltrate Water Quality Design Storm Volume within 48 hours, and empty within 24 hours after cessation of most rain events.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.

Table V-A.2: Maintenance Standards - Infiltration (continued)

Maintenance Component	Defect	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
		(A percolation test pit or test of facility indicates facility is only working at 90% of its designed capabilities. Test every 2 to 5 years. If two inches or more sediment is present, remove).	
Filter Bags (if applicable)	Filled with Sediment and Debris	Sediment and debris fill bag more than 1/2 full.	Filter bag is replaced or system is redesigned.
Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Gravel in rock filter is replaced.
Side Slopes of Pond	Erosion	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Emergency Overflow Spillway and Berms over 4 feet in height.	Tree Growth	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Piping	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Emergency Overflow Spillway	Rock Missing	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
	Erosion	See Table V-A.1: Maintenance Standards - Detention Ponds	See Table V-A.1: Maintenance Standards - Detention Ponds
Pre-settling Ponds and Vaults	Facility or sump filled with Sediment and/or debris	6" or designed sediment trap depth of sediment.	Sediment is removed.

Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point or the vent is damaged.	Vents open and functioning.
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for 1/2 length of storage vault or any point depth exceeds 15% of diameter. (Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than 1/2 length of tank.)	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any openings or voids allowing material to be transported into facility. (Will require engineering analysis to determine structural stability).	All joint between tank/pipe sections are sealed.
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of its design shape. (Review required by engineer to determine structural stability).	Tank/pipe repaired or replaced to design.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determines that the vault is not structurally sound. Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	Vault replaced or repaired to design specifications and is structurally sound. No cracks more than 1/4-inch wide at the joint of the inlet/outlet pipe.

Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults) (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins

Table V-A.4: Maintenance Standards - Control Structure/Flow Restrictor

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris (Includes Sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall. Structure is not in upright position (allow up to 10% from plumb). Connections to outlet pipe are not watertight and show signs of rust. Any holes - other than designed holes - in the structure.	Structure securely attached to wall and outlet pipe. Structure in correct position. Connections to outlet pipe are water tight; structure repaired or replaced and works as designed. Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing. Gate cannot be moved up and down by one maintenance person. Chain/rod leading to gate is missing or damaged. Gate is rusted over 50% of its surface area.	Gate is watertight and works as designed. Gate moves up and down easily and is watertight. Chain is in place and works as designed. Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Manhole	See Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)	See Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)	See Table V-A.3: Maintenance Standards - Closed Detention Systems (Tanks/Vaults)
Catch Basin	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins

Table V-A.5: Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%. Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe. Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height. Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No Trash or debris located immediately in front of catch basin or on grate opening. No trash or debris in the catch basin. Inlet and outlet pipes free of trash or debris. No dead animals or vegetation present within the catch basin.
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin). Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	Top slab is free of holes and cracks. Frame is sitting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regouted and secure at basin wall.
	Settlement/ Mis-alignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See Table V-A.1: Maintenance Standards - Detention Ponds	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Cover/grate is in place, meets design standards, and is secured
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place, meets the design standards, and is installed and aligned with the flow path.

Table V-A.6: Maintenance Standards - Debris Barriers (e.g., Trash Racks)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
Metal	Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches. Bars are missing or entire barrier missing. Bars are loose and rust is causing 50% deterioration to any part of barrier.	Bars in place with no bends more than 3/4 inch. Bars in place according to design. Barrier replaced or repaired to design standards.
	Inlet/Outlet Pipe	Debris barrier missing or not attached to pipe	Barrier firmly attached to pipe

Table V-A.7: Maintenance Standards - Energy Dissipators

Maintenance Components	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
External:			
Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Rock pad replaced to design standards.
	Erosion	Soil erosion in or adjacent to rock pad.	Rock pad replaced to design standards.
Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/flushed so that it matches design.
	Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench redesigned or rebuilt to standards.
	Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Perforated pipe cleaned or replaced.
	Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes or receives credible report of water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility rebuilt or redesigned to standards.
	Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
Internal:			
Manhole/Chamber	Worn or Damaged Post, Baffles, Side of Chamber	Structure dissipating flow deteriorates to 1/2 of original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Structure replaced to design standards.
	Other Defects	See Table V-A.5: Maintenance Standards - Catch Basins	See Table V-A.5: Maintenance Standards - Catch Basins

Table V-A.8: Maintenance Standards - Typical Biofiltration Swale

Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
General	Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits on grass treatment area of the bio-swale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
	Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
	Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire swale width.

Table V-A.13: Maintenance Standards - Sand Filters (Above Ground/Open) (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
	Flow Spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter.	Spreader leveled and cleaned so that flows are spread evenly over sand filter.
	Damaged Pipes	Any part of the piping that is crushed or deformed more than 20% or any other failure to the piping.	Pipe repaired or replaced.

Table V-A.14: Maintenance Standards - Sand Filters (Below Ground/Enclosed)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Below Ground Vault.	Sediment Accumulation on Sand Media Section	Sediment depth exceeds 1/2-inch.	No sediment deposits on sand filter section that which would impede permeability of the filter section.
	Sediment Accumulation in Pre-Settling Portion of Vault	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6-inches.	No sediment deposits in first chamber of vault.
	Trash/Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/outlet, floatables and non-floatables.	Trash and debris removed from vault and inlet/outlet piping.
	Sediment in Drain Pipes/Cleanouts	When drain pipes, cleanouts become full with sediment and/or debris.	Sediment and debris removed.
	Short Circuiting	When seepage/flow occurs along the vault walls and corners. Sand eroding near inflow area.	Sand filter media section re-laid and compacted along perimeter of vault to form a semi-seal. Erosion protection added to dissipate force of incoming flow and curtail erosion.
	Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
	Access Cover Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover. Maintenance person cannot remove cover using normal lifting pressure.	Cover repaired to proper working specifications or replaced.
	Ventilation	Ventilation area blocked or plugged	Blocking material removed or cleared from ventilation area. A specified % of the vault surface area must provide ventilation to the vault interior (see design specifications).
	Vault Structure Damaged; Includes Cracks in Walls, Bottom, Damage to Frame and/or Top Slab.	Cracks wider than 1/2-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound. Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound. Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
	Baffles/Internal walls	Baffles or walls corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel.	

Table V-A.15: Maintenance Standards - Manufactured Media Filters

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Below Ground	Sediment Accumulation on Media.	Sediment depth exceeds 0.25-inches.	No sediment deposits which would impede permeability of the

Table V-A.15: Maintenance Standards - Manufactured Media Filters (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Vault			compost media.
	Sediment Accumulation in Vault	Sediment depth exceeds 6-inches in first chamber.	No sediment deposits in vault bottom of first chamber.
	Trash/Debris Accumulation	Trash and debris accumulated on compost filter bed.	Trash and debris removed from the compost filter bed.
	Sediment in Drain Pipes/Clean-Outs	When drain pipes, clean-outs, become full with sediment and/or debris.	Sediment and debris removed.
	Damaged Pipes	Any part of the pipes that are crushed or damaged due to corrosion and/or settlement.	Pipe repaired and/or replaced.
	Access Cover Damaged/Not Working	Cover cannot be opened; one person cannot open the cover using normal lifting pressure, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/or Top Slab	Cracks wider than 1/2-inch or evidence of soil particles entering the structure through the cracks, or maintenance/inspection personnel determine that the vault is not structurally sound. Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or evidence of soil particles entering through the cracks.	Vault replaced or repairs made so that vault meets design specifications and is structurally sound. Vault repaired so that no cracks exist wider than 1/4-inch at the joint of the inlet/outlet pipe.
	Baffles	Baffles corroding, cracking warping, and/or showing signs of failure as determined by maintenance/inspection person.	Baffles repaired or replaced to specifications.
Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, not securely attached to structure wall, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.	
Below Ground Cartridge Type	Media	Drawdown of water through the media takes longer than 1 hour, and/or overflow occurs frequently.	Media cartridges replaced.
	Short Circuiting	Flows do not properly enter filter cartridges.	Filter cartridges replaced.

Appendix 6: Special Reports and Studies

1. N/A