

PRELIMINARY DRAINAGE REPORT

For

LORENZINI SHORT PLAT
4719 86TH AVE SE Mercer Island, WA



DRS Project No. 21071
Mercer Island Permit No. SUB22-002

Applicant

Design Built Homes
11400 SE 8th ST, Suite 415
Bellevue, WA 98004

Report Prepared by



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PRELIMINARY DRAINAGE REPORT

4719 89th AVE SE SHORT PLAT

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SECTION I: PROJECT OVERVIEW

GENERAL DESCRIPTION

The Site is located at 4719 86th Ave SE, Mercer Island Washington, also known as Tax Parcel Numbers 7598100420. Project is the subdivision one existing parcel into two single-family residential lots. Access to project will be along 89th Ave SE where it connects with the existing roadway facility; the second lot will be accessed from a proposed private drive located along the northern edge of the property line. The Project is required to meet the standards in the 2019 Department of Ecology Stormwater Management Manual for Western Washington. The existing residence will be removed.

PREDEVELOPED SITE CONDITIONS

The total area of the existing parcel is 28,644 s.f. (0.658 ac). The total project area is 29,138 s.f. (0.669 ac). The Site is currently developed with a single-family residence, driveways and landscaping. Vegetation consists of lawn and landscaping with evergreen and deciduous trees. There are no critical areas identified on the Site.

The Site is encompassed in one Threshold Discharge Area (TDA). This TDA consists of one Natural Discharge Area (NDA) and one Natural Discharge Locations (NDL). The topography of NDA 1 slopes from a high point in the north east corner of the site at approximately 12.2% within Lot 1 to 4.4% within Lot 2; runoff travels southwest along the western property line exiting the Site through as sheet flow along the southwest property corner and continues southwest through the existing stormwater conveyance system in SE 47th PL. The system along SE 47th PL conveys runoff until it outfalls to Lake Washington.

The USDA Web Soil Survey describes the soil on Site as Arents, Alderwood material, 6 to 15 percent slopes (AmC - 6-15% slopes), Kitsap silt loam, 2 to 8 percent slopes and Kitsap silt loam, 15 to 30 percent slopes.

DEVELOPED SITE CONDITIONS

The applicant is seeking approval for development of 28,644 s.f. (0.658 ac) into two single-family residential lots through the City of Mercer Island short plat process (Project), with lot sizes of 13,670 and 14,974 s.f. (Project). Lots 1 and 2 will contain new development; Lot 1 will contain a 20qwide shared use driveway. Lot 2 will access the lot from the shared driveway. A total of 4,002 s.f. of pavement will be provided for access to Lots 1 and 2. The existing residence will be removed. A total of 5,097 CF of volume is required for flow control; accordingly, all runoff is being routed to a 110-foot long, 8-foot diameter tank.

The Project is located in R-9.6 zoning, which has a minimum lot area of 9,600 s.f. Maximum impervious is limited to 40% per lot and the maximum lot coverage by structure is limited to 40% per lot.

- Total area of land-disturbing activities = 29,138 s.f.
- Total Lot Impervious Area Allowed = 11,457 s.f. (40% of Site area)
- Total Impervious Area Added = 11,951 s.f.

Applicable Minimum Requirements for the Project are determined by Flow chart (see Appendix A). The Project is defined as new development and therefore does not qualify for Redevelopment thresholds.

The Project will result in more than 2,000 s.f. of new, replaced, and new plus replaced impervious surfaces. Lots 1 and 2 will provide 11,457 s.f. of impervious surfaces; accordingly, all minimum requirements apply to the new and replaced hard surfaces and the land disturbed.

Minimum Requirement #1: Preparation of Stormwater Site Plans

This Stormwater Site Plan has been prepared in accordance with the 2019 Department of Ecology Stormwater Management Manual for Western Washington.

Minimum Requirement #2: Construction Stormwater Pollution Prevention (SWPP)

The Project will comply with the Construction SWPP thirteen elements. An erosion control plan will be provided with each building permit.

Minimum Requirement #3: Source Control of Pollution

All known, available, and reasonable source control BMPs will be applied to this Project.

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

The natural drainage patterns will be maintained for this Project. Surface runoff will be collected for flow control and discharged to the existing system in SE 47th PL.

Minimum Requirement #5: On-site Stormwater Management

The project will apply On-site Stormwater Management BMPs in accordance with the project thresholds, standards, and lists found in Table 1-3-2 of the 2019 Department of Ecology Stormwater Management Manual for Western Washington. For the process of selecting on-site BMPs see Appendix A.

Since all nine minimum requirements are triggered by this project, On-site Stormwater Management BMPs from List #2 will be applied according to feasibility to each type of surface. The result of the selection process for Lot 1 is outlined below.

Lawn and Landscaped Areas:

- Post-Construction Soil Quality and Depth BMP T5.13 will be applied to all feasible areas in accordance with the 2019 Department of Ecology Stormwater Management Manual for Western Washington. See soil management plan, below.

Roofs:

- Full Dispersion: Not feasible as there is not enough available area that is in the native or forested condition.
- Full Infiltration: Not permitted per Mercer Island infiltration feasibility map.
- Bioretention: Not feasible due to the lack of a safe and available overflow pathway to the municipal storm system.
- Downspout Dispersion Systems: A downspout dispersion system consistent with DOE BMP T5.10B will be provided.

Other Hard Surfaces (Driveways/Sidewalks) .

- Full Dispersion: Not feasible as there is not enough available area that is in the native or forested condition.
- Permeable Pavement: Not permitted per Mercer Island infiltration feasibility map.
- Bioretention: Not feasible due to the lack of a safe and available overflow pathway to the municipal storm system.
- Sheet Flow Dispersion: Basic sheet flow dispersion may be utilized to the maximum extent feasible per Figure V-3.2 of the 2019SWMMWW; location of sheet flow dispersion strips to be determined as applicable with final engineering plans.

The result of the BMP selection process for Lot 2 is outlined below.

Lawn and Landscaped Areas:

- Post-Construction Soil Quality and Depth BMP T5.13 will be applied to all feasible areas in accordance with the 2020 SWES. See soil management plan, below.

Roofs:

- Full Dispersion: Not feasible as there is not enough available area that is in the native or forested condition.
- Full Infiltration: Not permitted per Mercer Island infiltration feasibility map.
- Bioretention: Not feasible due to the lack of a safe and available overflow pathway to the municipal storm system.
- Downspout Dispersion Systems: A downspout dispersion system consistent with DOE BMP T5.10B will be provided.

Other Hard Surfaces (Driveways/Sidewalks) .

- Full Dispersion: Not feasible as there is not enough available area that is in the native or forested condition.
- Permeable Pavement: Not permitted per Mercer Island infiltration feasibility map.
- Bioretention: Not feasible due to the lack of a safe and available overflow pathway to the municipal storm system.

- Sheet Flow Dispersion: Basic sheet flow dispersion may be utilized to the maximum extent feasible per Figure V-3.2 of the 2019SWMMWW; location of sheet flow dispersion strips to be determined as applicable with final engineering plans. There are no sidewalks to be constructed along the proposed private drive.

Soil Management Plan

Within the limits of Site disturbance, duff and topsoil will be retained in an undisturbed state and stockpiled for later use to stabilize and amend soils throughout the Site. Post-construction soil amendment will meet the requirements of BMP T5.13 Post-Construction Soil Quality and Depth. Detailed calculation for imported soil amendment compost, if necessary, will be provided during engineering review for the Project.

Minimum Requirement #6: Runoff Treatment

Not applicable for this project. The total effective PGIS for the Project is less than 5,000 s.f. (4,002 s.f.) and therefore, according per the TDA thresholds as outlined in 1-3.4.6 of the 2019 Department of Ecology Stormwater Management Manual for Western Washington, a treatment facility is not applicable.

Minimum Requirement #7: Flow Control

A continuous simulation model, WWHM 2012, was used to analyze the pre- and post-developed runoff rates. The soil type is modeled as hydrologic soil group C for the Alderwood SCS classification as shown in Figure 4. In the pre-developed condition, the entire Site is modeled as %Forest+. In post-development conditions, the soil types are unchanged from the pre-developed conditions. Pursuant to the 2019 Department of Ecology Stormwater Management Manual for Western Washington, Volume III-Appendix C, all areas that meet the soil quality and depth requirement are to be entered into the model as pasture rather than lawn/landscaping; accordingly, landscaped areas are modeled as %Pasture+for this Project. The remaining portions of the developed Site tributary to the proposed detention tank are modeled impervious as appropriate. Results of the WWHM2012 analysis are included in Appendix B.

Minimum Requirement #8: Wetlands Protection

Not applicable to this Project. There are no wetlands on the Project Site nor in the vicinity of the downstream discharge area.

Minimum Requirement #9: Operation and Maintenance

An operation and maintenance manual will be provided at final engineering.

PROPOSED SITE DOWNSTREAM DRAINAGE SYSTEM

Upstream Analysis

In evaluating the upstream area, we reviewed the USGS topographic survey mapping of the area, and field topographic survey, performed by D.R. STRONG Consulting Engineers Inc. The majority of upstream runoff appears to be drained away from the Site. Runoff from the parcel to the north drains toward the west and is either collected

along SE 47th ST or sheet flows across neighboring parcels to the west until it is collected along 84th AVE SE. A negligible amount of stormwater may enter the Project Site over the northern property line before draining to the west, away from the Site. Runoff from parcels to the south drains southwest and away from the Site. In summary, the amount of upstream stormwater the Site is expected to receive is negligible.

Downstream Analysis

The downstream area is located within the Mercer Island Drainage Basin. The downstream area was evaluated by reviewing available resources, and by conducting a field reconnaissance. The field reconnaissance was performed on June 18, 2021 under sunny conditions and no precipitation.

The Site is encompassed in one Threshold Discharge Area (TDA). This TDA consists of one Natural Discharge Area (NDA) and one Natural Discharge Locations (NDL). The topography of NDA 1 slopes from a high point in the north east corn of the site at approximately 12.2% within Lot 1 to 4.4% within Lot 2; runoff travels southwest along the western property line exiting the Site through as sheet flow along the southwest property corner and continues southwest through the existing stormwater conveyance system in SE 47th PL. The system along SE 47th PL conveys runoff until it outfalls to Lake Washington.

Downstream Path of the NDA 1

Point A1+ is the natural discharge location where runoff sheet flows over the southwestern property corner of the Site. (0q)

From A1+ to Point A2+, runoff travels south as surface flow over vegetation. (0q±200q)
No flow was observed.

Point A2+, runoff enters an existing catch basin located in the loop of SE 47TH PL (±200q)

From Point A2+ to Point A3+, Runoff continues southwest as pipe flow through a 12-inch diameter concrete pipe. (±260) No flow was observed.

Point A3+, runoff from the 12-inch PVC converges with an open water course. (±260q)

From Point A3+ to Point A4+, Runoff continues west as channelized flow through. (±420) No flow was observed.

Point A4+, runoff from the channelized flow enters a 12+concrete pipe. (±420q)

From Point A4+ to Point A5+, Runoff continues southwest as pipe flow through a stormwater conveyance system. (±515) No flow was observed.

Point A5+, runoff enters a Type 2 manhole just north of Mercer Way. (±515q)

From Point A5+ to Point A6+, Runoff continues southwest as pipe flow through a 12-inch concrete pipe. (±620) No flow was observed.

From Point A6,+ stormwater outfalls from a 12-inch concrete pipe into an open watercourse (±620)

From Point A6+ to Point A7+, Runoff continues south as channel flow. (±705) No flow was observed.

From Point A7,+stormwater enters an 18-inch corrugated metal pipe (±705)

From Point A7+ to Point A8+, Runoff continues south as pipe flow through an 18-inch corrugated metal pipe. (±725) No flow was observed.

From Point A8,+stormwater enters a type 1 CB east of 84th Ave SE. (±725)

From Point A8+ to Point A9+, Runoff continues west as pipe flow through a 12-inch concrete pipe. (±740) No flow was observed.

From Point A9,+stormwater outfalls from a 12-inch concrete pipe to an open water course (±740)

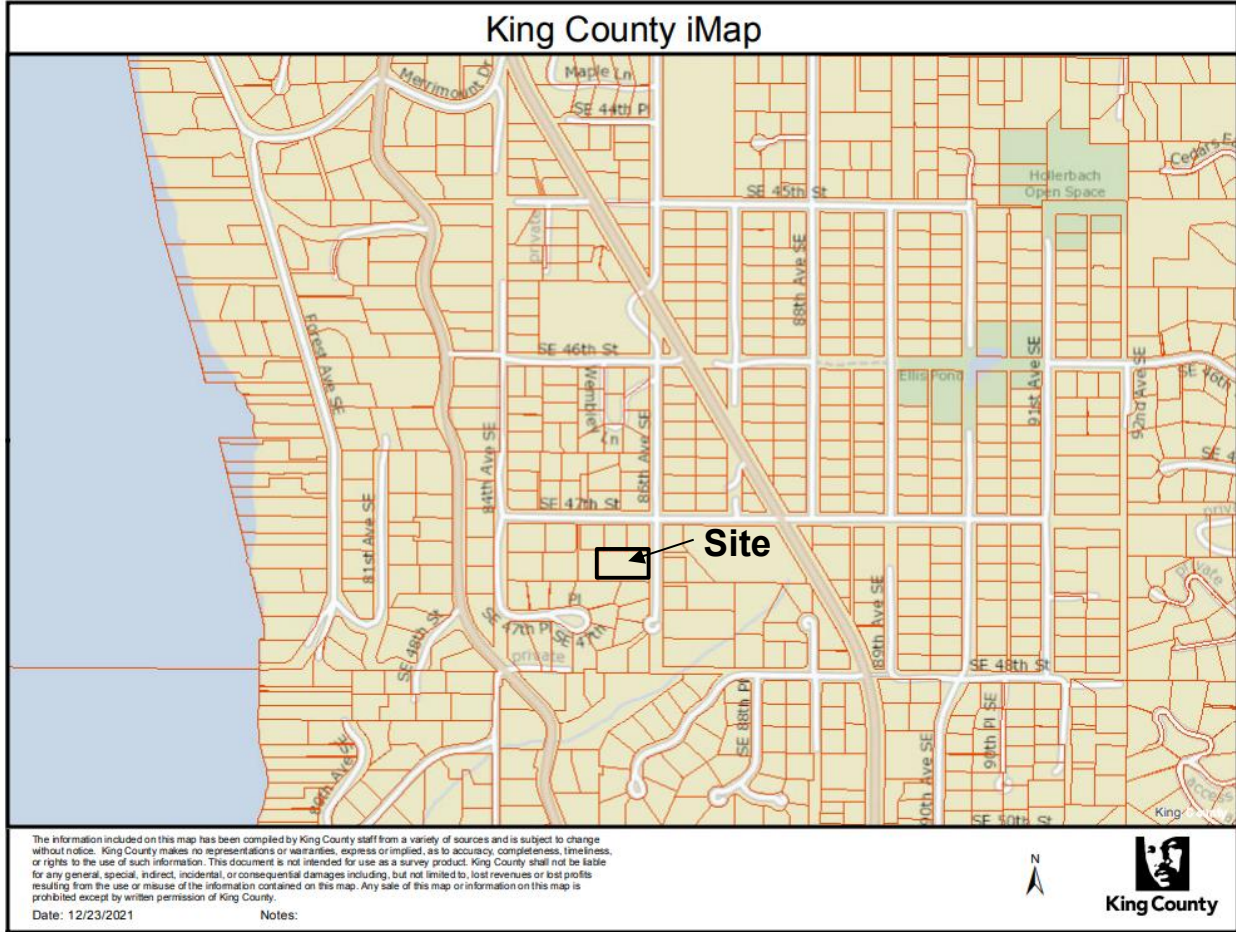
From Point A9+ to Point A10+, Runoff continues west as channelized flow through an open water course. (±1320) No flow was observed.

From Point A10,+stormwater enters an 18-inch corrugated metal pipe where it travels through a series of catch basins, and open water courses until it ultimately outfalls to Lake Washington (±1320)

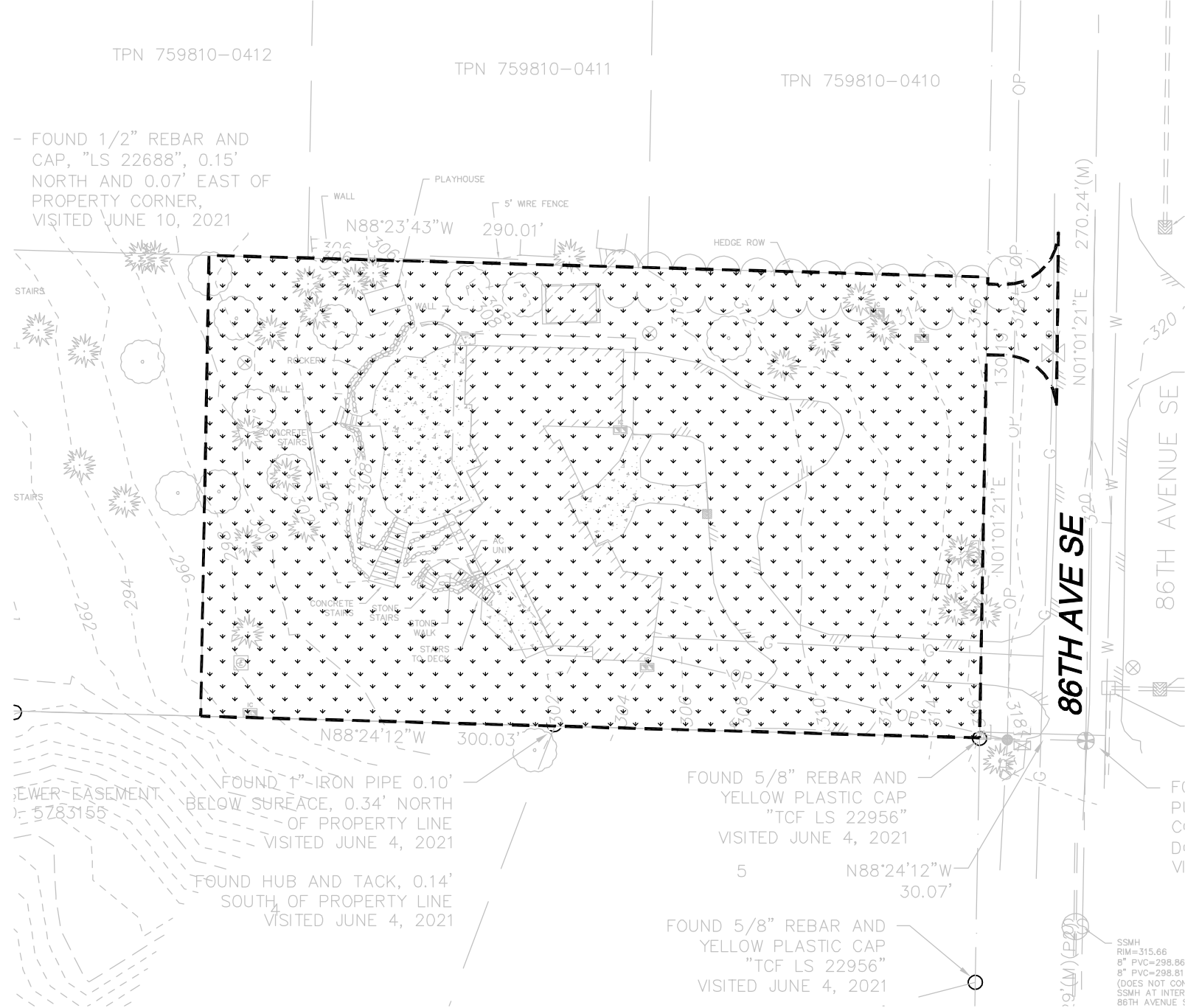
SECTION II: SITE MAPS

FIGURE 1 VICINITY MAP

4719 86TH AVE SE, MERCER ISLAND, WA



**FIGURE 2
PREDEVELOPED FIGURE**

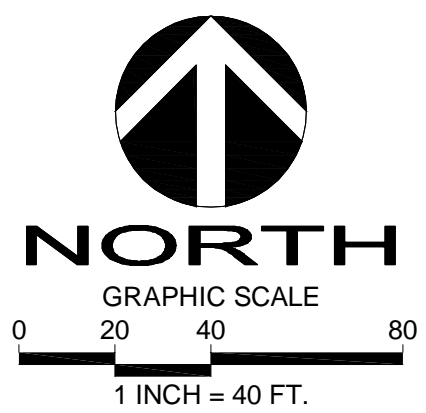


AREA BREAKDOWN

TOTAL SITE/PROJECT AREA: 29,138 S.F. (0.669 ACRES)

LEGEND

- SITE/PROJECT BOUNDARY
- C, PASTURE, MODERATE 29,138 S.F. (0.669 ACRES)



DRS

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PREDEVELOPED FIGURE

**SHORT PLAT
LORENZINI SP
MERCER ISLAND, WA**

DRAFTED BY: JSK
DESIGNED BY: JSK
PROJECT ENGINEER: MAJ
DATE: 12.23.21
PROJECT NO.: 21071

FIGURE: 02

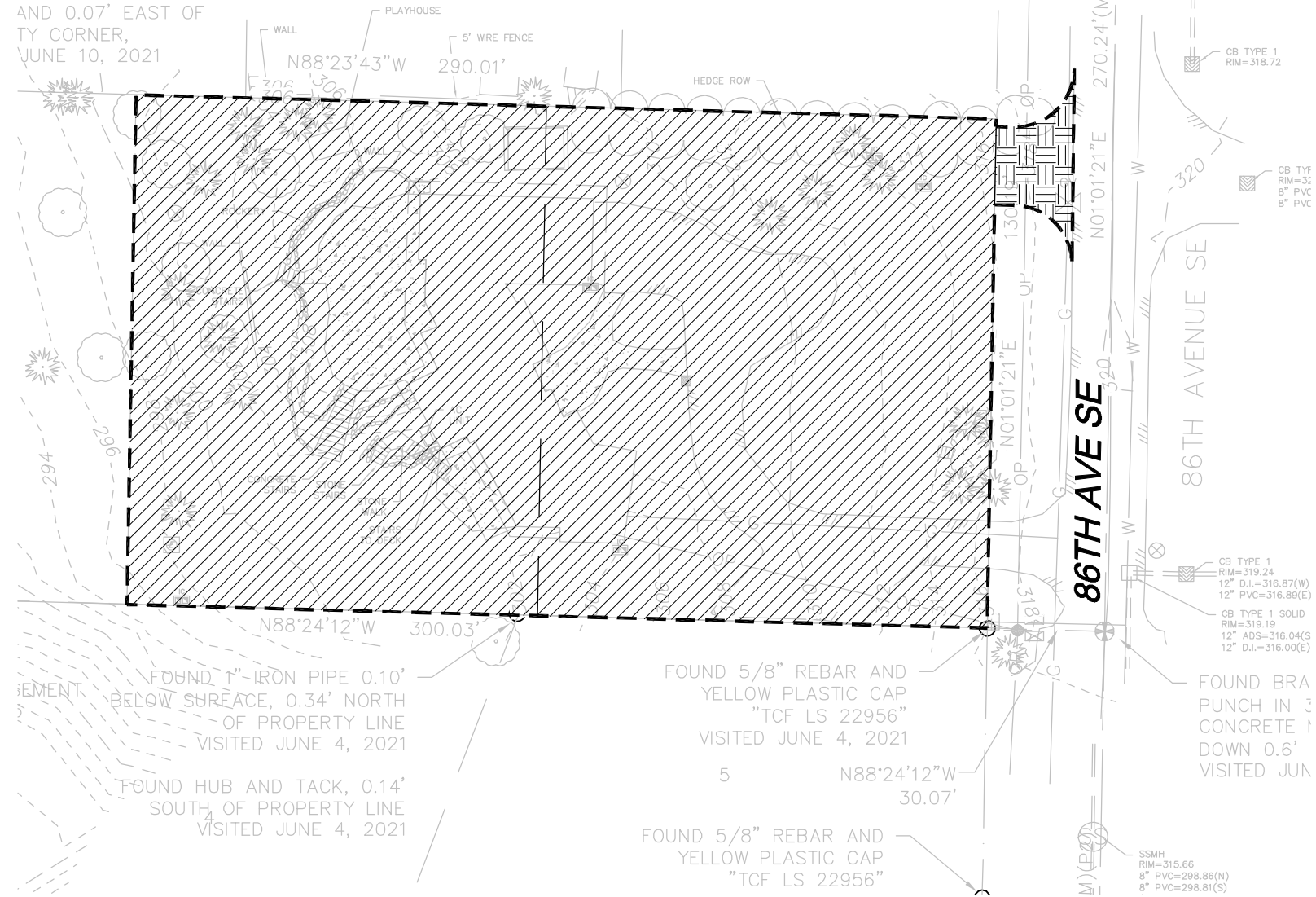
**FIGURE 3
DEVELOPED FIGURE**

TPN 759810-0412

TPN 759810-0411

TPN 759810-0410

1/2" REBAR AND
5 22688", 0.15'
AND 0.07' EAST OF
TY CORNER,
JUNE 10, 2021



AREA BREAKDOWN

TOTAL SITE/PROJECT AREA: 29,138 S.F. (0.669 ACRES)

LEGEND

	SITE/PROJECT BOUNDARY	
	LOT 1 & 2 AREA (PROPOSED):	28,644 S.F. (0.658 ACRES)
	PERVIOUS:	17,187 S.F. (0.395 ACRES)
	IMPERVIOUS:	11,457 S.F. (0.263 ACRES)
	ROW:	494 S.F. (0.011 ACRES)
	PERVIOUS:	0 S.F. (0.000 ACRES)
	IMPERVIOUS:	494 S.F. (0.011 ACRES)

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DEVELOPED FIGURE
SHORT PLAT
LORENZINI SP
MERCER ISLAND, WA

NORTH

GRAPHIC SCALE

0 20 40 80

1 INCH = 40 FT.

FIGURE 4 SOILS MAP



King County Area, Washington

AmC—Arents, Alderwood material, 6 to 15 percent slopes

Map Unit Setting

National map unit symbol: 1hmsq
Elevation: 50 to 660 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 150 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Arents, alderwood material, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arents, Alderwood Material

Setting

Landform: Till plains
Parent material: Basal till

Typical profile

H1 - 0 to 26 inches: gravelly sandy loam
H2 - 26 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 6 to 15 percent
Depth to restrictive feature: 20 to 40 inches to densic material
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 16 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B/D
Hydric soil rating: No

Data Source Information

Soil Survey Area: King County Area, Washington
Survey Area Data: Version 17, Aug 23, 2021

King County Area, Washington

KpB—Kitsap silt loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1hmt9
Elevation: 0 to 590 feet
Mean annual precipitation: 37 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 160 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Kitsap and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kitsap

Setting

Landform: Terraces
Parent material: Lacustrine deposits with a minor amount of volcanic ash

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 24 inches: silt loam
H3 - 24 to 60 inches: stratified silt to silty clay loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Soils with Few Limitations (G002XN502WA)
Other vegetative classification: Soils with Few Limitations (G002XN502WA)
Hydric soil rating: No

Minor Components

Alderwood

Percent of map unit: 10 percent

Hydric soil rating: No

Bellingham

Percent of map unit: 3 percent

Landform: Depressions

Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Seattle

Percent of map unit: 1 percent

Landform: Depressions

Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Tukwila

Percent of map unit: 1 percent

Landform: Depressions

Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Data Source Information

Soil Survey Area: King County Area, Washington

Survey Area Data: Version 17, Aug 23, 2021

King County Area, Washington

KpD—Kitsap silt loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1hmtc
Elevation: 0 to 590 feet
Mean annual precipitation: 37 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 160 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Kitsap and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kitsap

Setting

Landform: Terraces
Parent material: Lacustrine deposits with a minor amount of volcanic ash

Typical profile

H1 - 0 to 5 inches: silt loam
H2 - 5 to 40 inches: silt loam
H3 - 40 to 60 inches: stratified silt to silty clay loam

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: F002XA004WA - Puget Lowlands Forest
Forage suitability group: Sloping to Steep Soils (G002XN702WA)
Other vegetative classification: Sloping to Steep Soils (G002XN702WA)
Hydric soil rating: No

Minor Components

Bellingham

Percent of map unit: 1 percent

Landform: Depressions

Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Seattle

Percent of map unit: 1 percent

Landform: Depressions

Other vegetative classification: Wet Soils (G002XN102WA)

Hydric soil rating: Yes

Tukwila

Percent of map unit: 1 percent

Landform: Depressions

Other vegetative classification: Wet Soils (G002XN102WA)

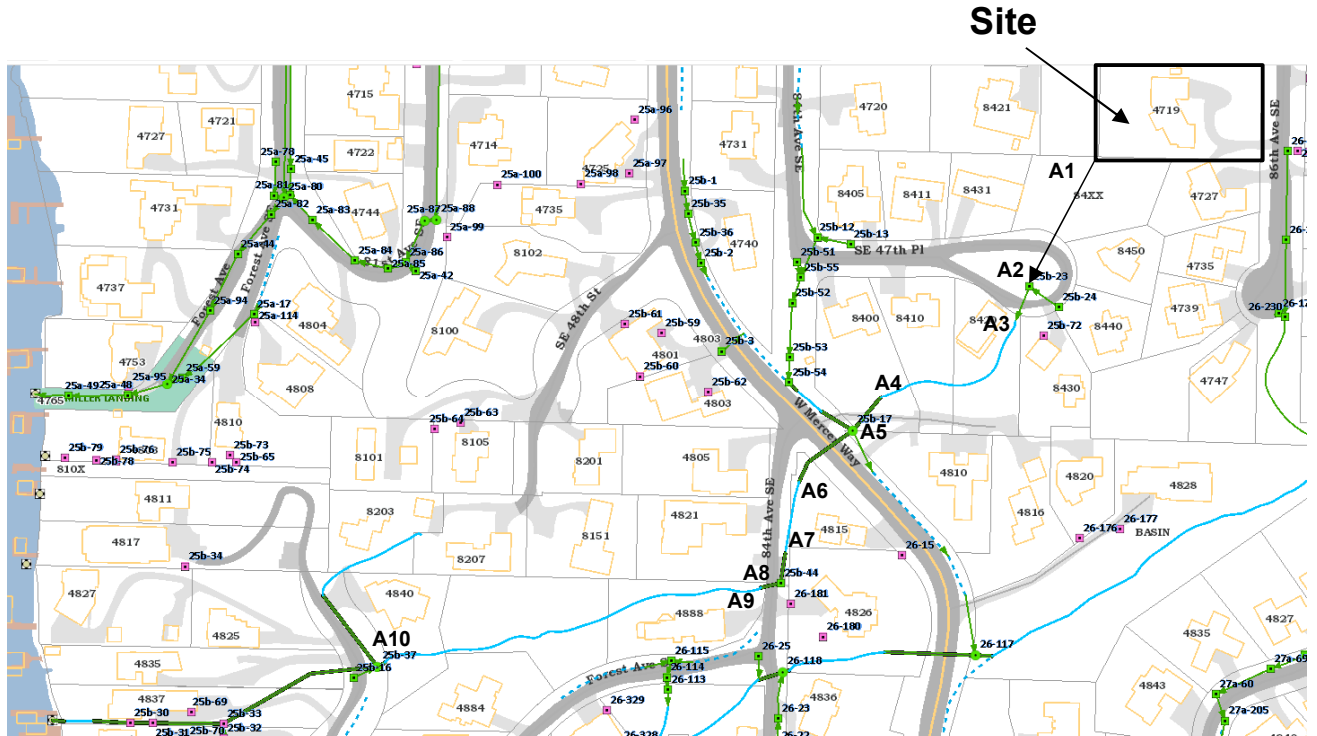
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: King County Area, Washington

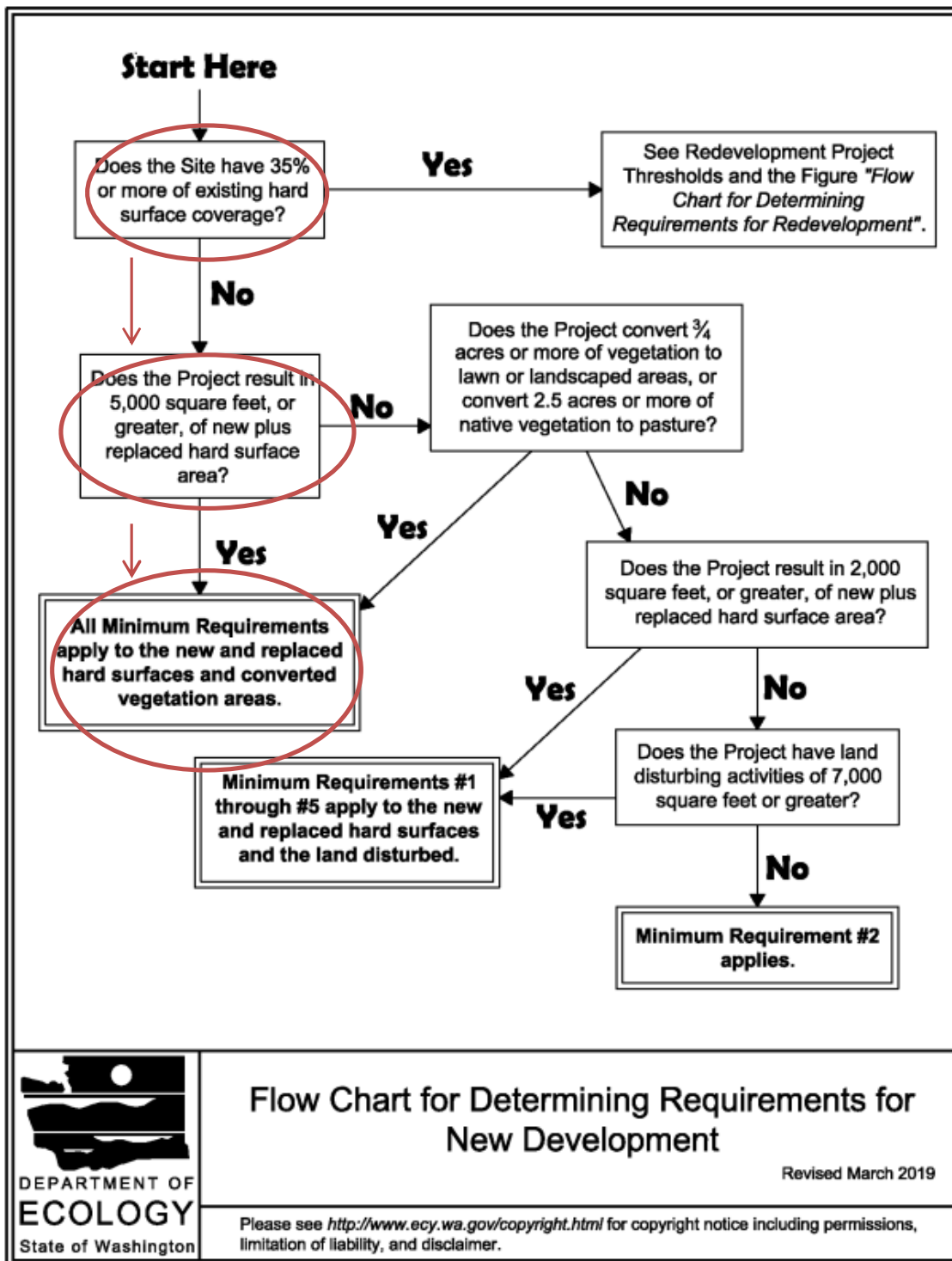
Survey Area Data: Version 17, Aug 23, 2021

**FIGURE 5
DOWNSTREAM MAP**



APPENDICES

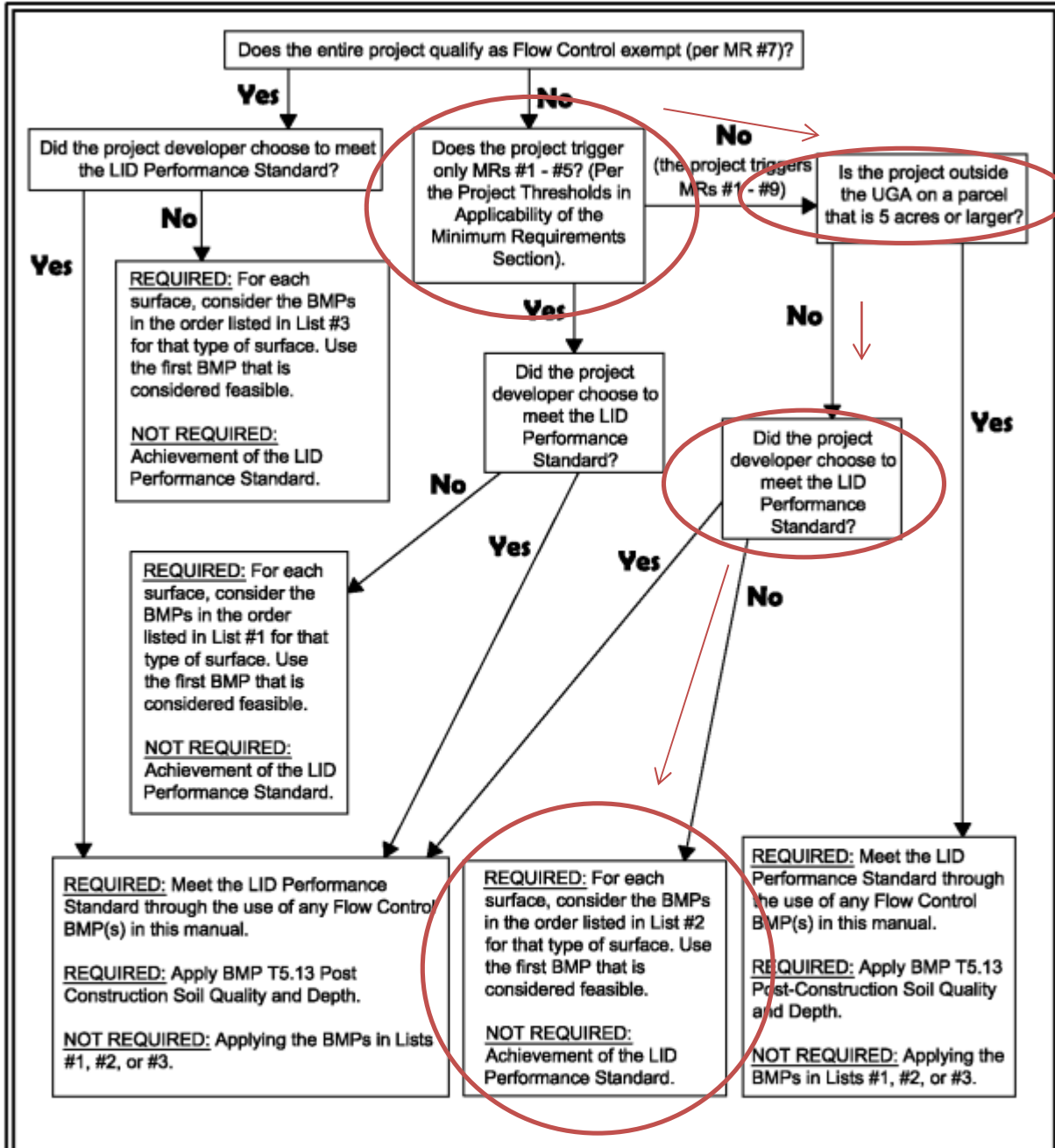
APPENDIX A FLOW CHART



Flow Chart for Determining Requirements for New Development

Revised March 2019

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Flow Chart for Determining MR #5 Requirements

Revised March 2019

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APPENDIX B
WWHM Report

WWHM2012
PROJECT REPORT

General Model Information

Project Name: pipe
Site Name: Lorenzini
Site Address:
City:
Report Date: 3/10/2022
Gage: Seatac
Data Start: 1948/10/01
Data End: 2009/09/30
Timestep: 15 Minute
Precip Scale: 1.000
Version Date: 2021/08/19
Version: 4.2.18

POC Thresholds

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

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Forest, Mod	acre 0.638
Pervious Total	0.638
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.638

Element Flows To:		
Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use C, Pasture, Flat	acre 0.364
Pervious Total	0.364
Impervious Land Use	acre
ROOF TOPS FLAT	0.178
DRIVEWAYS MOD	0.09
SIDEWALKS FLAT	0.006
Impervious Total	0.274
Basin Total	0.638

Element Flows To:		
Surface	Interflow	Groundwater
Tank 1	Tank 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Tank 1

Dimensions
 Depth: 8 ft.
 Tank Type: Circular
 Diameter: 8 ft.
 Length: 109 ft.
 Discharge Structure
 Riser Height: 7 ft.
 Riser Diameter: 24 in.
 Orifice 1 Diameter: 0.410 in. Elevation:0 ft.
 Orifice 2 Diameter: 0.670 in. Elevation:4.7 ft.
 Orifice 3 Diameter: 0.430 in. Elevation:6 ft.
 Element Flows To:
 Outlet 1 Outlet 2

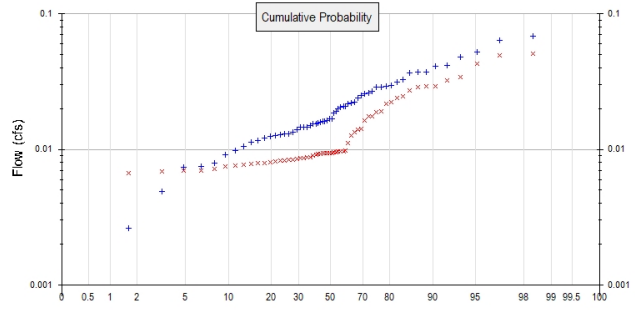
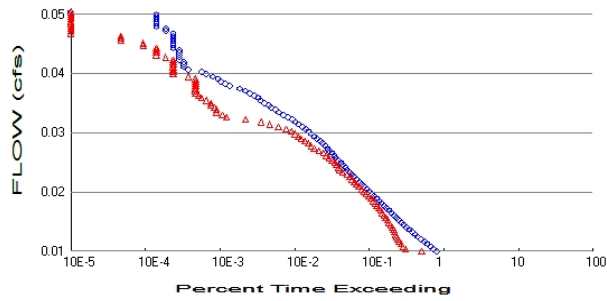
Tank Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.000000	0.000000	0.000	0.000
0.0889	0.004197	0.000249	0.001	0.000
0.1778	0.005902	0.000703	0.001	0.000
0.2667	0.007187	0.001286	0.002	0.000
0.3556	0.008251	0.001974	0.002	0.000
0.4444	0.009171	0.002749	0.003	0.000
0.5333	0.009987	0.003601	0.003	0.000
0.6222	0.010723	0.004522	0.003	0.000
0.7111	0.011394	0.005505	0.003	0.000
0.8000	0.012011	0.006546	0.004	0.000
0.8889	0.012582	0.007639	0.004	0.000
0.9778	0.013114	0.008782	0.004	0.000
1.0667	0.013610	0.009970	0.004	0.000
1.1556	0.014075	0.011200	0.004	0.000
1.2444	0.014511	0.012471	0.005	0.000
1.3333	0.014921	0.013779	0.005	0.000
1.4222	0.015307	0.015123	0.005	0.000
1.5111	0.015671	0.016500	0.005	0.000
1.6000	0.016015	0.017908	0.005	0.000
1.6889	0.016339	0.019346	0.005	0.000
1.7778	0.016645	0.020812	0.006	0.000
1.8667	0.016934	0.022305	0.006	0.000
1.9556	0.017206	0.023822	0.006	0.000
2.0444	0.017463	0.025363	0.006	0.000
2.1333	0.017705	0.026926	0.006	0.000
2.2222	0.017933	0.028510	0.006	0.000
2.3111	0.018146	0.030114	0.006	0.000
2.4000	0.018347	0.031736	0.007	0.000
2.4889	0.018535	0.033375	0.007	0.000
2.5778	0.018710	0.035031	0.007	0.000
2.6667	0.018873	0.036701	0.007	0.000
2.7556	0.019025	0.038386	0.007	0.000
2.8444	0.019165	0.040083	0.007	0.000
2.9333	0.019293	0.041792	0.007	0.000
3.0222	0.019411	0.043513	0.007	0.000
3.1111	0.019518	0.045243	0.008	0.000

3.2000	0.019614	0.046982	0.008	0.000
3.2889	0.019699	0.048730	0.008	0.000
3.3778	0.019775	0.050484	0.008	0.000
3.4667	0.019840	0.052245	0.008	0.000
3.5556	0.019894	0.054011	0.008	0.000
3.6444	0.019939	0.055781	0.008	0.000
3.7333	0.019974	0.057555	0.008	0.000
3.8222	0.019999	0.059332	0.008	0.000
3.9111	0.020013	0.061110	0.009	0.000
4.0000	0.020018	0.062890	0.009	0.000
4.0889	0.020013	0.064669	0.009	0.000
4.1778	0.019999	0.066447	0.009	0.000
4.2667	0.019974	0.068224	0.009	0.000
4.3556	0.019939	0.069998	0.009	0.000
4.4444	0.019894	0.071768	0.009	0.000
4.5333	0.019840	0.073534	0.009	0.000
4.6222	0.019775	0.075295	0.009	0.000
4.7111	0.019699	0.077049	0.011	0.000
4.8000	0.019614	0.078797	0.013	0.000
4.8889	0.019518	0.080536	0.015	0.000
4.9778	0.019411	0.082266	0.016	0.000
5.0667	0.019293	0.083987	0.017	0.000
5.1556	0.019165	0.085696	0.018	0.000
5.2444	0.019025	0.087393	0.019	0.000
5.3333	0.018873	0.089078	0.020	0.000
5.4222	0.018710	0.090748	0.021	0.000
5.5111	0.018535	0.092404	0.021	0.000
5.6000	0.018347	0.094043	0.022	0.000
5.6889	0.018146	0.095665	0.023	0.000
5.7778	0.017933	0.097269	0.023	0.000
5.8667	0.017705	0.098853	0.024	0.000
5.9556	0.017463	0.100416	0.024	0.000
6.0444	0.017206	0.101957	0.026	0.000
6.1333	0.016934	0.103474	0.027	0.000
6.2222	0.016645	0.104967	0.028	0.000
6.3111	0.016339	0.106433	0.029	0.000
6.4000	0.016015	0.107871	0.030	0.000
6.4889	0.015671	0.109279	0.031	0.000
6.5778	0.015307	0.110656	0.032	0.000
6.6667	0.014921	0.112000	0.033	0.000
6.7556	0.014511	0.113308	0.033	0.000
6.8444	0.014075	0.114579	0.034	0.000
6.9333	0.013610	0.115809	0.035	0.000
7.0222	0.013114	0.116997	0.106	0.000
7.1111	0.012582	0.118140	0.821	0.000
7.2000	0.012011	0.119233	1.923	0.000
7.2889	0.011394	0.120274	3.277	0.000
7.3778	0.010723	0.121257	4.783	0.000
7.4667	0.009987	0.122178	6.346	0.000
7.5556	0.009171	0.123030	7.865	0.000
7.6444	0.008251	0.123805	9.248	0.000
7.7333	0.007187	0.124493	10.41	0.000
7.8222	0.005902	0.125076	11.33	0.000
7.9111	0.004197	0.125530	12.00	0.000
8.0000	0.000000	0.125779	12.50	0.000
8.0889	0.000000	0.000000	13.18	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1

Total Pervious Area: 0.638
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 0.364
Total Impervious Area: 0.274

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.018997
5 year	0.031128
10 year	0.038928
25 year	0.048206
50 year	0.054633
100 year	0.060636

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.011462
5 year	0.01902
10 year	0.025767
25 year	0.036723
50 year	0.046969
100 year	0.059298

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.022	0.008
1950	0.026	0.014
1951	0.042	0.051
1952	0.013	0.007
1953	0.011	0.008
1954	0.016	0.009
1955	0.026	0.009
1956	0.021	0.019
1957	0.017	0.009
1958	0.019	0.009

1959	0.016	0.008
1960	0.029	0.027
1961	0.016	0.009
1962	0.010	0.007
1963	0.013	0.009
1964	0.019	0.009
1965	0.013	0.013
1966	0.012	0.008
1967	0.029	0.009
1968	0.016	0.009
1969	0.016	0.008
1970	0.013	0.009
1971	0.014	0.010
1972	0.032	0.024
1973	0.014	0.014
1974	0.015	0.010
1975	0.022	0.009
1976	0.015	0.009
1977	0.002	0.007
1978	0.013	0.010
1979	0.008	0.007
1980	0.037	0.025
1981	0.012	0.009
1982	0.024	0.019
1983	0.021	0.010
1984	0.012	0.008
1985	0.007	0.008
1986	0.033	0.018
1987	0.029	0.022
1988	0.011	0.008
1989	0.008	0.007
1990	0.069	0.029
1991	0.036	0.029
1992	0.015	0.010
1993	0.015	0.008
1994	0.005	0.007
1995	0.021	0.011
1996	0.048	0.050
1997	0.037	0.032
1998	0.009	0.008
1999	0.041	0.022
2000	0.014	0.009
2001	0.003	0.007
2002	0.017	0.016
2003	0.025	0.008
2004	0.027	0.029
2005	0.020	0.010
2006	0.022	0.013
2007	0.052	0.043
2008	0.063	0.034
2009	0.030	0.017

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0688	0.0507
2	0.0634	0.0495
3	0.0520	0.0428

4	0.0482	0.0342
5	0.0415	0.0324
6	0.0408	0.0293
7	0.0372	0.0290
8	0.0371	0.0290
9	0.0365	0.0274
10	0.0326	0.0248
11	0.0315	0.0239
12	0.0295	0.0224
13	0.0292	0.0218
14	0.0287	0.0192
15	0.0286	0.0189
16	0.0268	0.0175
17	0.0260	0.0175
18	0.0258	0.0164
19	0.0251	0.0142
20	0.0241	0.0141
21	0.0224	0.0134
22	0.0219	0.0126
23	0.0215	0.0111
24	0.0208	0.0098
25	0.0208	0.0097
26	0.0206	0.0097
27	0.0199	0.0096
28	0.0191	0.0095
29	0.0186	0.0095
30	0.0168	0.0094
31	0.0168	0.0094
32	0.0164	0.0094
33	0.0162	0.0094
34	0.0160	0.0094
35	0.0160	0.0093
36	0.0157	0.0092
37	0.0155	0.0091
38	0.0154	0.0090
39	0.0149	0.0087
40	0.0145	0.0087
41	0.0145	0.0086
42	0.0145	0.0086
43	0.0140	0.0085
44	0.0135	0.0084
45	0.0130	0.0084
46	0.0130	0.0083
47	0.0128	0.0083
48	0.0127	0.0081
49	0.0124	0.0080
50	0.0122	0.0079
51	0.0116	0.0079
52	0.0113	0.0078
53	0.0105	0.0077
54	0.0098	0.0075
55	0.0091	0.0075
56	0.0079	0.0071
57	0.0075	0.0069
58	0.0074	0.0069
59	0.0049	0.0069
60	0.0026	0.0067
61	0.0023	0.0065

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0095	17075	10671	62	Pass
0.0100	15481	6519	42	Pass
0.0104	14067	6049	43	Pass
0.0109	12810	5685	44	Pass
0.0113	11569	5364	46	Pass
0.0118	10532	5176	49	Pass
0.0122	9569	4986	52	Pass
0.0127	8765	4793	54	Pass
0.0131	8044	4633	57	Pass
0.0136	7347	4502	61	Pass
0.0141	6744	4327	64	Pass
0.0145	6192	4126	66	Pass
0.0150	5739	3927	68	Pass
0.0154	5311	3756	70	Pass
0.0159	4924	3557	72	Pass
0.0163	4571	3364	73	Pass
0.0168	4237	3200	75	Pass
0.0172	3957	3018	76	Pass
0.0177	3645	2838	77	Pass
0.0182	3388	2697	79	Pass
0.0186	3133	2565	81	Pass
0.0191	2915	2402	82	Pass
0.0195	2706	2246	83	Pass
0.0200	2490	2094	84	Pass
0.0204	2314	1936	83	Pass
0.0209	2136	1826	85	Pass
0.0214	1972	1689	85	Pass
0.0218	1826	1547	84	Pass
0.0223	1702	1434	84	Pass
0.0227	1579	1346	85	Pass
0.0232	1443	1266	87	Pass
0.0236	1325	1181	89	Pass
0.0241	1233	1067	86	Pass
0.0245	1147	932	81	Pass
0.0250	1086	856	78	Pass
0.0255	1020	820	80	Pass
0.0259	947	773	81	Pass
0.0264	887	736	82	Pass
0.0268	824	679	82	Pass
0.0273	761	615	80	Pass
0.0277	725	566	78	Pass
0.0282	674	519	77	Pass
0.0286	623	453	72	Pass
0.0291	589	391	66	Pass
0.0296	549	353	64	Pass
0.0300	506	324	64	Pass
0.0305	469	292	62	Pass
0.0309	427	260	60	Pass
0.0314	388	237	61	Pass
0.0318	356	217	60	Pass
0.0323	328	193	58	Pass
0.0327	298	164	55	Pass
0.0332	270	129	47	Pass

0.0337	241	99	41	Pass
0.0341	218	76	34	Pass
0.0346	198	47	23	Pass
0.0350	174	26	14	Pass
0.0355	152	23	15	Pass
0.0359	130	19	14	Pass
0.0364	119	19	15	Pass
0.0369	104	18	17	Pass
0.0373	95	16	16	Pass
0.0378	83	16	19	Pass
0.0382	74	14	18	Pass
0.0387	69	12	17	Pass
0.0391	61	11	18	Pass
0.0396	53	10	18	Pass
0.0400	46	10	21	Pass
0.0405	39	10	25	Pass
0.0410	29	10	34	Pass
0.0414	25	10	40	Pass
0.0419	22	10	45	Pass
0.0423	20	10	50	Pass
0.0428	17	8	47	Pass
0.0432	14	5	35	Pass
0.0437	12	5	41	Pass
0.0441	8	5	62	Pass
0.0446	7	5	71	Pass
0.0451	7	5	71	Pass
0.0455	7	5	71	Pass
0.0460	6	5	83	Pass
0.0464	6	4	66	Pass
0.0469	6	3	50	Pass
0.0473	6	3	50	Pass
0.0478	6	3	50	Pass
0.0483	5	3	60	Pass
0.0487	5	2	40	Pass
0.0492	5	2	40	Pass
0.0496	5	1	20	Pass
0.0501	5	1	20	Pass
0.0505	5	1	20	Pass
0.0510	5	0	0	Pass
0.0514	4	0	0	Pass
0.0519	4	0	0	Pass
0.0524	3	0	0	Pass
0.0528	3	0	0	Pass
0.0533	3	0	0	Pass
0.0537	3	0	0	Pass
0.0542	3	0	0	Pass
0.0546	3	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Tank 1 POC	<input type="checkbox"/>	56.66			<input type="checkbox"/>	0.00			
Total Volume Infiltrated		56.66	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Failed

Model Default Modifications

Total of 0 changes have been made.

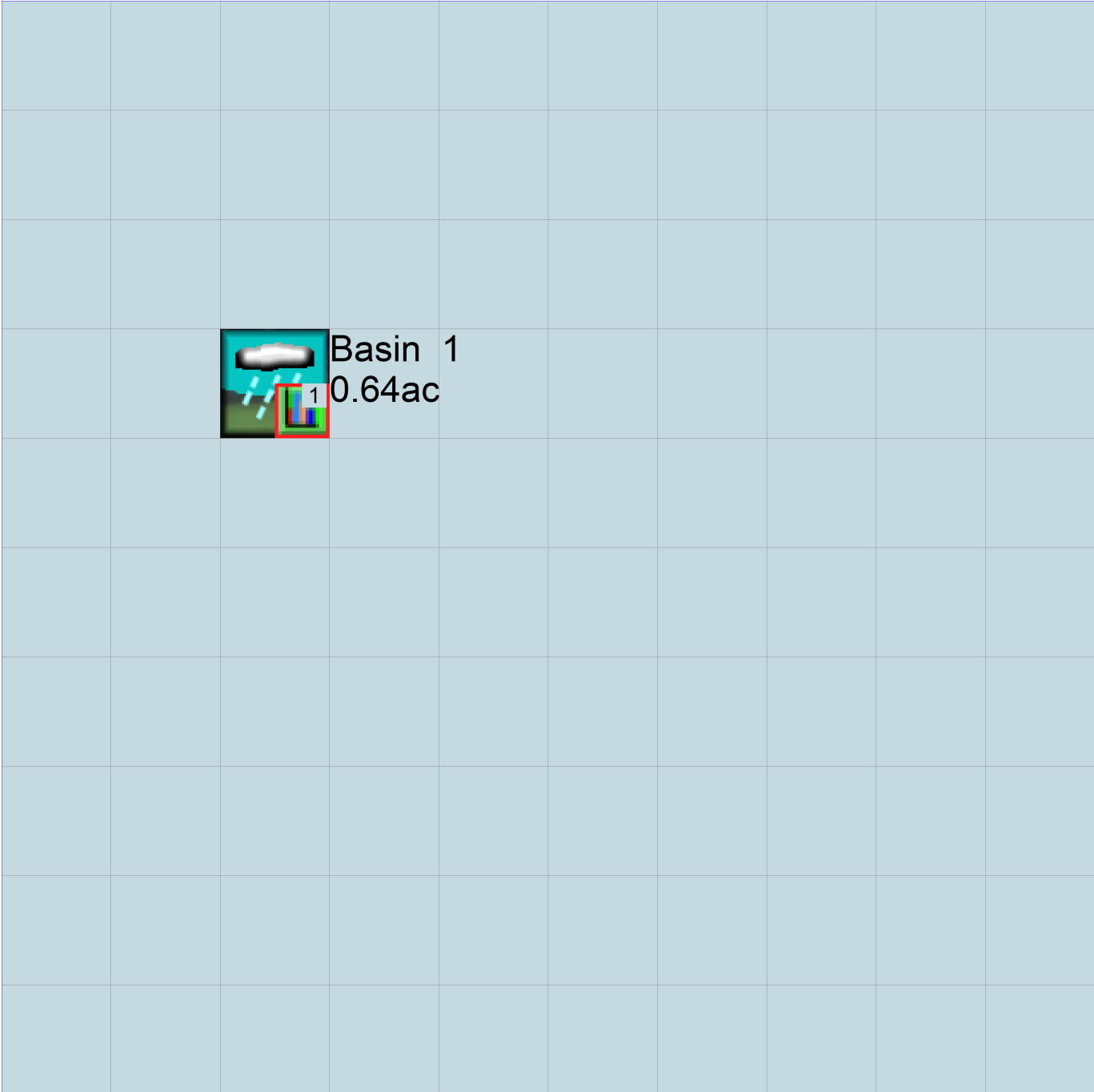
PERLND Changes

No PERLND changes have been made.

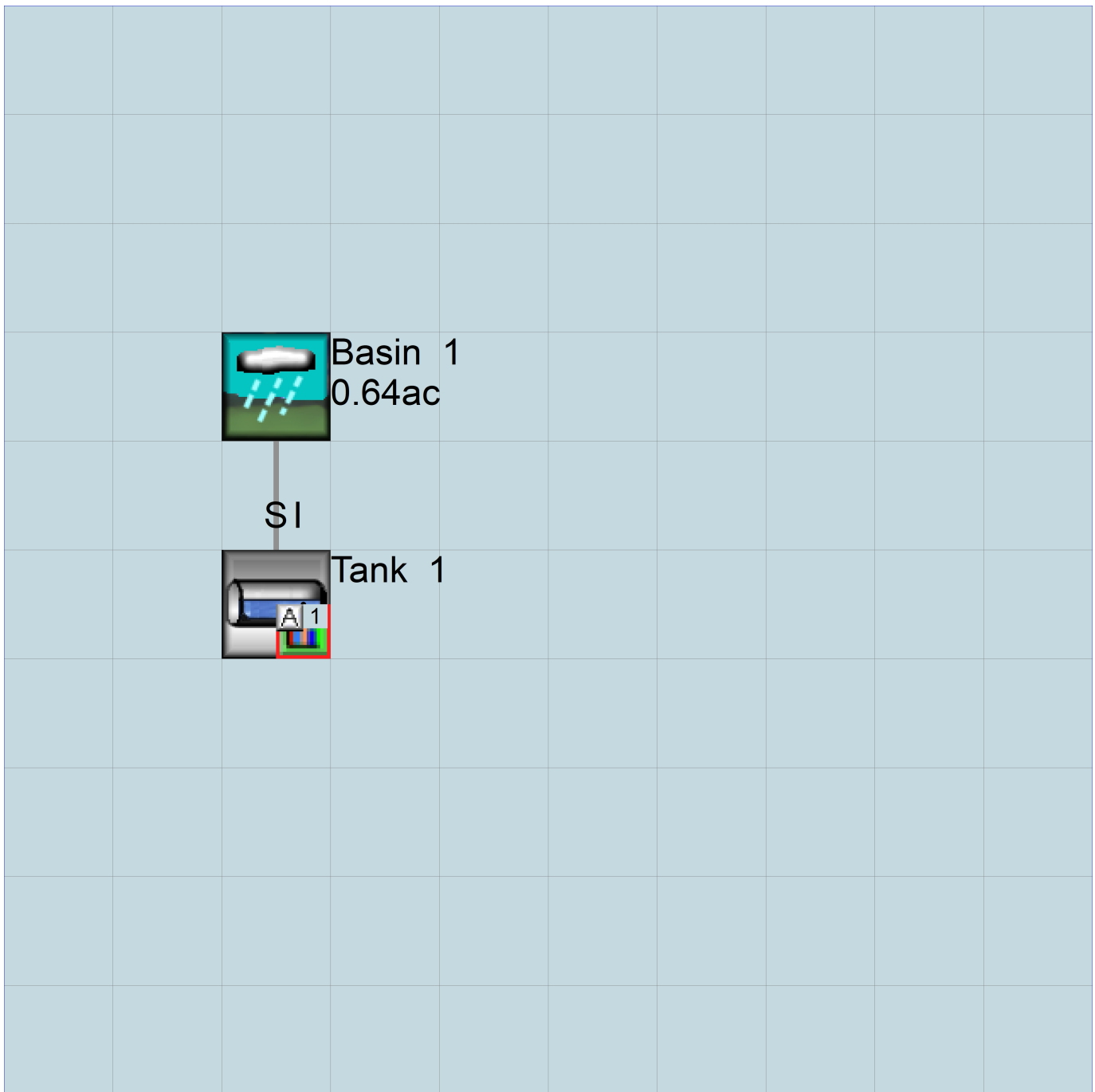
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

```
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      pipe.wdm
MESSU    25      Prepipe.MES
          27      Prepipe.L61
          28      Prepipe.L62
          30      POCpipe1.dat
```

END FILES

OPN SEQUENCE

```
INGRP          INDELT 00:15
  PERLND        11
  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

PARAM

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

END PARAM

END GENER

PERLND

GEN-INFO

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

```
11      C, Forest, 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 ***
11      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 *****
11      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 ***
11 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
11 0 4.5 0.08 400 0.1 0.5 0.996
END PWAT-PARM2

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
11 0 0 2 2 0 0 0
END PWAT-PARM3

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
11 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
11 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	11	0.638		COPY	501	12		
PERLND	11	0.638		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	PERLND	1 999	EXTNL	PREC
WDM	2	PREC	ENGL	1	IMPLND	1 999	EXTNL	PREC

```
WDM      1 EVAP      ENGL      0.76          PERLND    1 999 EXTNL  PETINP
WDM      1 EVAP      ENGL      0.76          IMPLND    1 999 EXTNL  PETINP
```

END EXT SOURCES

EXT TARGETS

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

MASS-LINK

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

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

END MASS-LINK

END RUN

Mitigated UCI File

RUN

GLOBAL

```
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      pipe.wdm
MESSU    25      Mitpipe.MES
          27      Mitpipe.L61
          28      Mitpipe.L62
          30      POCpipe1.dat
```

END FILES

OPN SEQUENCE

```
INGRP          INDELT 00:15
  PERLND        13
  IMPLND         4
  IMPLND         6
  IMPLND         8
  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      Tank 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  LRSUR  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 ***
4     ROOF TOPS/FLAT      1  1  1  27  0
6     DRIVEWAYS/MOD      1  1  1  27  0
8     SIDEWALKS/FLAT     1  1  1  27  0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
4     0   0   1   0   0   0
6     0   0   1   0   0   0
8     0   0   1   0   0   0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
4     0   0   4   0   0   0   1   9
6     0   0   4   0   0   0   1   9
8     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  ***
4     0   0   0   0   0
6     0   0   0   0   0
8     0   0   0   0   0

```

END IWAT-PARM1

IWAT-PARM2

```

<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
4 400 0.01 0.1 0.1
6 400 0.05 0.1 0.08
8 400 0.01 0.1 0.1

```

END IWAT-PARM2

IWAT-PARM3

```

<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
4 0 0
6 0 0
8 0 0

```

END IWAT-PARM3

IWAT-STATE1

```

<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
4 0 0
6 0 0
8 0 0

```

END IWAT-STATE1

END IMPLND

SCHEMATIC

```

<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Basin 1***
PERLND 13 0.364 RCHRES 1 2
PERLND 13 0.364 RCHRES 1 3
IMPLND 4 0.178 RCHRES 1 5
IMPLND 6 0.09 RCHRES 1 5
IMPLND 8 0.006 RCHRES 1 5

```

*****Routing*****

```

PERLND 13 0.364 COPY 1 12
IMPLND 4 0.178 COPY 1 15
IMPLND 6 0.09 COPY 1 15
IMPLND 8 0.006 COPY 1 15
PERLND 13 0.364 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 Tank 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 ***

```


2.844444	0.019165	0.040083	0.007694
2.933333	0.019293	0.041792	0.007813
3.022222	0.019411	0.043513	0.007930
3.111111	0.019518	0.045243	0.008046
3.200000	0.019614	0.046982	0.008160
3.288889	0.019699	0.048730	0.008273
3.377778	0.019775	0.050484	0.008384
3.466667	0.019840	0.052245	0.008493
3.555556	0.019894	0.054011	0.008602
3.644444	0.019939	0.055781	0.008708
3.733333	0.019974	0.057555	0.008814
3.822222	0.019999	0.059332	0.008918
3.911111	0.020013	0.061110	0.009021
4.000000	0.020018	0.062890	0.009123
4.088889	0.020013	0.064669	0.009224
4.177778	0.019999	0.066447	0.009324
4.266667	0.019974	0.068224	0.009423
4.355556	0.019939	0.069998	0.009520
4.444444	0.019894	0.071768	0.009617
4.533333	0.019840	0.073534	0.009713
4.622222	0.019775	0.075295	0.009807
4.711111	0.019699	0.077049	0.011185
4.800000	0.019614	0.078797	0.013846
4.888889	0.019518	0.080536	0.015381
4.977778	0.019411	0.082266	0.016598
5.066667	0.019293	0.083987	0.017644
5.155556	0.019165	0.085696	0.018580
5.244444	0.019025	0.087393	0.019435
5.333333	0.018873	0.089078	0.020229
5.422222	0.018710	0.090748	0.020975
5.511111	0.018535	0.092404	0.021680
5.600000	0.018347	0.094043	0.022352
5.688889	0.018146	0.095665	0.022994
5.777778	0.017933	0.097269	0.023612
5.866667	0.017705	0.098853	0.024207
5.955556	0.017463	0.100416	0.024782
6.044444	0.017206	0.101957	0.026398
6.133333	0.016934	0.103474	0.027714
6.222222	0.016645	0.104967	0.028774
6.311111	0.016339	0.106433	0.029721
6.400000	0.016015	0.107871	0.030597
6.488889	0.015671	0.109279	0.031421
6.577778	0.015307	0.110656	0.032206
6.666667	0.014921	0.112000	0.032958
6.755556	0.014511	0.113308	0.033683
6.844444	0.014075	0.114579	0.034384
6.933333	0.013610	0.115809	0.035064
7.022222	0.013114	0.116997	0.106054
7.111111	0.012582	0.118140	0.821138
7.200000	0.012011	0.119233	1.923675
7.288889	0.011394	0.120274	3.276970
7.377778	0.010723	0.121257	4.783643
7.466667	0.009987	0.122178	6.346395
7.555556	0.009171	0.123030	7.865931
7.644444	0.008251	0.123805	9.248484
7.733333	0.007187	0.124493	10.41818
7.822222	0.005902	0.125076	11.33270
7.911111	0.004197	0.125530	12.00147
8.000000	0.001000	0.125779	12.50607

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	PERLND	1 999 EXTNL	PREC
WDM	2	PREC	ENGL	1	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

Predeveloped HSPF Message File

Mitigated HSPF Message File

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APPENDIX C
Geotechnical Report