Bell Place Apartments Preliminary Stormwater Drainage Report

Prepared for
Puyallup Mixed Use, LLC

October 2025

Parametrix

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Prepared for

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APPENDICES

Acronyms and Abbreviations

BMPs	best management practices
cfs	cubic feet per second
City	City of Puyallup
Ecology	Washington State Department of Ecology
EPSC	erosion prevention and sediment control
hrs	hours
LF	linear feet
LID	low-impact development
Manual	2024 Stormwater Management Manual for Western Washington
MEP	Maximum extent practicable
NPDES	National Pollutant Discharges Elimination System
NPGHS	non-pollution generating hard surface
NRCS	National Resource Conservation Service
PGHS	pollution generating hard surfaces
ROW	right-of-way
SF	square feet
SWMMWW	2024 Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Loads
TSS	total suspended solids
USDA	United States Department of Agriculture
WRIA	Water Resource Inventory Area
WWHM	Western Washington Hydrology Model 2012

1. Introduction

This report is prepared for Puyallup Mixed Use, LLC to meet the requirements of preliminary drainage report as outlined in section 21.10 of the Puyallup Municipal Code (PMC) and the Washington Department of Ecology's 2024 Stormwater Management Manual for Western Washington (SWMMWW).

This report addresses the type of project proposed, applicable minimum requirements, the site's existing and developed hydrology, the analysis of off-site drainage as a result of the project completion, the stormwater facility selection and sizing, and the stormwater conveyance system analysis and design as required by the City of Puyallup.

2. Proposed Project Description

2.1 Overview

The Bell Place Apartment (Project) is a mixed-use development project owned by Puyallup Mixed Use, LLC. The project site is located on parcel 5745001631 between W Meeker and SW 4th Street in Puyallup, WA located in Pierce County.

The Project preliminarily proposes developing a 5-story apartment building with 100 residential units, covered parking, and resident amenities while installing new utility service connections and public frontage improvements areas as part of the development. The Project area will be approximately 0.75-acres of development that includes constructing the following:

- 100 residential units
- Domestic water and sewer service connections
- Dedicated fire suppression services
- Frontage improvements along SW 4th Street and Pioneer W Meeker

2.2 Minimum Requirements

The Project meets the definition of new development per Figure I-3.1 of the Department of Ecology *2024 Stormwater Management Manual for Western Washington* (SWMMWW) since it proposes to add over 5,000 SF of new plus hard surfaces on a site with less than 35% of existing hard surface coverage.

See the completed flowchart in Appendix A. As such, it must evaluate meeting all minimum requirements for stormwater runoff generated as a result of the Project.

2.2.1 Minimum Requirement No. 1 – Preparation of Stormwater Site Plan

Preparation of this drainage report in accordance with the SWMMWW outlines and satisfies this criterion. The proposed development activities are indicated in the Preliminary Drainage Composite Plan figure. Stormwater elements are outlined within this report in conjunction with the figure.

2.2.2 Minimum Requirement No. 2 – Construction Stormwater Pollution Prevention Plan (SWPPP)

Minimum Requirement #2 is that all projects shall address erosion and sediment control during site construction activities. There are 13 elements that must be met to cover the general water quality protection strategies of limiting site impacts, preventing erosion and sedimentation, and managing activities and sources during the construction phase of a project.

1. Preserve Vegetation/Mark Clearing Limits
2. Establish Construction Access
3. Control Flow Rates
4. Install Sediment Controls
5. Stabilize Soils
6. Protect Slopes
7. Protect Storm Drain Inlets
8. Stabilize Channels and Outlets
9. Control Pollutants
10. Control Dewatering
11. Maintain Best Management Practices
12. Manage The Project
13. Protect Low Impact Development BMPs

Compliance with the erosion and sediment control requirements shall be demonstrated through implementation of an approved large parcel erosion and sediment control plan. A Construction SWPPP will be completed and submitted with the final stormwater report.

2.2.3 Minimum Requirement No. 3 – Source Control of Pollution

Minimum Requirement #3 is that all known, available, and reasonable source control BMPs shall be applied to all projects to prevent stormwater from coming in contact with pollutants on the developed site. Unlike Core Requirement #1, this core requirement focuses on the post-development condition of the site. Where applicable, source control BMPs will be selected, designed, and maintained according to Volume IV of the SWMMWW.

The site will be a covered multi-family apartment building where pollution concerns are limited. The covered parking garage is the most common area where pollutants may contact stormwater. Any runoff collected in inlets within the garage will be routed through an oil-water separator before discharging through the sanitary sewer connection. Illicit dischargers to storm drains will be prevented. Drains which are found to connect to the stormwater drainage system must either be permanently plugged or disconnected and rerouted as soon as possible. Plug unused drains with concrete or similar permanent materials. Furthermore, any facility material storage or maintenance facilities must implement proper spill control plan procedures including but not limited to storing pollutants in an enclosed structure.

2.2.4 Minimum Requirement No. 4 – Preservation of Natural Drainage Systems and Outfalls

Minimum Requirement #4 is that natural drainage patterns shall be maintained and discharges from the project site shall occur at the natural location to the maximum extent practicable (MEP). Discharges from the Project Site shall occur at the natural location.

For the Project, the site is located in urbanized, residential and central business district. There are no natural drainage systems within the limits of the Project area. However, the City of Puyallup's stormwater collection system is located around the Project site, and there are existing catch basins near the Project area that outfall into the City's system.

Currently, runoff from the site sheet flows into W Meeker and W Pioneer Avenue where it flows south along the curb line to inlets on SW 5th Avenue.

A new stormwater connections will be made into the City's system as a result of the project. All runoff from the site will be conveyed into the City's storm system. The adjacent roadway will maintain its existing grades as a result of the project and new catch basin inlet will be installed on Meeker. The City's stormwater collection system will be maintained and the ultimate discharge to the Puyallup River will remain.

2.2.5 Minimum Requirement No. 5 –On-Site Stormwater Management

The Project's TDAs were evaluated for Flow Control exemption as a result of ultimately discharging into the Puyallup River through entirely manmade conveyance structures. During the Project's Pre-Application Engineer Review, the City acknowledged that there is a direct connection to a flow control exempt waterbody, but there are capacity issues within the City's conveyance system to the outfall in the Puyallup River. The City is currently developing a protocol – including but not limited to fee-in-lieu payment – within the downtown business district that permits direct discharge of stormwater runoff without requiring on-site retention/detention.

As such, completion of flow Chart for Determining MR #5 Requirements the List Approach will be implemented for each surface type per List #3. The evaluation of each BMP from List #3 is provided in Table 1 below. The first feasible BMP must be selected, and once a feasible BMP is selected further evaluation may cease.

Table 1 The List Approach for MR5 Compliance

List #3 BMP	Justification for Use
Lawn and Landscaped Areas	
Post Construction Soil Quality and Depth (BMP T5.13)	**Feasible: This will be implemented by leaving native vegetation undisturbed to the extent practical, reusing topsoil where practical, and importing topsoil with sufficient organic content and depth to meet requirements.**
Roofs	
Downspout Full Infiltration (BMP T5.10A)	Infeasible: Siting and design criteria cannot be achieved on site due to the dense development and the presence of shallow groundwater table. There is not enough separation available from property lines, building foundations, and season groundwater level within the property limits.
Downspout Dispersion Systems (BMP T5.10B)	Infeasible: The urban lot size does not provide a sufficient vegetated flow path length to provide downspout dispersion system. As such, the building's roof drains will be directly connected to the City's stormwater system to convey runoff off-site
Perforated Stub-out Connections (BMP T5.10C)	Infeasible: Siting and design criteria cannot be achieved on site due to the dense development and the presence of shallow groundwater table. There is not enough separation available from property lines, building foundations, and season groundwater level within the property limits.

2.2.6 Minimum Requirement No. 6 – Runoff Treatment

Minimum Requirement #6 is that runoff treatment shall be evaluated for development project sites to reduce the water quality impacts of stormwater runoff from pollution-generating surfaces.

The Project Area is separated between an on-site and off-site Threshold Discharge Areas (TDA). Each TDA's proposed surface types is evaluated if it triggers the threshold that may be subject to runoff treatment requirements. The TDAs are evaluated whether or not a total of 5,000 square feet of pollution generating hard surfaces (PGHS) or more than ¾-acres of pollution generating pervious surfaces (PGPS) are present with the subject area.

2.2.6.1 TDA On-Site Runoff Treatment

The lot's zoning permits up 90% max lot coverage, which results in the building's footprint and rooftop – approximately 27,450 SF – the covering majority of the on-site TDA. The rooftop is a non-pollution-generating hard surface (NPGHS), and it is not subject to runoff treatment thresholds.

A small driveway connection to the covered parking garage is exposed, but the approximately 500 SF of PGHS does not exceed runoff treatment thresholds. Additionally, any rainwater or snowmelt

tracked into the covered parking garage will be collected internally through catch basin inlets that convey runoff through an oil-water separator before ultimately discharging through a sanitary sewer line.

As such, runoff treatment is not required for runoff generated from the on-site impervious surfaces.

2.2.6.2 TDA Off-Site Runoff Treatment

Frontage improvements will occur along W Meeker and SW 4th Street as part of the Project. Improvements will include sidewalk widening, intersection curb ramps, street trees, minor asphalt roadway patching, and on-street parking channelization.

The roadway resurfacing may include improvements down to the existing subgrade in addition to the asphalt surfacing, which qualifies the improvements as a PGHS. The total estimated roadway resurfacing is 4,682 SF does not exceed runoff treatment thresholds.

As such, runoff treatment is not required for runoff generated from the off-site PGHS.

2.2.7 Minimum Requirement No. 7 – Flow Control

For projects in which the total of effective impervious surfaces is 10,000 square feet or more in a Threshold Discharge Area (TDA), flow control is typically required. However, flow control is not required for TDAs that discharge directly to a water listed in Appendix I-A of the Manual and qualify for flow control exemption. While the City develops its protocol for permitting flow control exemption in its downtown business district, the Project was requested to evaluate the quantity of stormwater runoff generated as a result of the project.

The Project Area is separated between an on-site and off-site Threshold Discharge Areas (TDA). Each TDA's proposed surface types is evaluated if it triggers the threshold that may be subject to flow control requirements. The TDAs are evaluated whether or not a total of 10,000 square feet of effective impervious surfaces; more than ¾-acres of or more of native vegetation, pasture, scrub/shrub, or unmaintained non-native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture, and from which there is a surface discharge in a natural or man-made conveyance system from the TDA; or TDAs that through a combination of effective hard surfaces and converted vegetation areas cause a 0.15 cubic feet per second (cfs) or greater increase in the 100-year flow frequency as estimated using an approved continuous simulation model and 15-minute time step.

2.2.7.1 TDA On-Site Flow Control

As previously mentioned, the Project's building footprint and rooftop – approximately 27,450 SF – the covering majority of the on-site TDA in an impervious surfaces. Under typical circumstances, flow control is required. However, due to the limited availability of space to provide on-site flow control in combination with the City's goal to address its housing needs and downtown revitalization efforts, a development agreement is being created to permit direct discharge of runoff directly into the City's stormwater system.

In Section 5.2, an analysis of the estimated direct discharge flowrates from the Project is discussed further.

2.2.7.2 TDA Off-Site Flow Control

As previously mentioned, frontage improvements will occur along W Meeker and SW 4th Street. Improvements will include sidewalk widening, intersection curb ramps, street tree, minor asphalt roadway patching, and on-street parking channelization.

The total estimated roadway resurfacing is 4,682 SF does not exceed flow control thresholds.

As such, flow control is not required for runoff generated from the on-site PGHS.

2.2.8 Minimum Requirement No. 8 – Wetland Protection

There are no wetlands in the immediate vicinity or indirectly through a conveyance system from the Project site. This requirement is not applicable.

2.2.9 Minimum Requirement No. 9 – Operations and Maintenance

Operation and maintenance of the on-site conveyance network and stormwater BMPs will be provided by the building's property management group. Any improvements within the public ROW will be maintained by the City. An operation and maintenance manual prepared for the Project with the final drainage report. Common maintenance tasks for the stormwater facilities are listed in Table 2.

Table 2. Operation and Maintenance Plan

Facility	Frequency	Maintenance
Conveyance Systems	Annually and major storm event	▪ Use rodding to clear any root invasion. ▪ Replace damaged pipes with dents or punctures that impact performance. ▪ Remove vegetation that reduces free movement of water through pipes. ▪ Flush pipe networks from cleanouts to clear debris.
Catch Basin	Biannually and major storm event	▪ Dry sweep the parking lots and access drives at least every 6 months to reduce accumulation of sediments and debris. ▪ Clean and dispose of trapped sediments from the sump at least every 6 months and after major storms. ▪ Dispose of any debris or accumulated sediment properly, according to federal, state, and local jurisdictions.
Energy Dissipators	Annually	▪ Replace rock pad or riprap when native soil is visible. ▪ Replace rock pad/riprap and backfill if soil erosion exceeds 6 inches.

3. Existing Site Conditions

The Project site is located on parcel 5745001631 between W Meeker and SW 4th Street in Puyallup, WA located in Pierce County.

An existing single family residential house, garage, and yard occupy the property. It is flat with no defined low points or high points. A few stands of large trees are located throughout the grass yard.

The frontage surrounding the site includes sidewalks, street parking, and a rear alleyway. There are existing catch basin inlets located down Pioneer and Meeker intersections with SW 5th Street that connect to the City's existing conveyance system.

See Appendix A for reference.

3.1 Land Use

The site is in the Residential Multi-Family (RM-Core) zone district and the High Density Residential (HDR) Comprehensive Plan designated area. Nearby land use includes surface parking lots, public parks, churches, schools, single and multi-family housing, shopping, and restaurants.

3.2 Existing Site Hydrology

The 0.75 -acre lot is 86% pervious surface with a large, grass yard covering most of the property. A single-story house and garage is in the northeast corner.

There are no existing drainage facilities located on the property. It is assumed that runoff generated from the house's rooftop is dispersed across the lawn and infiltrated into the subgrade. Due to the flat land surrounding the site, there is no anticipated run-on.

Table 3. Existing Land Surface Characteristics

Threshold Discharge Area	Landscape	Sidewalks (NPGHS)	Roofs (NPGHS)	Pavement (PGHS)
On-Site	27,971 SF	-	4,545 SF	-
Off-Site	-	3,597 SF	-	4,646 SF

NPGHS (non-pollution-generating hard surfaces) – Roofs, sidewalks, or other hard surfaces not subject to a significant source of pollutants.

PGHS (pollution-generating hard surfaces) – Hard surfaces considered to be a significant source of pollutants in stormwater runoff. Such surfaces are subject to vehicular use, industrial activities, or storage of erodible material. Bike lanes, parking lots, driveways, and unfenced fire lanes are all PGHS.

The pre-development drainage basin map can be found in Appendix A.

3.3 Infiltration Rates/Soils Reports

A draft geotechnical soils report was completed by GeoResources in August 2022. They completed a site investigation including: test pits, soil borings, stormwater infiltration testing, and groundwater monitoring.

Subsurface investigation encountered approximately ¾ - 1-feet of topsoil overtop 2 ¼ - 3-feet brown poorly graded sanded with some silt to brown sandy silt in a loose to medium dense/medium stiff, moist conditions. This weathered alluvium covered another alluvial layer of brown-grey sand with varying amounts of silt interbedded with silt and varying amount of sand continuing down to the extent of the 15-deep exploratory bore.

Groundwater was observed in all of the exploratory bores between 3.7- to 6.2-feet below ground surface (bgs) and mottling observations occurred as shallow as 1- to 2.5-feet bgs. GeoReources continued to monitor groundwater through the 2022 wet weather season.

Based on their site reconnaissance and subsurface explorations, it is their opinion that the infiltration of stormwater runoff generated onsite by the proposed residential development is not feasible for this project.

Further information regarding the geotechnical investigation can be found in Appendix C.

4. Developed Site Conditions

The Project preliminarily proposes developing a 5-story apartment building with 100 residential units, covered parking, and resident amenities while installing new utility service connections and public frontage improvements areas as part of the development. The Project area will be approximately 0.75-acres of development that includes constructing the following:

- 100 residential units
- Domestic water and sewer service connections
- Dedicated fire suppression services
- Frontage improvements along SW 4th Street and Pioneer W Meeker

4.1 Developed Site Hydrology

The 0.75-acre lot will be developed and covered nearly entirely by the proposed building's footprint and rooftop. There are small landscaping areas surrounding the site and on the rooftop of building, but nearly 91% of the site will be covered by impervious surfaces. Frontage improvements will include replaced sidewalk, street trees, curb and gutter, and commercial driveway connection. Ultimately, all run-off generated will be collected and conveyed into the City's stormwater conveyance system.

4.1.1 Developed Drainage Patterns

The Project will replace an existing residential lot with a 5-story apartment building covering majority of the property limits. The building's rooftop is impervious, and its gutters will convey runoff through downspouts to the City's stormwater conveyance system through a new connection.

The building's covered parking garage will have inlets installed at low points graded intermittently throughout. Minimal runoff is anticipated to be collected within the covered parking garage resulting from rainwater or snow melt being tracked inside. Whatever runoff is collected will drain through an oil water separator prior to connecting to the building's sanitary sewer service.

Frontage improvements along W Meeker and SW 4th Street will generally match the existing roadway grade. Detailed grading will occur at curb ramps and near building entrances, but generally the existing drainage patterns will remain. Runoff from new hard surfaces within the City's right-of-way will be graded into the roadway, conveyed along the curb line, and collected in public catch basins. The City's existing stormwater conveyance system will remain as is where it will drain stormwater away from the downtown area to its outfall location in the Puyallup River.

For additional detail, see the post-development basin figure in Appendix A.

Table 4. Developed Land Coverage

Threshold Discharge Area	Landscape	Sidewalks (NPGHS)	Roofs (NPGHS)	Pavement (PGHS)
On-Site	2,9696 SF	1,597 SF	27,450 SF	500 SF
Off-Site	520 SF	6,050 SF	-	4,682 SF

NPGHS (non-pollution-generating hard surfaces) – Roofs, sidewalks, or other hard surfaces not subject to a significant source of pollutants.

PGHS (pollution-generating hard surfaces) – Hard surfaces considered to be a significant source of pollutants in stormwater runoff. Such surfaces are subject to vehicular use. Bike lanes, parking lots, driveways, and unfenced fire lanes are all PGHS.

5. Permanent Stormwater Control Plan

A permanent storm control plan is required since the Project must meet Minimum Requirements 1-9. Runoff treatment BMPs remove pollutants generated from hard surfaces to prevent downstream pollution. Flow control facilities mitigate potential adverse impacts on downstream properties and waterbodies due to the increase in stormwater runoff caused by increased impervious surfaces.

5.1 Methodology

The SWMMWW was used as a reference to complete hydrologic analysis and design to select appropriate and applicable BMPs for runoff treatment and flow control. On-site stormwater management BMPs from List #3 were evaluated for feasibility and selected as discussed previously in section 2.2.5.

As previously mentioned, the Project's building footprint and rooftop – approximately 27,450 SF – the covering majority of the on-site TDA in an impervious surfaces. Under typical circumstances, flow control is required. However, due to the limited availability of space to provide on-site flow control in combination with the City's goal to address its housing needs, a development agreement is being created to permit direct discharge of runoff directly into the City's stormwater system. The City has requested an estimate of the runoff quantity generated a result of these replaced and new hard surfaces.

As such, hydrologic analysis of pre- and post-development conditions are based on hydrographs, water quality flowrates, and discharge flowrate comparisons calculated by the Western Washington Hydrology Model 2012 (WWHM 2012).

A model was prepared to evaluate the typical flow control requirements of reducing post-development discharge rates to that equal to or less than forested site conditions.

Pre-development developed surface conditions were analyzed by using long-term recorded precipitation data for regional specificity, vegetation and land conditions, and continuous simulation hydrology modeling. Pre-development basins were modelled as flat impervious and pervious land use. WWHM models times of concentrations (Tc) and rainfall events from historical data. Land surface characteristics are provided in Table 3.

Post-development surface conditions were analyzed comparing the same precipitation data and continuous simulation hydrology modelling with the new land surface characteristics from developed land coverage. Contributing areas were modeled as impervious land use flat roads; flat roofs, and

flat walks. Pervious land use were modelled as pervious Type C lawn. Developed TDAs land coverage details are provided in Table 4.

WWHM 2012 stormwater modelling reports can be found in Appendix E.

5.1 Runoff Treatment BMPs

Within the project limits, there are no TDAs with more than 5,000 square feet of new pollution-generating hard surface (PGHS) being created. Therefore, the project does not require construction of stormwater treatment BMPs for these areas.

5.2 Flow Control Analysis

As previously mentioned, an analysis was prepared to evaluate flow control requirements of reducing post-development discharge rates to that equal to or less than forested site conditions for the Project. An analysis evaluated discharge flowrates without any on-site detention. The results are summarized below in Table 5.

Table 5 Flow Control Analysis #1

Storm Event	Pre-Development		Post-Development	
	On-Site (cfs)	Off-Site (cfs)	On-Site (cfs)	Off-Site (cfs)
2-Year	0.02	0.004	0.24	0.06
10-Year	0.03	0.007	0.39	0.10
25-Year	0.03	0.009	0.47	0.12
50-Year	0.04	0.010	0.54	0.14

An additional analysis was prepared to evaluate on-site flow control. An underground vault with a flow control structure was selected to retain runoff before discharging at less than or equal to pre-development conditions. The underground vault would need to be approximately 290’x20‘x7’ (LxWxH).

Table 6 Flow Control Analysis #2

Storm Event	Pre-Development	Post-Development
	On-Site (cfs)	On-Site (cfs)
2-Year	0.02	0.01
10-Year	0.03	0.02
25-Year	0.03	0.03
50-Year	0.04	0.04

As noted, a large underground detention facility would be required to reduce runoff flowrates to less than or equal to forested conditions. It is not feasible to install an underground detention vault within the Project’s property limits due to existing utility easements and proposed columns and foundation locations. The Project will work with the City to permit direct discharge to its stormwater conveyance system in order to manage the runoff generated from the site.

WWHM 2012 stormwater modelling reports can be found in Appendix E.

6. Off-site Analysis

An analysis was conducted to determine if project construction will create any drainage problems downstream of the project limits. Completion of the project will result in a similar quantity of impervious surfaces and therefore similar amount of runoff generated from the Project site. However, the replacement of the existing, pollution generating parking lot with a non-leaching roof of the proposed building will reduce the amount of contaminated stormwater runoff from the site. As such, the Project will result in similar quantity of runoff but with less pollutants contributing to the watershed.

6.1 Study Area Definition and Maps

The Project area is located within the South Puyallup and Clarks Creek subbasin in the Puyallup/White watershed in the Water Resource Inventory Area (WRIA) 10 per Ecology. The site-specific study area will extend from the Project site to its ultimate outfall in the Puyallup River through the City's existing conveyance system.

6.2 Resource Review

WRIA 10 is defined as the area that drains to the Puyallup, White, and Carbon Rivers, which originate on Mount Rainier. The annual precipitation in the Puyallup-White Watershed ranges from 30 to 40 inches per year in the greater Tacoma area to over 120 inches in the Cascade Mountains. The Puyallup-White Watershed is one of the most heavily populated basins in western Washington.

The western portion of the Puyallup-White Watershed is predominantly urban, characterized by a combination of residential, industrial, commercial, agricultural, transportation, communication, and utility land uses. The most populated cities in the watershed are Tacoma, Auburn, and Federal Way. Approximately 14 percent of the watershed is within a city or designated urban growth area, and approximately 86 percent of the WRIA is outside of the urban growth areas. The confluence of the Puyallup River with Commencement Bay occurs in the urbanized and highly industrialized Port of Tacoma. The eastern or upland portion of the watershed generally consists of commercial forest land, Mount Rainier National Park (19 percent of the WRIA), and the Baker-Snoqualmie and Gifford Pinchot national forests (26 percent of the WRIA). Washington State agencies manage about 3% of the WRIA. Land uses shift to agriculture, suburban developments, and small urban centers in the foothills of the Cascade Mountains. Rural residential development has primarily occurred in the foothills outside of the urban centers.

WRIA 10 is an important watershed for several salmon species – Chinook, Coho, Sockeye, Pink, and Shum – listed under the Endangered Species Act as well as other fish species. Many communities rely on the watershed for their water supply through a mix of groundwater and surface water. Ecology recently published a restoration and enhancement plan for the watershed in 2021 outlining projects and implementation plans to offset the consumptive water use from well connection located throughout the watershed's area.

6.3 Existing Conveyance System Analysis

The City's GIS system was reviewed to trace the downstream route runoff with be conveyed from the Project site to its outfall in the Puyallup River. The analysis is limited to a qualitative review of the City's system.

After discharging from the Project site, runoff will travel west approximately 75-feet and connect into a 15-inch diameter ductile iron pipe and enter into the City's storm system main on SW 5th Avenue. The SW 5th Avenue SW storm drains flows south approximately 640-feet before it connects to 24-inch pipe in SW 4th Avenue and drains west– increasing up to a 30-inch pipe – for approximately 0.6 miles before draining into a 30-inch main in Pioneer Street. The stormwater is conveyed approximately 1000 feet west along Pioneer Street until it intersects with a weir box at the intersection of 17th Street SW and Pioneer. Low flows are then diverted north along 15th Street SW towards the Puyallup River and high flows are conveyed west along Pioneer towards Clarks Creek.

The Puyallup River is approximately 1.1 miles north of the 15th Street SW/Pioneer Intersection. Clarks Creek is approximately 0.5 miles west of the 15th Street SW/Pioneer Intersection. Low flows for part of the Clarks Creek Drainage basin are diverted north to the Puyallup River in a weir box located at the intersection of Pioneer and 15th Street. SW; however, peak flows are conveyed west to Clarks Creek.

6.4 Downstream Water Quality

A review of Ecology's list of impaired water bodies indicates that Puyallup River is listed as an impaired water body. The impaired water body is categorized as follows:

- Category 5 (303d list) for temperature.
- Category 5 (303d list) for bacteria-fecal coliform.
- Category 5 (303d list) for Mercury.
- Category 2 (water of concern) for Lead.
- Category 2 (water of concern) for Dissolved Oxygen.
- Category 2 (water of concern) for Turbidity.
- Category 1 (meets tested criteria) for arsenic.
- Category 1 (meets tested criteria) for Ammonia-N.
- Category 1 (meets tested criteria) for pH.
- Category 1 (meets tested criteria) for Zinc.
- Category 1 (meets tested criteria) for Copper.

The Puyallup River is an identified water body with both aquatic life and recreation use. Therefore, the Department of Ecology has the following Water Quality Standards for this water body:

- Temperature: 60.8 degrees Fahrenheit.
- DO: 9.5 milligrams per liter (mg/L).
- pH: pH shall be within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 standard units.
- Turbidity: 5 nephelometric turbidity units (NTUs) over background when the background is 50 NTUs or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTUs.
- Bacteria: Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies per 100 milliliters (mL), with not more than 10 percent of all samples (or any

single sample when less than 10 sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies/100 mL.

6.5 Floodplain Analysis

The project site is outside of a floodplain. See Appendix A for the FEMA Firmette Map.

7. Conveyance System

Any conveyance system shall be designed to convey and contain up to the 25-year storm event.

The Project proposes installing a gutter system to collect and convey runoff generated from the building's rooftop through downspouts and a new 8-inch diameter schedule 40 PVC stormwater service connection into the City's conveyance system.

Preliminary design indicates that an 8-inch diameter pipe with a Manning's n roughness value of 0.012 at 1% slope would be 48% full when conveying 0.47 cfs, the 25-year event flowrate.

For the final design, all storm connection(s) shall be designed as 8-inch diameter pipe sloped at a minimum of 1%.

8. Covenants, Dedications, Easements, Agreements

An agreement between the developer and the City of Puyallup to remove the flow control requirement for the Project is under discussion. The agreement has not been executed yet. Once terms have been agreed upon and the agreement is in place, on-site detention will not be provided, and the property will directly discharge stormwater runoff to the City's existing conveyance system.

9. Other Permits

This project will require the following permits:

- Building Permit
- Right Of Way Use Permit

10. References

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Federal Emergency Management Agency. FEMA Flood Map Service Center. Available at https://msc.fema.gov/portal/home.

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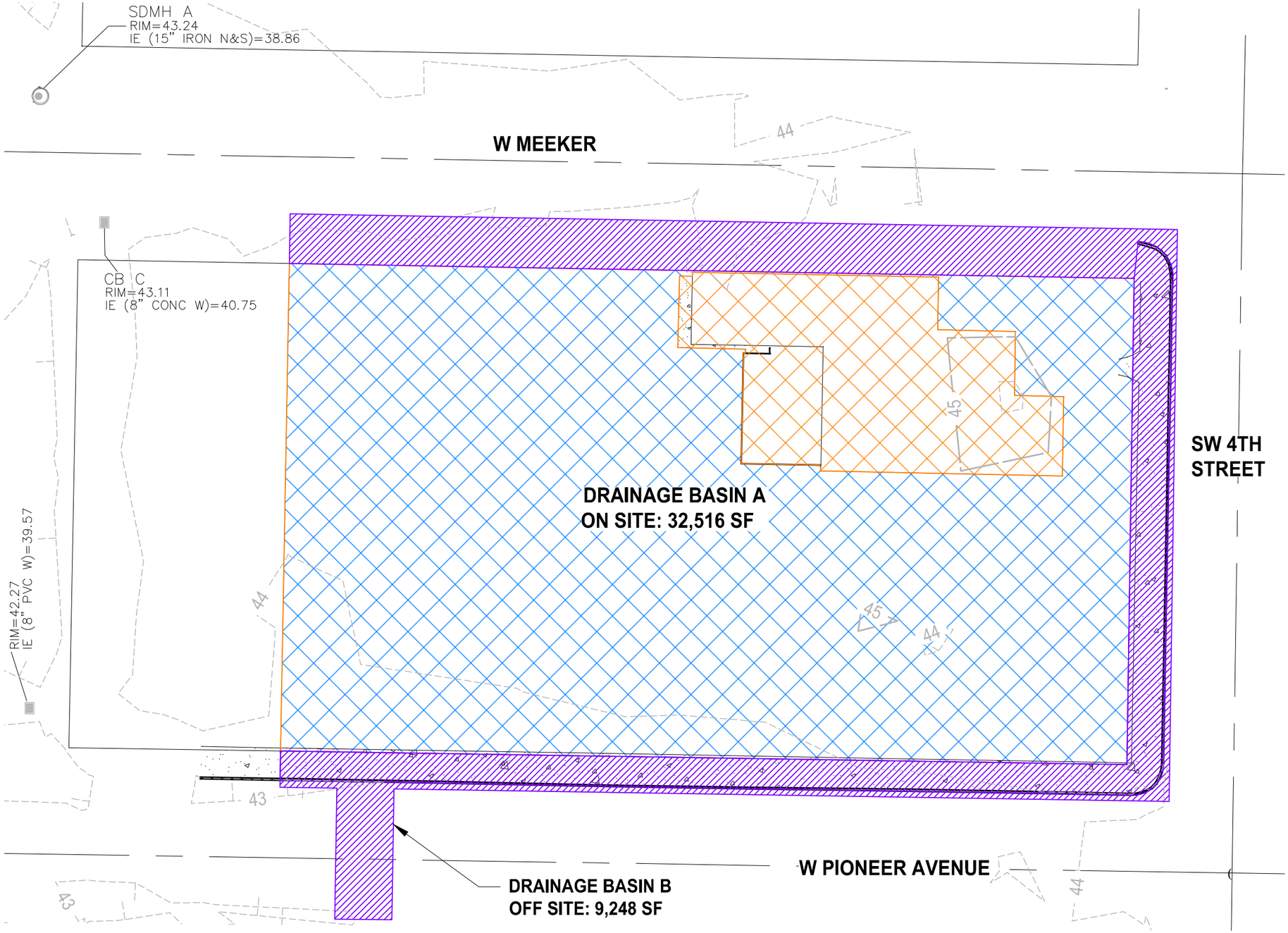
Appendix A

Supplemental Figures



LEGEND

BASIN A:

- IMPERVIOUS (4,545-SF)
- PERVIOUS (27,971-SF)

BASIN B:

- IMPERVIOUS (8,243-SF)
- PERVIOUS (0-SF)

NOTES:

1. EXISTING SITE IS RELATIVELY FLAT.
2. THERE ARE NO EXISTING DRAINAGE FACILITIES LOCATED WITHIN THE PROPERTY LIMITS.
3. THE CITY'S STORMWATER SYSTEM ULTIMATELY OUTFALLS INTO THE PUYALLUP RIVER.

Parametrix

DATE: September 18, 2025

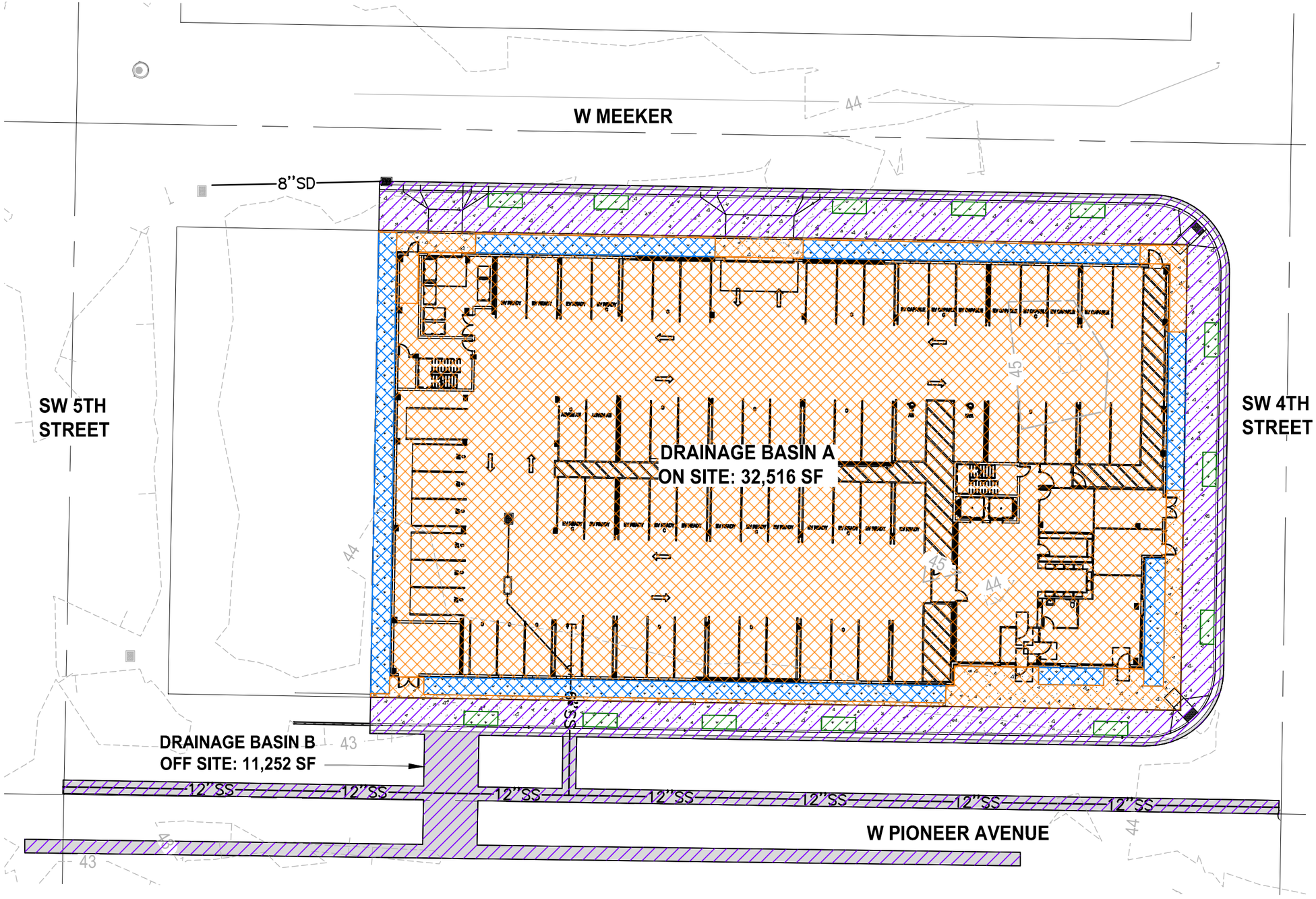
FILE: BELL PLACE STORM_V2

0 N 30

1 INCH = 30 FT.

PRE-DEVELOPMENT DRAINAGE BASIN

BELL PLACE APARTMENTS



LEGEND

BASIN A:

- IMPERVIOUS (29,547-SF)
- PERVIOUS (2,969-SF)

BASIN B:

- IMPERVIOUS (10,732-SF)
- PERVIOUS (520-SF)

NOTES:

1. THE GROUND-LEVEL PARKING GARAGE WILL BE COVERED BY RESIDENTIAL UNITS ABOVE AND BUILDING'S ROOFTOP.
2. ANY RUNOFF COLLECTED WITHIN THE GARAGE WILL BE ROUTED THROUGH AN OIL-WATER SEPARATOR AND DISCHARGED TO THE SANITARY SEWER SERVICE.
3. STORMWATER RUNOFF FROM THE ROOFTOP WILL BE DISCHARGED OFF-SITE THROUGH NEW CONNECTIONS TO THE CITY OF PUYALLUP'S STORMWATER DRAINAGE SYSTEM.
4. THE CITY'S STORMWATER SYSTEM ULTIMATELY OUTFALLS INTO THE PUYALLUP RIVER.

Parametrix

DATE: October 10, 2025

FILE: BELL PLACE STORM_V2

0 N 30

1 INCH = 30 FT.

POST-DEVELOPMENT DRAINAGE BASIN

BELL PLACE APARTMENTS

Start Here

Does all stormwater runoff from the Project Site discharge to a Class V UIC Well?

Yes → The UIC Rule (Chapter 173-218 WAC) applies. Refer to *I-4 UIC Program Guidelines* for UIC Program Requirements.

No

Does the Site have 35% or more of existing hard surface coverage?

Yes → See Redevelopment Project Thresholds and the Figure *"Flow Chart for Determining Requirements for Redevelopment"*.

No

Does the Project result in 2,000 square feet or more of new plus replaced hard surface area?
OR
Does the land disturbing activity total 7,000 square feet or greater?

Yes

Minimum Requirements #1 through #5 apply to the new and replaced hard surfaces and the land disturbed.

Next Question

Does the Project add 5,000 square feet or more of new plus replaced hard surfaces?
OR
Convert ¾ acres or more of vegetation to lawn or landscaped areas?
OR
Convert 2.5 acres or more of native vegetation to pasture?

Yes

All Minimum Requirements apply to the new and replaced hard surfaces and converted vegetation areas.

No

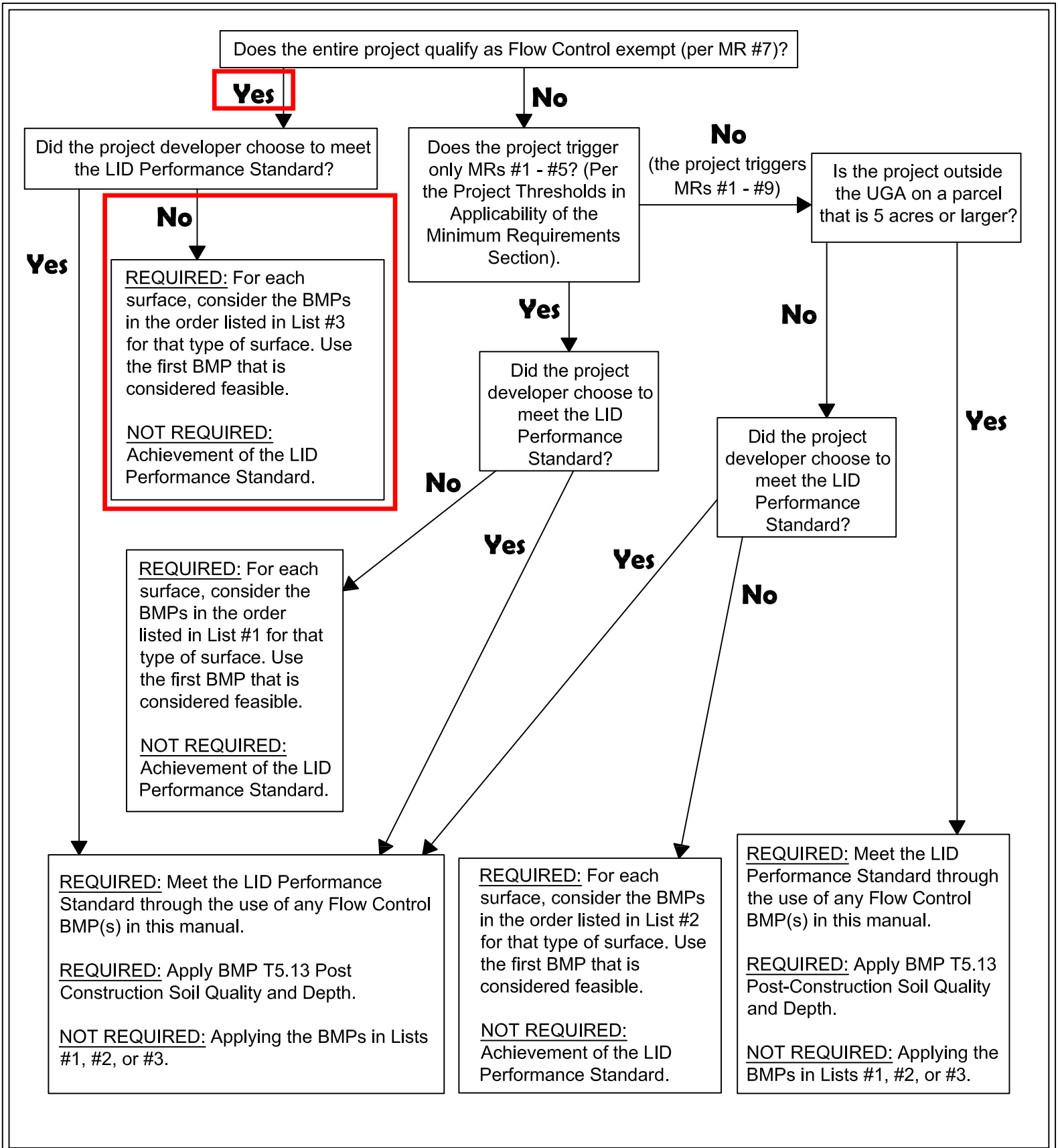
No additional requirements

No → **Minimum Requirement #2 applies.**

DEPARTMENT OF ECOLOGY
State of Washington

Flow Chart for Determining Requirements for New Development

Revised September 2022



DEPARTMENT OF ECOLOGY
State of Washington

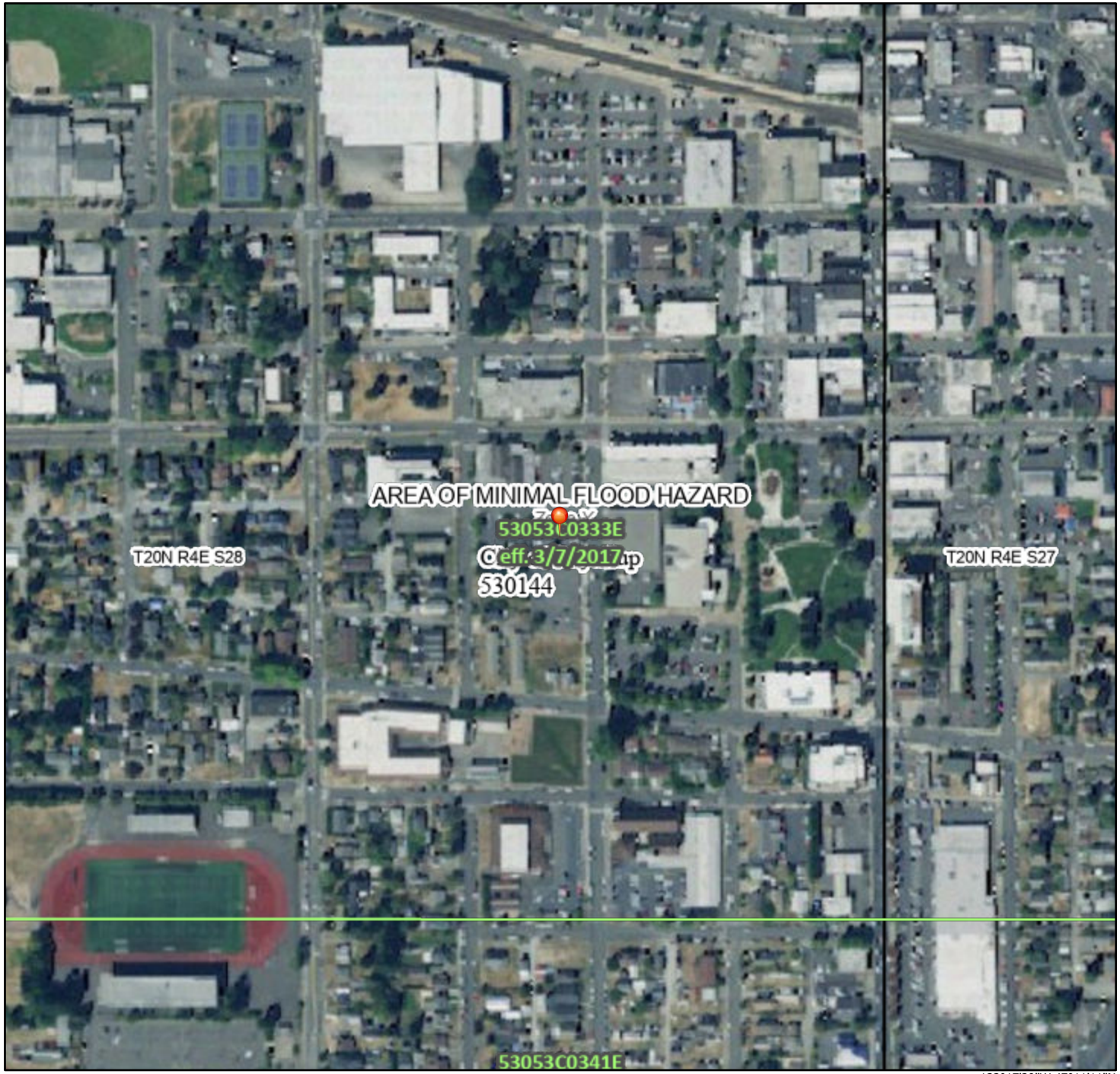
Flow Chart for Determining MR #5 Requirements

Revised March 2019

National Flood Hazard Layer FIRMette

FEMA

122°18'7"W 47°11'35"N



122°17'29"W 47°11'11"N

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

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

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

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

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

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

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

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

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

N

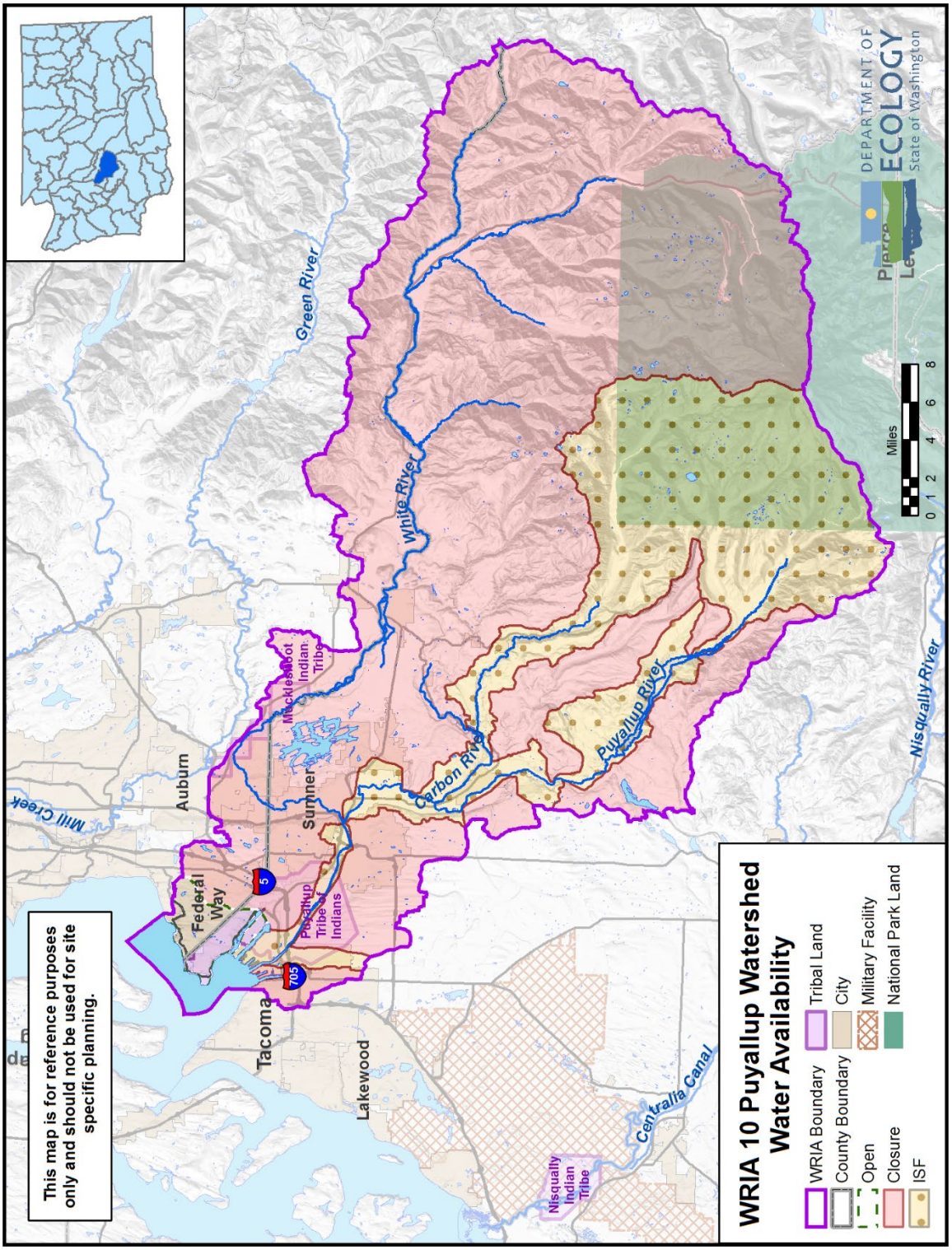
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/17/2025 at 8:54 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

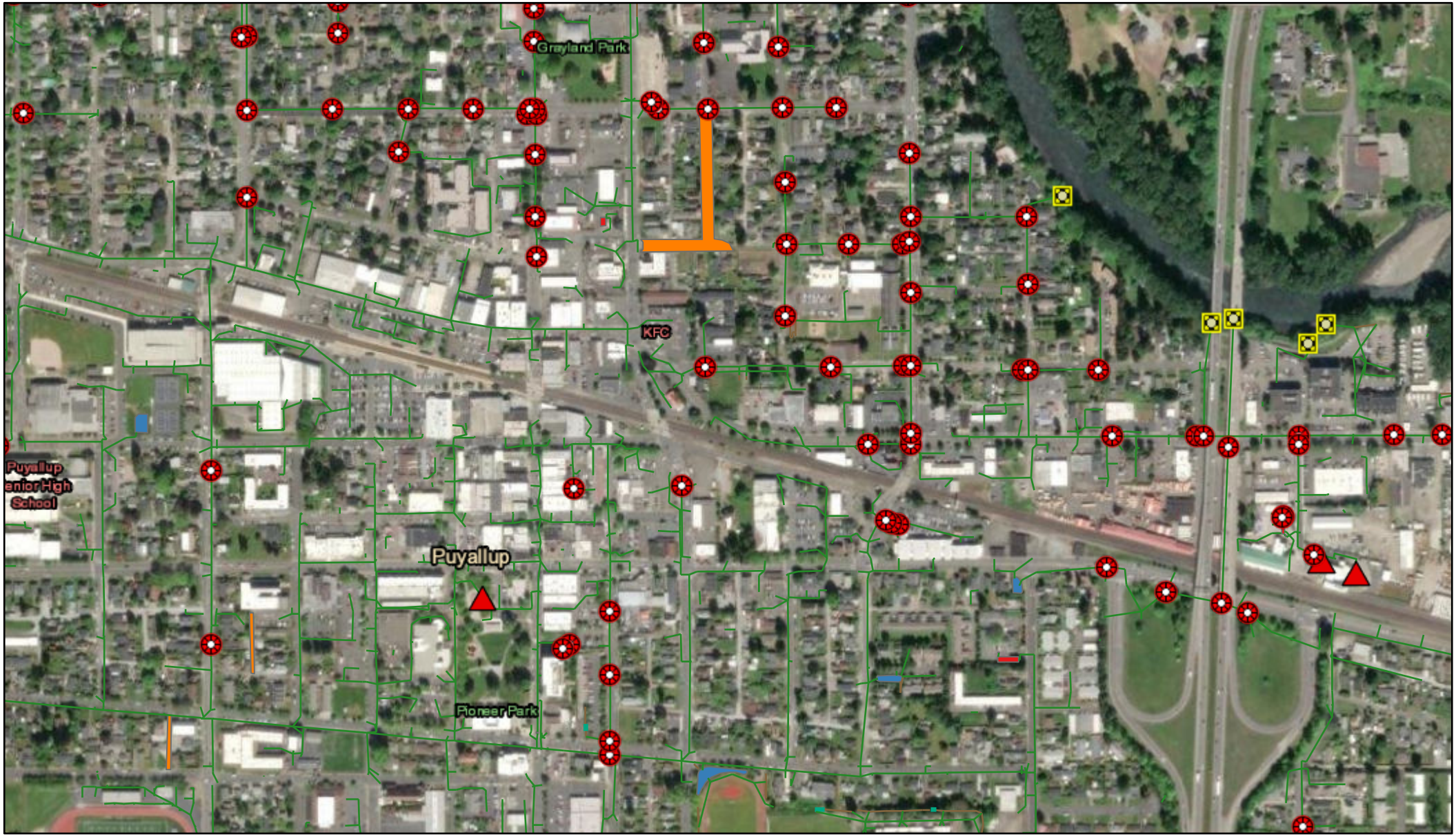
Map


WRIA 10 Puyallup Watershed
Water Availability
WRIA Boundary
County Boundary
Open
Closure
ISF
Tribal Land
City
Military Facility
National Park Land
This map is for reference purposes only and should not be used for site specific planning.
Green River
White River
Carbon River
Puyallup River
Nisqually River
Mill Creek
Auburn
Sumner
Federal Way
Tacoma
Lakewood
Centralia Canal
Muckleshoot Indian Tribe
Puyallup Tribe of Indians
Nisqually Indian Tribe
Miles
0 1 2 4 6 8
DEPARTMENT OF ECOLOGY
State of Washington

Appendix B

GIS Maps

Bell Place Apartments



9/17/2025, 4:03:41 PM

1:9,360

0 290 580 1,160 ft

0 87.5 175 350 m

Esri, HERE, Garmin, iPC, Maxar

World_Boundaries_and_Places

Outfalls

Manholes

Control Structures

Pipes

Culverts

Channels

Facilities

System

Pond

Vault

Permeable

World Imagery

Low Resolution 15m Imagery

High Resolution 60cm Imagery

High Resolution 30cm Imagery

Citations

Appendix C

Geotechnical Engineering Investigation Report

GEORESOURCES
earth science & geotechnical engineering
4809 Pacific Hwy. E. | Fife, Washington 98424 | 253.896.1011 | www. georesources.rocks

August 5, 2022

Azure Green Consultants
409 E Pioneer
Puyallup, WA 98372
(253) 770-3144

Attn: Jim Job
jim@mailagc.com

Soils Report
Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31, -32, -41
Doc ID: AGC.4thStSW.SR

INTRODUCTION

This *Soils Report* summarizes our site observations and geotechnical data review and addresses the feasibility of stormwater infiltration for the proposed residential redevelopment to be constructed at 204 – 4th Street SW in Puyallup, Washington. The approximate site location is shown on Figure 1.

Our understanding of the project is based on our correspondence with Azure Green Consultants, our understanding of the City of Puyallup's development codes, and our experience in the site area. We understand that the site is currently developed with a single-family residence. Furthermore, we understand that you propose to demolish the existing residence and construct a new mixed use building at the site. We have not been provided with conceptual plans for the proposed structure at the time of this report, but we anticipate the new structure will consist of one to two stories of concrete construction with two to four stories of wood-framing above. Support for the proposed structure will likely consist of shallow foundations bearing on improved ground, or deep foundations such as continuous flight auger piles.

SCOPE

The purpose of our services was to evaluate the surface and subsurface conditions across the site as a basis for providing geotechnical recommendations and design criteria for the proposed restaurant. Specifically, the scope of services for this project included the following:

1. Reviewing the available geologic, hydrogeologic, and geotechnical data for the site area;
2. Exploring the subsurface conditions by observing four direct push Geoprobes and installing groundwater monitoring wells in each exploration at selected locations at the site;
3. Installing Leveloggers in each well and monitoring of groundwater levels within each groundwater monitoring well during the prescriptive wet season (December 21 through April 1);

4. Providing our opinion about the feasibility of onsite infiltration in accordance with the 2014 SWMMWW, including a preliminary design infiltration rate based on grain size analysis and in-situ testing, as applicable; and,
5. Preparing a *Soils Report* that satisfies the 2014 SWMMWW requirements and summarizes our site observations and conclusions, our geotechnical recommendations and design criteria, along with the supporting data.

The above scope of work was summarized in our *Proposal for Geotechnical Engineering Services* dated December 2, 2021. We received authorization to proceed from you the same day.

SITE CONDITIONS

Surface Conditions

As stated, the site is located at 204 – 4th Street SW in Puyallup, Washington. The site consists of three tax parcels that, when combined, are generally rectangular in shape, measure approximately 135 feet wide (north to south) by approximately 240 feet long (east to west), and encompasses approximately 0.74 acres. The site is bounded by existing residential development to the west, West Pioneer Avenue to the south, West Meeker to the north, and 4th Street SW to the east.

Based on topographic information obtained from Pierce County Public GIS and our site observations, the ground surface of the site is generally level with small rises and falls in elevation on the order of approximately 1 foot. The total topographic relief of the site is on the order of approximately 2 feet. The existing site configuration and topography are shown on the Site Vicinity Map, Figure 3.

Vegetation across the site generally consisted of maintained grass with typical residential landscaping. No seeps or springs were observed at the site however some small areas of standing water were observed. No signs of erosion or soil instability were observed during our site reconnaissance.

Site Soils

The Natural Resource Conservation Service (NRCS) Web Soil Survey maps the site as being underlain by Puyallup fine sandy loam (31A) soils. These soils are derived from alluvium, form on slopes of 0 to 3 percent, are considered to have a “slight” erosion hazard when exposed, and are included in hydrologic soils group A. A copy of the NRCS soils map is included as Figure 3.

Site Geology

According to the *draft Geologic map of the Puyallup 7.5-minute Quadrangle, Washington* by Troost, (in review) the site is mapped as being underlain by Quaternary Alluvium (Qal). Alluvial soils generally consist of normally consolidated, stratified deposits of sand, silt, clay, and occasional peat that were deposited along the Puyallup River channel. The existing topography, as well as the surficial and shallow soils in the area, are the result of fluvial action, including down-cutting by the river, channel meandering and migration, and flood deposits. An excerpt from the geologic map is included as Figure 4.

Subsurface Explorations

On December 22, 2021, a field representative from GeoResources visited the site and monitored 4 direct push probes (GeoProbes) to a depth of approximately 15 feet, logged the

subsurface conditions, and obtained representative soils samples. The probes were completed by a licensed drilling company working for GeoResources. The approximate locations of the probes are indicated in the attached Site & Exploration Plan, Figure 2.

A representative from GeoResources continuously monitored the borings, maintained logs of the subsurface conditions encountered, and obtained representative samples in sealed containers for transportation to our laboratory. The soil densities presented on the logs were based on the difficulty of excavation and our experience. The number and location of the explorations were selected in the field based on project information provided by Azure Green Consultants, consideration for underground utilities, existing site conditions, and current site usage. Each exploration was completed as a groundwater monitoring well.

The subsurface explorations excavated as part of this evaluation indicate the subsurface conditions at specific locations only, as actual subsurface conditions can vary across the site. Furthermore, the nature and extent of such variation would not become evident until additional explorations are performed or until construction activities have begun. Based on our experience in the area and extent of prior explorations in the area, it is our opinion that the soils encountered in the explorations are generally representative of the soils at the site.

The soils encountered were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM D: 2488. The approximate locations of our explorations are indicated on the attached Site & Exploration Map, Figure 2. The USCS is included in Appendix A as Figure A-1, while the descriptive logs of our explorations are included as Figures A-2 through A-5.

Subsurface Conditions

At the locations of our explorations, we encountered relatively uniform subsurface conditions that in our opinion generally confirmed the mapped stratigraphy at the site. Our explorations encountered approximately ¾ to 1 foot of topsoil. Underlying the topsoil we encountered approximately 2¼ to 3 feet of brown poorly graded sand with some silt to brown sandy silt in a loose to medium dense/medium stiff, moist to wet condition. We interpret these soils to be weathered alluvium. Underlying the weathered alluvium we encountered brown-grey sand with varying amounts of silt interbedded with silt and varying amounts of sand. We interpret these soils to be alluvium. The alluvial soils were encountered to the full depth explored in each exploration.

Laboratory Testing

Geotechnical laboratory tests were performed on two samples retrieved from the explorations to estimate index engineering properties of the soils encountered. Laboratory testing included visual soil classification per ASTM D:2487 and ASTM D:2488, moisture content determinations per ASTM D:2216, and grain size analyses per ASTM D:6913 standard procedures. The results of the laboratory tests are included in Appendix B.

Groundwater Conditions

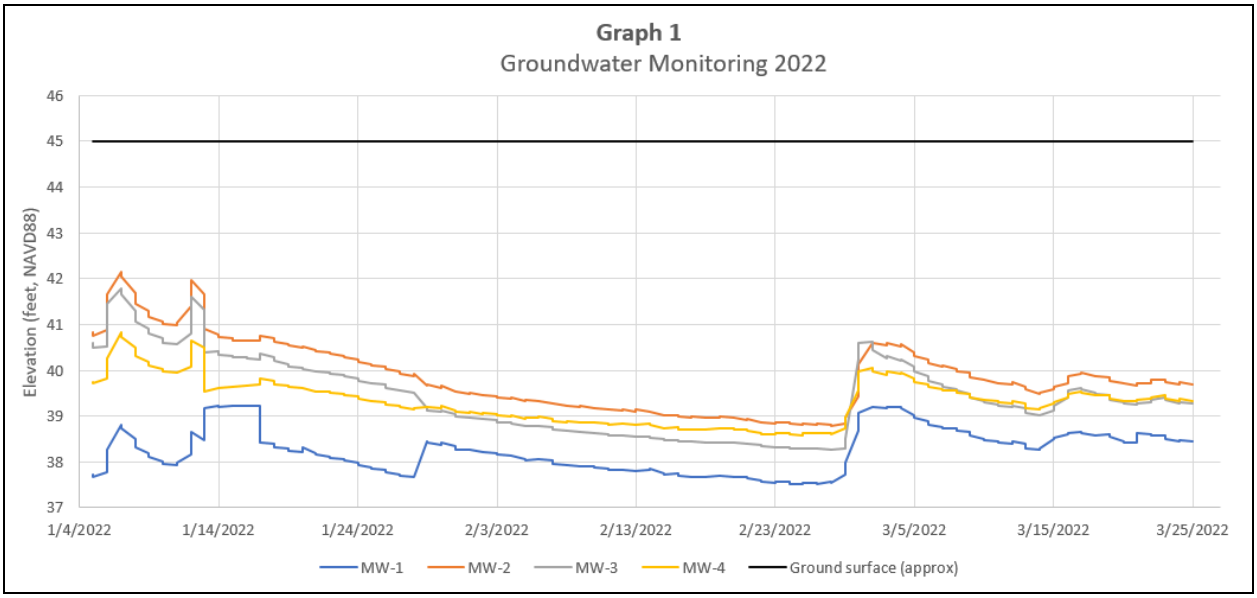
We encountered ground water in all explorations at approximately 3.7 to 6.2 feet below existing ground surface at the time of drilling. Additionally, mottling was encountered as shallow as 1 to 2½ feet below existing ground surface. Mottling may be indicative of a seasonal or fluctuating groundwater surface, often associated with perched groundwater. Perched groundwater table develops when the vertical infiltration of precipitation through a more permeable soil, is slowed at depth by a deeper, less permeable soil type. We anticipate fluctuations in the local groundwater levels will occur in response to precipitation patterns, off-site construction activities, and site

utilization. Analysis or modeling of anticipated groundwater levels during construction is beyond the scope of this report.

We installed downhole pressure transducers in each groundwater monitoring well on January 5, 2022. Water temperature and pressure were collected on 12-hour intervals on each instrument. An additional pressure transducer was installed in one monitoring well above the water line to record barometric pressure. All instruments were removed on March 25, 2022.

Data sets were uploaded into Solinst Levelogger Software (v 4.40), where water level measurements captured by the deployed instruments were adjusted to compensate for barometric pressure variations. The resulting compensated water level dataset provides a barometrically corrected record of groundwater levels within each groundwater monitoring well.

Based on our groundwater monitoring over the wet season, it appears that seasonal high groundwater levels occurred between elevation 39 to 42 feet (NAVD 88) in early to mid-January. Graph 1, below, summarizes the groundwater levels recorded as part of our groundwater monitoring program during our monitoring period.



CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our data review, site reconnaissance, and subsurface explorations, it is our opinion that soil conditions and shallow groundwater levels preclude the use of conventional infiltration facilities at the site. Low-impact development methods may be feasible, depending on site configuration. Additional discussion regarding stormwater management methods is included in the following sections.

Infiltration Recommendations

Low Impact Development (LID) BMPs

LID infiltration BMPs such as pervious pavement could be considered to manage stormwater for this project. Per the 2014 SWMMWW, Volume V, Chapter 5, BMP T5.15, permeable pavements are infeasible if saturated conditions would be created within 1 foot of the bottom elevation of the lowest layer and the seasonal high groundwater table or an underlying impermeable/low permeable layer.

Based on our groundwater monitoring measurements, the bottom of the proposed infiltration facilities should be no greater than 1.5 feet below existing grades, in order to meet the minimum 1 foot of vertical separation. We do not recommend infiltration in the area of MW-3. The surficial silty alluvium soils encountered at the surficial elevation of each exploration contain a significant amount of fines that will not support infiltration. The silty sands located at the surficial elevation in MW-1, MW-2, and MW-4 should be suitable for infiltration

Infiltration BMPs

Per the 2014 SWMMWW, Volume V, Chapter 4, BMP T5.10A, downspout infiltration is feasible on sites where 3 feet or more of permeable soil from the proposed final grade to the seasonal high-water table is available, and/or at least 1 foot of clearance from the bottom elevation of the infiltration trench to the seasonal high groundwater table is available. We observed 3 feet or more of permeable soil in MW-1, MW-2, and MW-4, however, based on our groundwater monitoring measurements to date, the vertical separation requirement from groundwater is not able to be met. Therefore, downspout infiltration does not appear feasible for this project. Stormwater runoff generated by the proposed impermeable surfaces should be collected and routed to an appropriate discharge location.

Design Infiltration Rate

We completed a soil gradation analyses on three representative soil sample from the site per the 2014 SWMMWW, Volume III, Section 3.3.6, Method 3 and in accordance with ASTM D6913. Based on our gradation analyses, we recommend a design infiltration rate of 0.5 inches per hour for permeable pavements or bio swales founded no greater than 1.5 feet below existing grades in the shallow silty sand alluvium soils encountered in the areas of MW-1, MW-2, and MW-4. Appropriate correction factors have been applied to these values in accordance with the 2014 SWMMWW, Volume III, Section 3.3.6, Table 3.3.1, including correction factors 0.33 for site variability ($F_{variability}$), 0.4 for testing method ($F_{testing}$) and 0.9 for maintenance for situation biofouling ($F_{maintenance}$).

Construction Considerations

We recommend that a representative from our firm be onsite at the time of excavation of the proposed infiltration facilities to verify that the soils encountered during construction are consistent with the soils observed in our subsurface explorations. Verification infiltration testing should also be performed at the time of construction to verify the recommended infiltration rates for infiltration facilities such as infiltration trenches and permeable pavements per the 2014 SWMMWW.

Appropriate design, construction and maintenance measures will be required to ensure the infiltration rate can be effectively maintained over time. Appropriate temporary erosion and sediment control methods should be included in the project plans and specifications to minimize the potential for fines contamination of infiltration facility utilized at the site. To further reduce the potential for fines migration, the infiltration system should not be connected to the stormwater runoff system until after construction is complete and the site area is landscaped, paved or otherwise protected.

Additional measures may also be taken during construction to minimize the potential of fines contamination of the proposed infiltration system, such as utilizing an alternative storm water management location during construction or leaving the bottom of the permanent systems 1 to 2 feet high, and subsequently excavating to the finished grade once the site soils have been stabilized. All contractors working on the site (builders and subcontractors) should divert sediment laden

stormwater away from proposed infiltration facilities during construction and landscaping activities. No concrete trucks should be washed or cleaned, and washout areas should not be within the vicinity of the proposed infiltration facilities. After construction activities have been completed, periodic sweeping of the paved areas will help extend the life of the infiltration system.

LIMITATIONS

We have prepared this report for use by Azure Green Consultants and other members of the design team, for use in the permitting and design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on subsurface explorations and data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

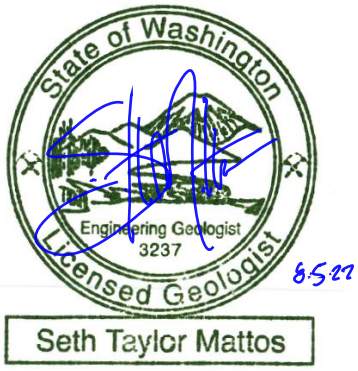
The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

◆ ◆ ◆

We have appreciated the opportunity to be of service to you on this project. If you have any questions or comments, please do not hesitate to call at your earliest convenience.

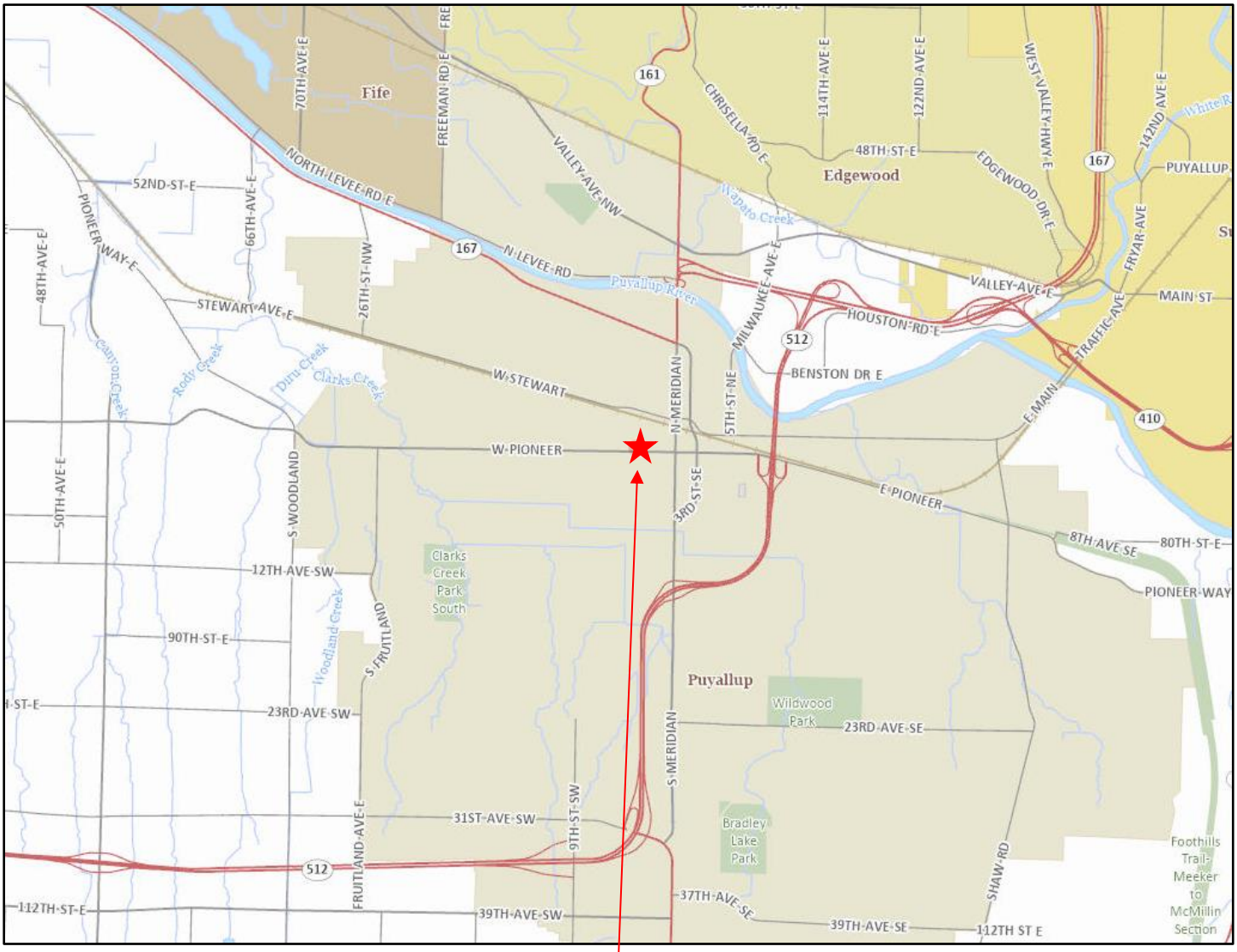
Respectfully submitted,
GeoResources, LLC



Andrew Schnitger, EIT
Staff Engineer

Seth Mattos, LEG
Associate

AES:STM/aes
DocID: AGC.4thStSW.SR.U
Attachments: Figure 1: Site Vicinity Map
Figure 2: Site & Exploration Map
Figure 3: NRCS Soils Map
Figure 4: Geologic Map
Appendix A – Subsurface Explorations
Appendix B – Laboratory Test Results



Approximate Site Location

Map created from Peirce County Public GIS (https://matterhornwab.co.pierce.wa.us/publicgis/)

N
W
E
S

Not to Scale

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Site Location Map

Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31,-32,-41

DocID: AGC.4thStSW.F	August 2022	Figure 1

Exploration number and approximate locations (GeoResources 2021)

Additional Notes:
Imagery and topography accessed from Pierce County Public GIS, not to scale, NAVD88
Downhole pressure transducers installed in all wells, suspended via mason line secured under well cap
Barometric pressure transducer installed in MW-1, suspended 18-inches below well cap
Must secure mason line before removing well cap
All instruments set to record at 1200 and 2400 hours daily

N W E S

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Site & Exploration Plan

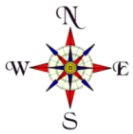
Proposed Mixed-use Development
204 – 4th St SW
Puyallup, Washington
PN: 5745001631, -32, -41

Doc ID: AGC.4thStSW.F2	December 2021	Figure 2

Approximate Site Location

Map created from Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

Soil Type	Soil Name	Parent Material	Slopes	Erosion Hazard	Hydrologic Soils Group
31A	Puyallup fine sandy loam	Alluvium	0 to 3	Slight	A



Not to Scale

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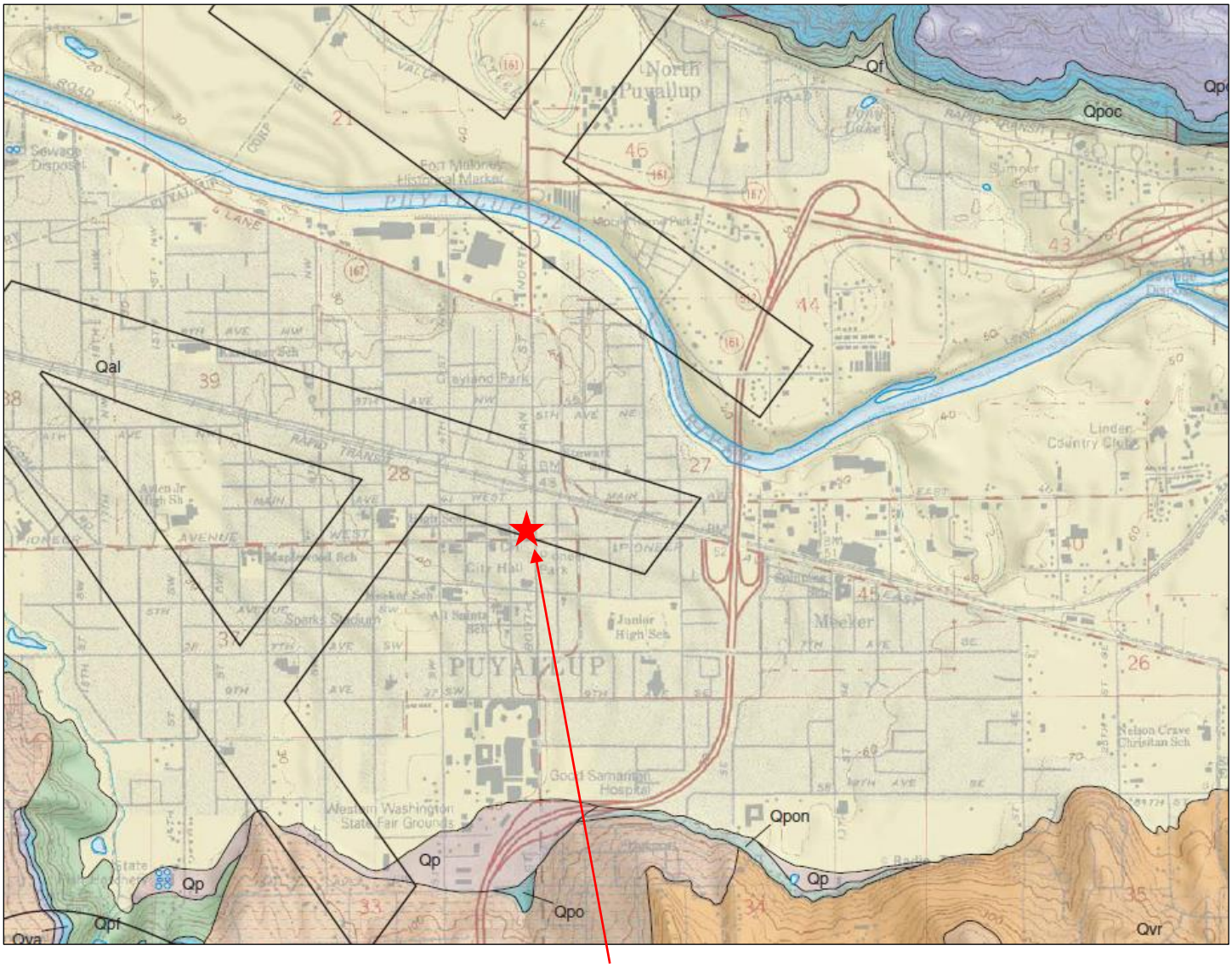
NRCS Soils Map

Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31,-32,-41



Approximate Site Location

Excerpt from the draft *Geologic Map of the Puyallup 7.5-Minute Quadrangle, Washington*
By Troost, K.G. (in review)

Qal	Alluvium

Not to Scale

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Geologic Map

Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31,-32,-41

DocID: AGC.4thStSW.F	August 2022	Figure 4

Appendix A

Subsurface Explorations

GEORESOURCES
earth science & geotechnical engineering

LOG OF BORING

MW-1

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Notes: East side of site

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/Geoprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	Truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Depth (feet)	Elevation (feet)	Soil description
0	42	Topsoil
		Brown poorly graded snad with some silt (loose to medium dense, moist to wet) (SP-SM) (Weathered Alluvium)
2.5	40	Poorly graded SAND with some silt (SP-SM)
		Brown-grey SILT with trace sand (medium stiff, moist) (ML) (Alluvium)
5	37.5	Brown poorly graded SAND with some SILT (loose to medium dense, moist to wet) (SP-SM) (Alluvium)
7.5	35	Brown sandy SILT (medium stiff, wet) (ML) (Alluvium)
		Grey SILT, trace organics (stiff, moist) (ML) (Alluvium)
10	32.5	Brown silty SAND (medium dense, moist to wet) (SM) (Alluvium)
12.5	30	
15	27.5	*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil
Poorly graded sand with silt
Silt

Sheet 1 of 1	JOB:	FIG.

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LOG OF BORING

MW-2

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Notes: Southern portion of site

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/geoprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Depth (feet)	Elevation (feet)	Soil description
0	42	Topsoil
		Brown poorly graded SAND interbedded with thin silt layers (loose to medium dense, moist to wet) (SP-SM) (Weathered Alluvium)
2.5	40	Silty SAND (SM)
5	37.5	Brown sandy SILT (medium stiff, wet) (ML) (Alluvium)
7.5	35	Grey SILT with trace organics (stiff, moist) (ML) (Alluvium)
10	32.5	Brown silty SAND (medium dense, moist) (SM) (Alluvium)
12.5	30	Brown sandy SILT (medium stiff, wet) (Alluvium)
15	27.5	*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil
Poorly graded sand with silt
Silt
Silty sand

Sheet 1 of 1	JOB:	FIG.

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LOG OF BORING

MW-3

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Notes: Northern portion of site

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/Geoprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Depth (feet)	Elevation (feet)	Soil description
0	40	Topsoil
2.5	37.5	Brown sandy SILT (medium stiff, moist to wet) (ML) (Weathered Alluvium)
5	35	Brown poorly graded SAND with some SILT (loose to medium dense, moist to wet) (SP-SM) (Alluvium)
7.5	32.5	grey-blue SILT, trace organics (Stiff, moist) (ML) (Alluvium)
10	30	Brown-grey sandy silt (medium stiff, wet) (ML) (Alluvium)
12.5	27.5	
15		*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil
Poorly graded sand with silt
Silt
Silty sand

Sheet 1 of 1

JOB:

FIG.

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LOG OF BORING

MW-4

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/geprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Notes: Southwest portion of the Site

Depth (feet)	Elevation (feet)	Soil description
0	40	Topsoil
		Dark brown poorly graded SAND with some silt (loose to medium dense, moist to wet) (SP-SM) (Weathered Alluvium)
2.5	37.5	Brown poorly graded SAND with some silt (loose to medium dense, moist to wet) (SP-SM) (Alluvium)
		Brown sandy SILT (medium stiff, wet) (ML) (Alluvium)
5	35	Brown silty SAND (medium dense, moist, wet) (SM) (Alluvium)
7.5	32.5	Grey-blue SILT with trace organics, thin sand lenses (stiff, moist) (ML) (Alluvium)
10	30	
12.5	27.5	
15		*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil | Poorly graded sand with silt | Silt | Silty sand

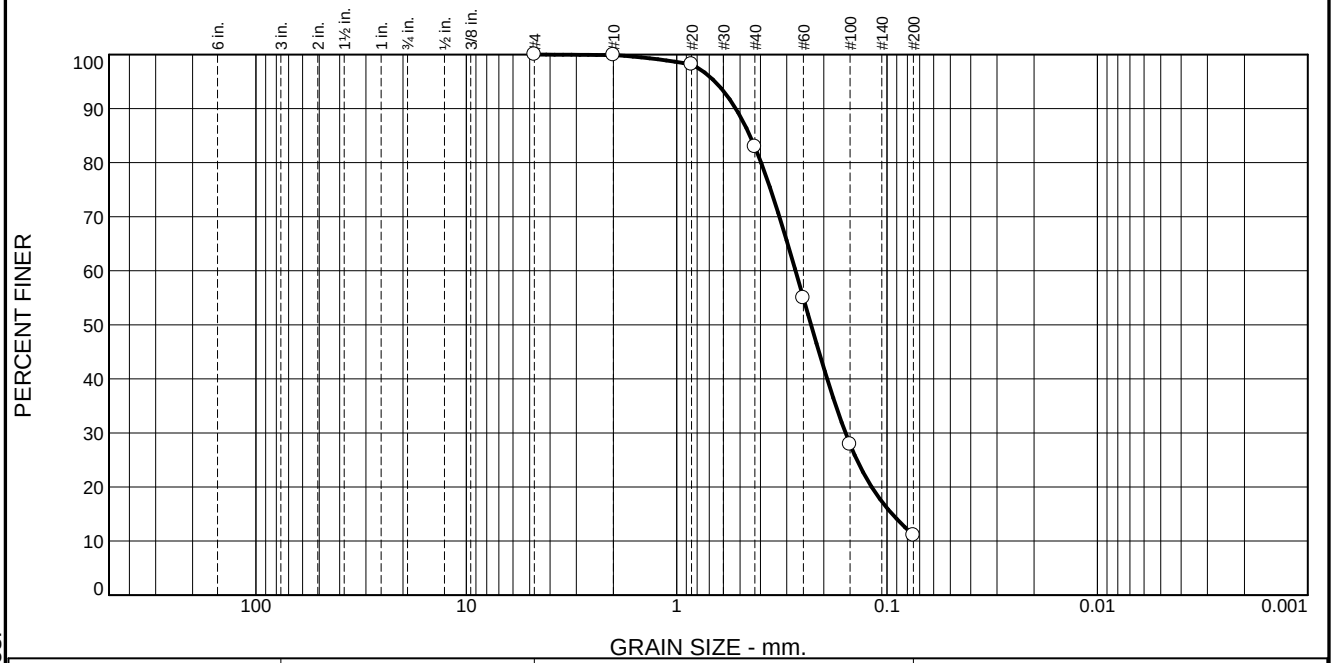
JOB:

FIG.

Appendix B

Laboratory results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	17.0	71.8	11.1	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	98.2		
#40	82.9		
#60	55.0		
#100	27.9		
#200	11.1		

* (no specification provided)

Material Description

Poorly graded SAND with some silt (SP-SM)

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.5235 D_{85}= 0.4483 D_{60}= 0.2724
D_{50}= 0.2297 D_{30}= 0.1576 D_{15}= 0.0946
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 15.7%

Date Received: 12/22/21 **Date Tested:** 12/28/21

Tested By: MAW

Checked By: STM

Title: PM

Source of Sample: B-1 **Depth:** 3 **Date Sampled:** 12/22/21

GeoResources, LLC

Fife, WA

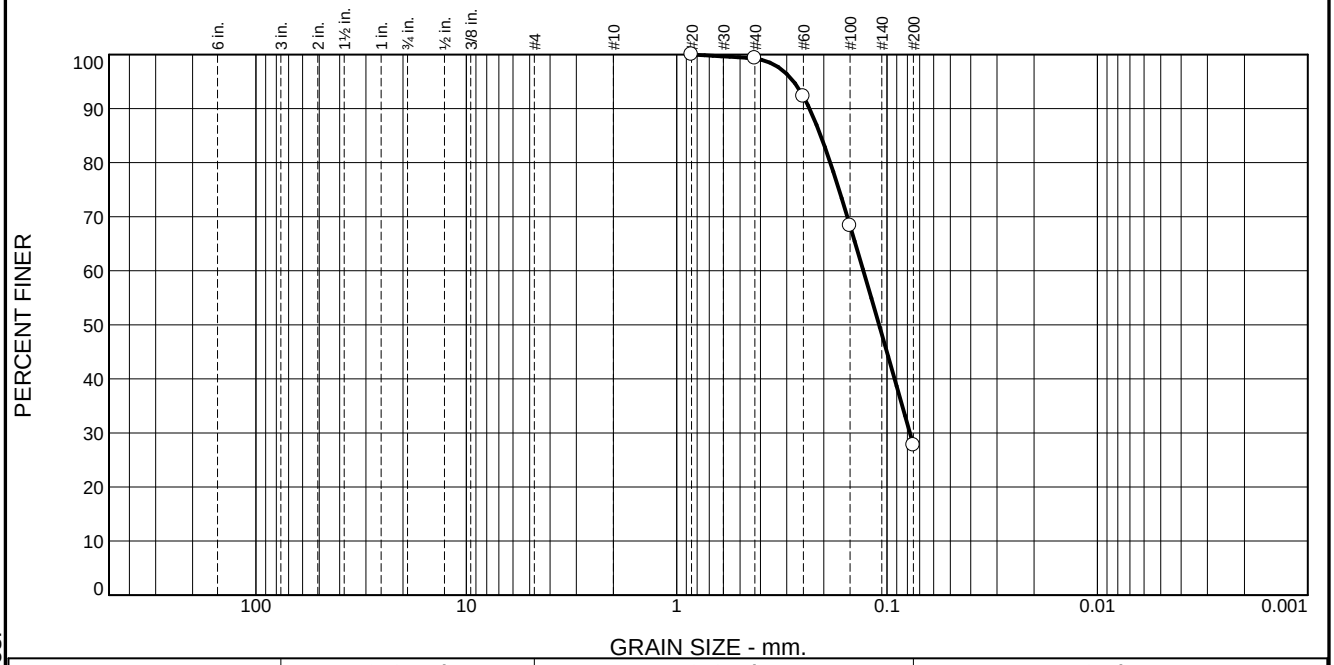
Client: Azure Green Consultants
Project: AGC.4thStSW

Project No: **Figure** B-1

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.7	71.6	27.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#20	100.0		
#40	99.3		
#60	92.2		
#100	68.3		
#200	27.7		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.2337 D_{85}= 0.2067 D_{60}= 0.1296
D_{50}= 0.1091 D_{30}= 0.0779 D_{15}=
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 31.5%

Date Received: 12/22/21 **Date Tested:** 12/28/21

Tested By: MAW

Checked By: STM

Title: PM

Source of Sample: B-2 **Depth:** 3

Date Sampled: 12/22/21

GeoResources, LLC

Fife, WA

Client: Azure Green Consultants
Project: AGC.4thStSW

Project No: **Figure** B-2

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ **Checked By:** _____

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September 27, 2022

Jody Miller Construction
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Tacoma, Washington 98448
(253) 405-1490
jody@jodymillerconstruction.com
CC: Azure Green Consultants

Soils Report Addendum:
Infiltration Testing
Proposed Redevelopment
204 – 4th Street Southwest
Puyallup, Washington
PN: 5745001631, -32, -41
Doc ID: JodyMillerConst.4thStSW.SRa

INTRODUCTION

This *Addendum* to our soils report summarizes the results of our in-situ infiltration testing performed at 204 – 4th Stret Southwest in Puyallup, Washington. The site consists of a three adjacent tax parcels.

On September 23, 2022, we performed two small-scale Pilot Infiltration Tests (PITs) in accordance with the 2019 Ecology Manual at two locations at the site. The location of our PITs is shown on Figure 1. Our PITs were performed at about 1.0 to 1.5 feet below existing grades in the silty sand which we had initially provided a preliminary design infiltration rate of 0.5 inches per hour based on grain size analysis in our *Soils Report* dated August 5, 2022. The exploration logs of our PITs are included in Appendix A.

During our PITs, we measured an infiltration rate of 8.0 inches per hour. Applying correction factors of 0.5 for test method, 0.3 for site variability and 0.9 for maintenance gives a design infiltration rate of 1.0 inch per hour. We over excavated the PIT and observed a restrictive layer at about 2.7 feet below existing grades. Groundwater was observed at 2.5 feet below existing grades in PIT-2. No groundwater was observed in PIT-1 during the over excavation.

LIMITATIONS

We have prepared this report for use by Jody Miller Construction, Azure Green Consultants, and other members of the design team, for use in the design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on our subsurface explorations, data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to

provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

◆ ◆ ◆

We have appreciated working for you on this project. Please do not hesitate to call at your earliest convenience if you have any questions or comments.

Respectfully submitted,
GeoResources, LLC

State of Washington
Engineering Geologist
3237
Licensed Geologist
9.27.22
Seth Taylor Mattos

Seth T. Mattos, LEG
Associate

Andrew Schnitger, EIT
Staff Engineer

AES:STM/aes
Doc ID: JodyMillerConst.4thStSW.SRa
Attachments: Figure 1: Site & Exploration Map
Appendix A – Subsurface Explorations

Notes:

An excerpt from the Pierce County Public GIS

Approximate location of PITs

Scale: Not to scale

North:

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Site & Exploration Map

Proposed Redevelopment

204 – 4th Street Southwest

Puyallup, Washington

PN: 57450016-31, -32, -41

Doc:ID: JodyMillerConst.4thStSW.Fa	September 2022	Figure 1

Appendix A

Subsurface Explorations

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More than 50% Retained on No. 200 Sieve	GRAVEL More than 50% Of Coarse Fraction Retained on No. 4 Sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More than 50% Of Coarse Fraction Passes No. 4 Sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% Passes No. 200 Sieve	SILT AND CLAY Liquid Limit Less than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY Liquid Limit 50 or more	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
2. Soil classification using laboratory tests is based on ASTM D2487-90.
3. Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

SOIL MOISTURE MODIFIERS:

Dry- Absence of moisture, dry to the touch

Moist- Damp, but no visible water

Wet- Visible free water or saturated, usually soil is obtained from below water table

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Unified Soils Classification System

Proposed Redevelopment
204 – 4th Street Southwest
Puyallup, Washington
PN: 57450016-31, -32, -41

Pilot Infiltration Test PIT-1

Location: North portion of site
Approximate Elevation: 42’

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Topsoil
0.5	-	2.7	SM	Brown silty SAND (loose, moist to wet)
2.7	-	4.0	SM	Gray, orange iron oxide stained silty SAND (loose to medium dense, moist)

PIT performed at 1.0 feet below existing grades.
Measured 8 inches per hour.
PIT overdug to 4.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Pilot Infiltration Test PIT-2

Location: East portion of site
Approximate Elevation: 42’

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Topsoil
0.5	-	2.7	SM	Brown to black poorly graded silty SAND (loose, moist to wet)
2.7	-	3.0	SM	Gray, orange iron oxide stained silty SAND (loose to medium dense, moist)

PIT performed at 1.5 feet below existing grades.
Measured 8 inches per hour.
PIT overdug to 3.0 feet below ground surface.
No caving observed at the time of excavation.
Static groundwater observed at 2.5 feet below existing grades during overdig.

Logged by: AES **Excavated on: September 23, 2022**

Appendix D

Construction Stormwater Pollution Prevention Plan (SWPPP)

Appendix E

Western Washington Hydrology Model 2012 Reports

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Bell Place
Site Name:	Bell Place
Site Address:	
City:	
Report Date:	9/18/2025
Gage:	38 IN CENTRAL
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year
Low Flow Threshold for POC2:	50 Percent of the 2 Year
High Flow Threshold for POC2:	50 Year

Landuse Basin Data
Predeveloped Land Use

AOB-ON

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.75
Pervious Total	0.75
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.75

Element Flows To:

Surface	Interflow	Groundwater

AOB-OFF

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.19
Pervious Total	0.19
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.19

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

AOB-ON

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.07
Pervious Total	0.07

Impervious Land Use	acre
ROADS FLAT	0.01
ROOF TOPS FLAT	0.63
SIDEWALKS FLAT	0.04
Impervious Total	0.68
Basin Total	0.75

Element Flows To:

Surface	Interflow	Groundwater

AOB-OFF

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.01
Pervious Total	0.01

Impervious Land Use	acre
ROADS FLAT	0.05
SIDEWALKS FLAT	0.13
Impervious Total	0.18
Basin Total	0.19

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault

Width: 20 ft.
Length: 438.156153358206 ft.
Depth: 7 ft.
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 0.33 in. Elevation:0 ft.
Orifice 2 Diameter: 0.66 in. Elevation:4.862 ft.
Orifice 3 Diameter: 1.25 in. Elevation:5.40541666666669 ft.
Element Flows To:
Outlet 1 Outlet 2

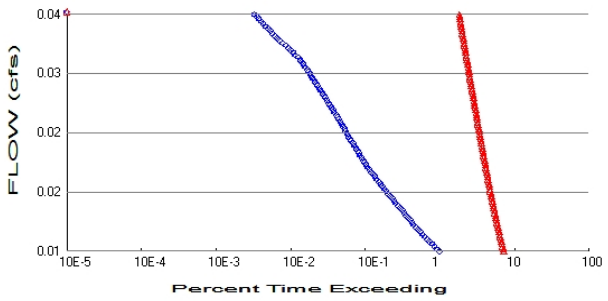
Vault Hydraulic Table

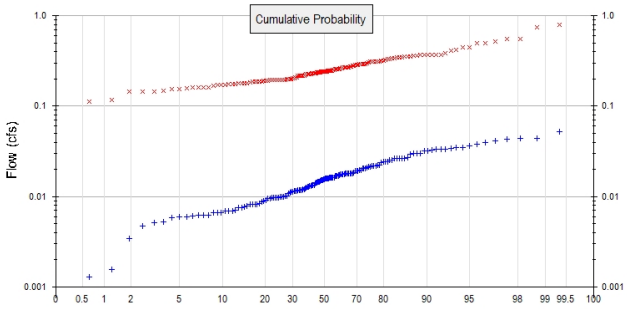
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.201	0.000	0.000	0.000
0.0778	0.201	0.015	0.000	0.000
0.1556	0.201	0.031	0.001	0.000
0.2333	0.201	0.046	0.001	0.000
0.3111	0.201	0.062	0.001	0.000
0.3889	0.201	0.078	0.001	0.000
0.4667	0.201	0.093	0.002	0.000
0.5444	0.201	0.109	0.002	0.000
0.6222	0.201	0.125	0.002	0.000
0.7000	0.201	0.140	0.002	0.000
0.7778	0.201	0.156	0.002	0.000
0.8556	0.201	0.172	0.002	0.000
0.9333	0.201	0.187	0.002	0.000
1.0111	0.201	0.203	0.003	0.000
1.0889	0.201	0.219	0.003	0.000
1.1667	0.201	0.234	0.003	0.000
1.2444	0.201	0.250	0.003	0.000
1.3222	0.201	0.266	0.003	0.000
1.4000	0.201	0.281	0.003	0.000
1.4778	0.201	0.297	0.003	0.000
1.5556	0.201	0.312	0.003	0.000
1.6333	0.201	0.328	0.003	0.000
1.7111	0.201	0.344	0.003	0.000
1.7889	0.201	0.359	0.004	0.000
1.8667	0.201	0.375	0.004	0.000
1.9444	0.201	0.391	0.004	0.000
2.0222	0.201	0.406	0.004	0.000
2.1000	0.201	0.422	0.004	0.000
2.1778	0.201	0.438	0.004	0.000
2.2556	0.201	0.453	0.004	0.000
2.3333	0.201	0.469	0.004	0.000
2.4111	0.201	0.485	0.004	0.000
2.4889	0.201	0.500	0.004	0.000
2.5667	0.201	0.516	0.004	0.000
2.6444	0.201	0.532	0.004	0.000
2.7222	0.201	0.547	0.004	0.000
2.8000	0.201	0.563	0.004	0.000
2.8778	0.201	0.578	0.005	0.000

2.9556	0.201	0.594	0.005	0.000
3.0333	0.201	0.610	0.005	0.000
3.1111	0.201	0.625	0.005	0.000
3.1889	0.201	0.641	0.005	0.000
3.2667	0.201	0.657	0.005	0.000
3.3444	0.201	0.672	0.005	0.000
3.4222	0.201	0.688	0.005	0.000
3.5000	0.201	0.704	0.005	0.000
3.5778	0.201	0.719	0.005	0.000
3.6556	0.201	0.735	0.005	0.000
3.7333	0.201	0.751	0.005	0.000
3.8111	0.201	0.766	0.005	0.000
3.8889	0.201	0.782	0.005	0.000
3.9667	0.201	0.798	0.005	0.000
4.0444	0.201	0.813	0.005	0.000
4.1222	0.201	0.829	0.006	0.000
4.2000	0.201	0.844	0.006	0.000
4.2778	0.201	0.860	0.006	0.000
4.3556	0.201	0.876	0.006	0.000
4.4333	0.201	0.891	0.006	0.000
4.5111	0.201	0.907	0.006	0.000
4.5889	0.201	0.923	0.006	0.000
4.6667	0.201	0.938	0.006	0.000
4.7444	0.201	0.954	0.006	0.000
4.8222	0.201	0.970	0.006	0.000
4.9000	0.201	0.985	0.008	0.000
4.9778	0.201	1.001	0.010	0.000
5.0556	0.201	1.017	0.011	0.000
5.1333	0.201	1.032	0.012	0.000
5.2111	0.201	1.048	0.013	0.000
5.2889	0.201	1.064	0.014	0.000
5.3667	0.201	1.079	0.015	0.000
5.4444	0.201	1.095	0.024	0.000
5.5222	0.201	1.110	0.031	0.000
5.6000	0.201	1.126	0.035	0.000
5.6778	0.201	1.142	0.039	0.000
5.7556	0.201	1.157	0.043	0.000
5.8333	0.201	1.173	0.046	0.000
5.9111	0.201	1.189	0.049	0.000
5.9889	0.201	1.204	0.052	0.000
6.0667	0.201	1.220	0.328	0.000
6.1444	0.201	1.236	0.926	0.000
6.2222	0.201	1.251	1.696	0.000
6.3000	0.201	1.267	2.563	0.000
6.3778	0.201	1.283	3.450	0.000
6.4556	0.201	1.298	4.282	0.000
6.5333	0.201	1.314	4.992	0.000
6.6111	0.201	1.330	5.538	0.000
6.6889	0.201	1.345	5.920	0.000
6.7667	0.201	1.361	6.278	0.000
6.8444	0.201	1.376	6.587	0.000
6.9222	0.201	1.392	6.882	0.000
7.0000	0.201	1.408	7.165	0.000
7.0778	0.201	1.423	7.437	0.000
7.1556	0.000	0.000	7.699	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.75
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.07
Total Impervious Area: 0.68

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.015805
5 year	0.024587
10 year	0.029359
25 year	0.034217
50 year	0.037104
100 year	0.039478

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.241097
5 year	0.324614
10 year	0.385458
25 year	0.468887
50 year	0.535957
100 year	0.60738

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1902	0.012	0.282
1903	0.010	0.313
1904	0.016	0.366
1905	0.008	0.160
1906	0.003	0.178
1907	0.024	0.243
1908	0.018	0.197
1909	0.018	0.241
1910	0.024	0.232
1911	0.016	0.262

1912	0.053	0.448
1913	0.025	0.187
1914	0.006	0.799
1915	0.010	0.162
1916	0.016	0.300
1917	0.005	0.113
1918	0.017	0.240
1919	0.012	0.149
1920	0.016	0.200
1921	0.018	0.171
1922	0.018	0.271
1923	0.014	0.187
1924	0.007	0.347
1925	0.008	0.146
1926	0.015	0.283
1927	0.010	0.231
1928	0.012	0.173
1929	0.025	0.346
1930	0.016	0.358
1931	0.015	0.174
1932	0.012	0.188
1933	0.011	0.185
1934	0.033	0.309
1935	0.015	0.158
1936	0.013	0.224
1937	0.021	0.330
1938	0.013	0.162
1939	0.001	0.203
1940	0.014	0.358
1941	0.007	0.354
1942	0.022	0.272
1943	0.011	0.266
1944	0.020	0.387
1945	0.018	0.289
1946	0.010	0.228
1947	0.006	0.174
1948	0.034	0.241
1949	0.029	0.369
1950	0.008	0.209
1951	0.010	0.316
1952	0.044	0.372
1953	0.040	0.342
1954	0.014	0.196
1955	0.012	0.180
1956	0.006	0.178
1957	0.020	0.194
1958	0.043	0.245
1959	0.026	0.247
1960	0.007	0.191
1961	0.027	0.551
1962	0.014	0.235
1963	0.007	0.173
1964	0.008	0.514
1965	0.030	0.229
1966	0.008	0.190
1967	0.013	0.271
1968	0.013	0.225
1969	0.013	0.203

1970	0.020	0.233
1971	0.032	0.227
1972	0.021	0.750
1973	0.027	0.424
1974	0.014	0.311
1975	0.034	0.332
1976	0.018	0.348
1977	0.006	0.146
1978	0.030	0.254
1979	0.008	0.260
1980	0.017	0.256
1981	0.016	0.240
1982	0.007	0.196
1983	0.027	0.269
1984	0.011	0.267
1985	0.018	0.308
1986	0.016	0.154
1987	0.030	0.266
1988	0.019	0.160
1989	0.017	0.146
1990	0.019	0.195
1991	0.015	0.292
1992	0.022	0.272
1993	0.021	0.311
1994	0.032	0.217
1995	0.006	0.167
1996	0.035	0.227
1997	0.013	0.201
1998	0.016	0.242
1999	0.001	0.257
2000	0.012	0.228
2001	0.006	0.181
2002	0.022	0.343
2003	0.019	0.194
2004	0.018	0.289
2005	0.032	0.553
2006	0.010	0.258
2007	0.010	0.292
2008	0.017	0.239
2009	0.012	0.181
2010	0.010	0.235
2011	0.008	0.245
2012	0.011	0.230
2013	0.009	0.219
2014	0.007	0.207
2015	0.013	0.363
2016	0.005	0.218
2017	0.024	0.352
2018	0.044	0.218
2019	0.041	0.323
2020	0.013	0.260
2021	0.022	0.218
2022	0.009	0.366
2023	0.018	0.450
2024	0.035	0.498
2025	0.016	0.234
2026	0.027	0.257
2027	0.010	0.287

2028	0.008	0.112
2029	0.018	0.187
2030	0.033	0.370
2031	0.011	0.117
2032	0.006	0.197
2033	0.010	0.247
2034	0.010	0.193
2035	0.038	0.245
2036	0.020	0.193
2037	0.005	0.260
2038	0.016	0.253
2039	0.002	0.495
2040	0.009	0.196
2041	0.012	0.248
2042	0.037	0.284
2043	0.018	0.314
2044	0.024	0.218
2045	0.016	0.176
2046	0.019	0.195
2047	0.014	0.239
2048	0.018	0.197
2049	0.016	0.292
2050	0.012	0.221
2051	0.017	0.316
2052	0.010	0.234
2053	0.017	0.199
2054	0.022	0.411
2055	0.007	0.242
2056	0.008	0.313
2057	0.012	0.153
2058	0.015	0.294
2059	0.027	0.366

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0526	0.7987
2	0.0443	0.7500
3	0.0443	0.5526
4	0.0428	0.5508
5	0.0413	0.5141
6	0.0400	0.4985
7	0.0377	0.4954
8	0.0367	0.4497
9	0.0347	0.4483
10	0.0347	0.4241
11	0.0340	0.4111
12	0.0337	0.3867
13	0.0334	0.3720
14	0.0331	0.3695
15	0.0325	0.3693
16	0.0321	0.3664
17	0.0317	0.3663
18	0.0302	0.3657
19	0.0300	0.3627
20	0.0298	0.3583
21	0.0291	0.3576
22	0.0267	0.3537

23	0.0266	0.3518
24	0.0266	0.3480
25	0.0266	0.3474
26	0.0265	0.3464
27	0.0264	0.3429
28	0.0252	0.3419
29	0.0251	0.3318
30	0.0245	0.3299
31	0.0244	0.3228
32	0.0243	0.3158
33	0.0239	0.3155
34	0.0221	0.3139
35	0.0220	0.3127
36	0.0219	0.3126
37	0.0218	0.3113
38	0.0217	0.3107
39	0.0213	0.3089
40	0.0211	0.3076
41	0.0208	0.3003
42	0.0205	0.2938
43	0.0204	0.2924
44	0.0204	0.2922
45	0.0196	0.2916
46	0.0195	0.2895
47	0.0192	0.2886
48	0.0191	0.2868
49	0.0191	0.2838
50	0.0184	0.2827
51	0.0182	0.2819
52	0.0181	0.2723
53	0.0180	0.2723
54	0.0180	0.2710
55	0.0180	0.2707
56	0.0180	0.2687
57	0.0178	0.2672
58	0.0178	0.2663
59	0.0177	0.2659
60	0.0176	0.2623
61	0.0176	0.2604
62	0.0174	0.2596
63	0.0172	0.2596
64	0.0170	0.2583
65	0.0169	0.2575
66	0.0169	0.2567
67	0.0168	0.2563
68	0.0163	0.2540
69	0.0163	0.2535
70	0.0163	0.2485
71	0.0162	0.2469
72	0.0161	0.2466
73	0.0161	0.2453
74	0.0160	0.2452
75	0.0159	0.2450
76	0.0158	0.2432
77	0.0158	0.2419
78	0.0158	0.2416
79	0.0156	0.2410
80	0.0154	0.2406

81	0.0153	0.2403
82	0.0152	0.2401
83	0.0151	0.2393
84	0.0149	0.2388
85	0.0145	0.2347
86	0.0144	0.2346
87	0.0144	0.2342
88	0.0144	0.2340
89	0.0143	0.2333
90	0.0140	0.2320
91	0.0135	0.2305
92	0.0134	0.2299
93	0.0133	0.2291
94	0.0130	0.2285
95	0.0130	0.2276
96	0.0130	0.2271
97	0.0128	0.2265
98	0.0128	0.2245
99	0.0125	0.2245
100	0.0123	0.2210
101	0.0121	0.2189
102	0.0120	0.2179
103	0.0118	0.2177
104	0.0117	0.2176
105	0.0117	0.2175
106	0.0117	0.2170
107	0.0116	0.2087
108	0.0115	0.2074
109	0.0115	0.2034
110	0.0113	0.2030
111	0.0112	0.2011
112	0.0110	0.1998
113	0.0108	0.1992
114	0.0102	0.1973
115	0.0102	0.1970
116	0.0099	0.1966
117	0.0099	0.1963
118	0.0098	0.1959
119	0.0098	0.1956
120	0.0098	0.1954
121	0.0097	0.1947
122	0.0097	0.1942
123	0.0096	0.1938
124	0.0096	0.1933
125	0.0095	0.1931
126	0.0091	0.1906
127	0.0090	0.1899
128	0.0087	0.1879
129	0.0083	0.1872
130	0.0083	0.1868
131	0.0083	0.1865
132	0.0082	0.1855
133	0.0082	0.1814
134	0.0079	0.1810
135	0.0077	0.1804
136	0.0076	0.1779
137	0.0075	0.1775
138	0.0070	0.1765

139	0.0069	0.1744
140	0.0069	0.1738
141	0.0068	0.1730
142	0.0067	0.1730
143	0.0066	0.1709
144	0.0066	0.1671
145	0.0062	0.1621
146	0.0062	0.1620
147	0.0062	0.1601
148	0.0061	0.1597
149	0.0060	0.1585
150	0.0060	0.1539
151	0.0058	0.1535
152	0.0053	0.1489
153	0.0051	0.1464
154	0.0047	0.1462
155	0.0034	0.1459
156	0.0016	0.1169
157	0.0013	0.1133
158	0.0008	0.1122

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0079	54282	398885	734	Fail
0.0082	50160	391184	779	Fail
0.0085	46564	383649	823	Fail
0.0088	43312	376337	868	Fail
0.0091	40260	369467	917	Fail
0.0094	37451	362708	968	Fail
0.0097	34902	356337	1020	Fail
0.0100	32553	350187	1075	Fail
0.0103	30332	344093	1134	Fail
0.0106	28310	338276	1194	Fail
0.0109	26432	332570	1258	Fail
0.0111	24819	327196	1318	Fail
0.0114	23296	321656	1380	Fail
0.0117	21950	316448	1441	Fail
0.0120	20637	311352	1508	Fail
0.0123	19440	306421	1576	Fail
0.0126	18282	301435	1648	Fail
0.0129	17241	296892	1722	Fail
0.0132	16160	292405	1809	Fail
0.0135	15158	288083	1900	Fail
0.0138	14271	283596	1987	Fail
0.0141	13462	279496	2076	Fail
0.0144	12665	275175	2172	Fail
0.0147	11950	271242	2269	Fail
0.0150	11241	267253	2377	Fail
0.0153	10582	263319	2488	Fail
0.0156	9972	259552	2602	Fail
0.0159	9385	255896	2726	Fail
0.0162	8847	252184	2850	Fail
0.0165	8338	248693	2982	Fail
0.0168	7856	245148	3120	Fail
0.0170	7462	241768	3239	Fail
0.0173	7030	238334	3390	Fail
0.0176	6620	235120	3551	Fail
0.0179	6271	231741	3695	Fail
0.0182	5978	228528	3822	Fail
0.0185	5701	225370	3953	Fail
0.0188	5444	222434	4085	Fail
0.0191	5197	219331	4220	Fail
0.0194	4946	216395	4375	Fail
0.0197	4703	213403	4537	Fail
0.0200	4515	210578	4663	Fail
0.0203	4334	207752	4793	Fail
0.0206	4159	205093	4931	Fail
0.0209	3956	202379	5115	Fail
0.0212	3770	199719	5297	Fail
0.0215	3577	197060	5509	Fail
0.0218	3416	194512	5694	Fail
0.0221	3259	191908	5888	Fail
0.0224	3135	189415	6041	Fail
0.0227	3026	186866	6175	Fail
0.0229	2928	184540	6302	Fail
0.0232	2813	182102	6473	Fail
0.0235	2683	179830	6702	Fail

0.0238	2555	177393	6942	Fail
0.0241	2452	175177	7144	Fail
0.0244	2358	172961	7335	Fail
0.0247	2256	170745	7568	Fail
0.0250	2139	168584	7881	Fail
0.0253	2040	166424	8158	Fail
0.0256	1952	164263	8415	Fail
0.0259	1860	162213	8721	Fail
0.0262	1777	160108	9010	Fail
0.0265	1691	158113	9350	Fail
0.0268	1618	156119	9648	Fail
0.0271	1561	154125	9873	Fail
0.0274	1482	152186	10268	Fail
0.0277	1407	150247	10678	Fail
0.0280	1338	148308	11084	Fail
0.0283	1270	146479	11533	Fail
0.0286	1217	144596	11881	Fail
0.0288	1163	142878	12285	Fail
0.0291	1105	140995	12759	Fail
0.0294	1055	139222	13196	Fail
0.0297	1007	137449	13649	Fail
0.0300	964	135732	14080	Fail
0.0303	920	134070	14572	Fail
0.0306	872	132297	15171	Fail
0.0309	815	130746	16042	Fail
0.0312	774	129139	16684	Fail
0.0315	738	127532	17280	Fail
0.0318	694	125870	18136	Fail
0.0321	637	124319	19516	Fail
0.0324	601	122712	20417	Fail
0.0327	556	121217	21801	Fail
0.0330	517	119665	23146	Fail
0.0333	478	118170	24721	Fail
0.0336	434	116618	26870	Fail
0.0339	394	115289	29261	Fail
0.0342	363	113848	31363	Fail
0.0344	340	112463	33077	Fail
0.0347	310	111078	35831	Fail
0.0350	297	109693	36933	Fail
0.0353	273	108419	39713	Fail
0.0356	252	107089	42495	Fail
0.0359	237	105760	44624	Fail
0.0362	223	104596	46904	Fail
0.0365	206	103267	50129	Fail
0.0368	195	101993	52304	Fail
0.0371	180	100718	55954	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality

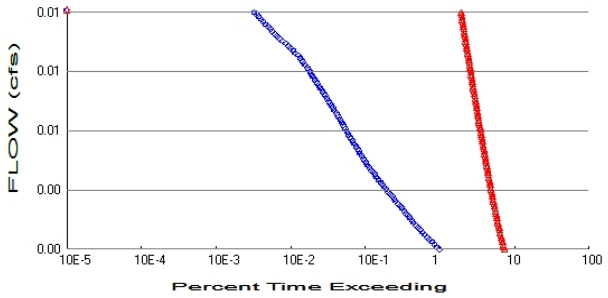
Water Quality BMP Flow and Volume for POC #1

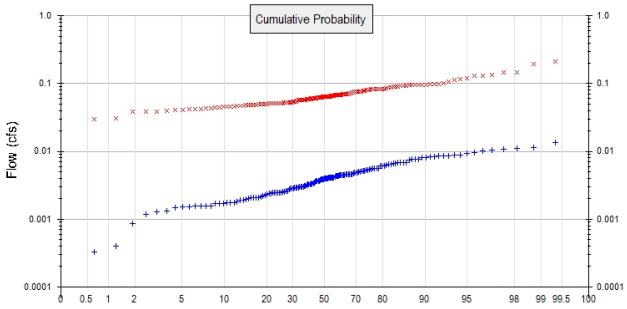
On-line facility volume:	0.0156 acre-feet
On-line facility target flow:	0.0206 cfs.
Adjusted for 15 min:	0.0206 cfs.
Off-line facility target flow:	0.0874 cfs.
Adjusted for 15 min:	0.0874 cfs.

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
Total Volume Infiltrated		0.00	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

POC 2





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #2
Total Pervious Area: 0.19
Total Impervious Area: 0

Mitigated Landuse Totals for POC #2
Total Pervious Area: 0.01
Total Impervious Area: 0.18

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	**Flow(cfs)**
2 year	0.004004
5 year	0.006229
10 year	0.007438
25 year	0.008668
50 year	0.0094
100 year	0.010001

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	0.063477
5 year	0.085344
10 year	0.101257
25 year	0.123058
50 year	0.140569
100 year	0.159207

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	**Predeveloped**	**Mitigated**
1902	0.003	0.075
1903	0.002	0.083
1904	0.004	0.095
1905	0.002	0.042
1906	0.001	0.047
1907	0.006	0.064
1908	0.005	0.052
1909	0.005	0.064
1910	0.006	0.061
1911	0.004	0.069
1912	0.013	0.116

1913	0.006	0.049
1914	0.002	0.209
1915	0.003	0.043
1916	0.004	0.079
1917	0.001	0.030
1918	0.004	0.064
1919	0.003	0.039
1920	0.004	0.052
1921	0.005	0.045
1922	0.005	0.071
1923	0.004	0.049
1924	0.002	0.092
1925	0.002	0.039
1926	0.004	0.075
1927	0.003	0.061
1928	0.003	0.046
1929	0.006	0.091
1930	0.004	0.095
1931	0.004	0.046
1932	0.003	0.049
1933	0.003	0.049
1934	0.008	0.081
1935	0.004	0.042
1936	0.003	0.059
1937	0.005	0.087
1938	0.003	0.043
1939	0.000	0.054
1940	0.004	0.095
1941	0.002	0.094
1942	0.005	0.071
1943	0.003	0.070
1944	0.005	0.101
1945	0.005	0.076
1946	0.002	0.060
1947	0.002	0.046
1948	0.009	0.064
1949	0.007	0.098
1950	0.002	0.055
1951	0.003	0.084
1952	0.011	0.096
1953	0.010	0.089
1954	0.004	0.052
1955	0.003	0.048
1956	0.001	0.047
1957	0.005	0.051
1958	0.011	0.064
1959	0.007	0.064
1960	0.002	0.050
1961	0.007	0.145
1962	0.004	0.062
1963	0.002	0.046
1964	0.002	0.135
1965	0.008	0.060
1966	0.002	0.050
1967	0.003	0.071
1968	0.003	0.059
1969	0.003	0.053
1970	0.005	0.061

1971	0.008	0.059
1972	0.005	0.196
1973	0.007	0.112
1974	0.004	0.082
1975	0.009	0.086
1976	0.005	0.091
1977	0.002	0.039
1978	0.008	0.066
1979	0.002	0.069
1980	0.004	0.067
1981	0.004	0.063
1982	0.002	0.052
1983	0.007	0.070
1984	0.003	0.070
1985	0.004	0.080
1986	0.004	0.040
1987	0.008	0.070
1988	0.005	0.042
1989	0.004	0.039
1990	0.005	0.051
1991	0.004	0.077
1992	0.006	0.072
1993	0.005	0.082
1994	0.008	0.057
1995	0.002	0.044
1996	0.009	0.059
1997	0.003	0.053
1998	0.004	0.063
1999	0.000	0.068
2000	0.003	0.060
2001	0.002	0.048
2002	0.006	0.089
2003	0.005	0.051
2004	0.004	0.076
2005	0.008	0.146
2006	0.002	0.068
2007	0.002	0.077
2008	0.004	0.063
2009	0.003	0.048
2010	0.002	0.062
2011	0.002	0.065
2012	0.003	0.061
2013	0.002	0.057
2014	0.002	0.055
2015	0.003	0.094
2016	0.001	0.058
2017	0.006	0.093
2018	0.011	0.057
2019	0.010	0.084
2020	0.003	0.068
2021	0.006	0.057
2022	0.002	0.097
2023	0.005	0.119
2024	0.009	0.130
2025	0.004	0.062
2026	0.007	0.068
2027	0.002	0.076
2028	0.002	0.030

2029	0.005	0.049
2030	0.008	0.098
2031	0.003	0.031
2032	0.002	0.052
2033	0.002	0.065
2034	0.002	0.051
2035	0.010	0.064
2036	0.005	0.051
2037	0.001	0.069
2038	0.004	0.066
2039	0.000	0.131
2040	0.002	0.052
2041	0.003	0.065
2042	0.009	0.075
2043	0.004	0.083
2044	0.006	0.057
2045	0.004	0.046
2046	0.005	0.051
2047	0.004	0.063
2048	0.005	0.052
2049	0.004	0.077
2050	0.003	0.058
2051	0.004	0.082
2052	0.002	0.062
2053	0.004	0.053
2054	0.006	0.107
2055	0.002	0.064
2056	0.002	0.083
2057	0.003	0.041
2058	0.004	0.078
2059	0.007	0.097

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	0.0133	0.2094
2	0.0112	0.1961
3	0.0112	0.1459
4	0.0108	0.1447
5	0.0105	0.1345
6	0.0101	0.1311
7	0.0096	0.1298
8	0.0093	0.1190
9	0.0088	0.1161
10	0.0088	0.1122
11	0.0086	0.1069
12	0.0085	0.1014
13	0.0085	0.0978
14	0.0084	0.0977
15	0.0082	0.0970
16	0.0081	0.0967
17	0.0080	0.0962
18	0.0076	0.0953
19	0.0076	0.0948
20	0.0075	0.0946
21	0.0074	0.0943
22	0.0068	0.0936
23	0.0067	0.0929

24	0.0067	0.0919
25	0.0067	0.0910
26	0.0067	0.0909
27	0.0067	0.0890
28	0.0064	0.0888
29	0.0064	0.0873
30	0.0062	0.0860
31	0.0062	0.0839
32	0.0061	0.0836
33	0.0061	0.0831
34	0.0056	0.0827
35	0.0056	0.0827
36	0.0056	0.0824
37	0.0055	0.0824
38	0.0055	0.0818
39	0.0054	0.0806
40	0.0054	0.0803
41	0.0053	0.0795
42	0.0052	0.0778
43	0.0052	0.0774
44	0.0052	0.0769
45	0.0050	0.0765
46	0.0049	0.0764
47	0.0049	0.0762
48	0.0048	0.0759
49	0.0048	0.0751
50	0.0047	0.0748
51	0.0046	0.0746
52	0.0046	0.0721
53	0.0046	0.0713
54	0.0046	0.0708
55	0.0046	0.0708
56	0.0046	0.0705
57	0.0045	0.0704
58	0.0045	0.0701
59	0.0045	0.0701
60	0.0045	0.0689
61	0.0045	0.0687
62	0.0044	0.0685
63	0.0044	0.0683
64	0.0043	0.0681
65	0.0043	0.0680
66	0.0043	0.0680
67	0.0043	0.0671
68	0.0041	0.0662
69	0.0041	0.0661
70	0.0041	0.0655
71	0.0041	0.0653
72	0.0041	0.0648
73	0.0041	0.0644
74	0.0040	0.0641
75	0.0040	0.0640
76	0.0040	0.0640
77	0.0040	0.0637
78	0.0040	0.0636
79	0.0040	0.0636
80	0.0039	0.0635
81	0.0039	0.0634

82	0.0039	0.0633
83	0.0038	0.0632
84	0.0038	0.0631
85	0.0037	0.0620
86	0.0037	0.0619
87	0.0036	0.0619
88	0.0036	0.0619
89	0.0036	0.0612
90	0.0036	0.0611
91	0.0034	0.0610
92	0.0034	0.0605
93	0.0034	0.0601
94	0.0033	0.0601
95	0.0033	0.0596
96	0.0033	0.0594
97	0.0032	0.0593
98	0.0032	0.0592
99	0.0032	0.0591
100	0.0031	0.0581
101	0.0031	0.0577
102	0.0030	0.0574
103	0.0030	0.0573
104	0.0030	0.0571
105	0.0030	0.0567
106	0.0030	0.0566
107	0.0029	0.0552
108	0.0029	0.0549
109	0.0029	0.0538
110	0.0029	0.0534
111	0.0028	0.0529
112	0.0028	0.0527
113	0.0027	0.0524
114	0.0026	0.0521
115	0.0026	0.0520
116	0.0025	0.0519
117	0.0025	0.0517
118	0.0025	0.0517
119	0.0025	0.0515
120	0.0025	0.0515
121	0.0025	0.0512
122	0.0024	0.0512
123	0.0024	0.0511
124	0.0024	0.0511
125	0.0024	0.0511
126	0.0023	0.0503
127	0.0023	0.0501
128	0.0022	0.0495
129	0.0021	0.0493
130	0.0021	0.0492
131	0.0021	0.0490
132	0.0021	0.0489
133	0.0021	0.0480
134	0.0020	0.0479
135	0.0019	0.0478
136	0.0019	0.0471
137	0.0019	0.0470
138	0.0018	0.0465
139	0.0017	0.0461

140	0.0017	0.0458
141	0.0017	0.0458
142	0.0017	0.0455
143	0.0017	0.0449
144	0.0017	0.0440
145	0.0016	0.0428
146	0.0016	0.0427
147	0.0016	0.0422
148	0.0015	0.0421
149	0.0015	0.0420
150	0.0015	0.0406
151	0.0015	0.0404
152	0.0013	0.0392
153	0.0013	0.0386
154	0.0012	0.0386
155	0.0009	0.0385
156	0.0004	0.0308
157	0.0003	0.0300
158	0.0002	0.0297

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0020	54265	403871	744	Fail
0.0021	50187	396170	789	Fail
0.0022	46586	388802	834	Fail
0.0022	43312	381600	881	Fail
0.0023	40287	374785	930	Fail
0.0024	37462	368193	982	Fail
0.0025	34919	361877	1036	Fail
0.0025	32553	355617	1092	Fail
0.0026	30337	349744	1152	Fail
0.0027	28265	343761	1216	Fail
0.0027	26432	338221	1279	Fail
0.0028	24781	332792	1342	Fail
0.0029	23296	327639	1406	Fail
0.0030	21928	322432	1470	Fail
0.0030	20631	317279	1537	Fail
0.0031	19429	312404	1607	Fail
0.0032	18288	307640	1682	Fail
0.0033	17219	302875	1758	Fail
0.0033	16149	298277	1847	Fail
0.0034	15147	294122	1941	Fail
0.0035	14271	289856	2031	Fail
0.0036	13446	285590	2123	Fail
0.0036	12654	281491	2224	Fail
0.0037	11939	277446	2323	Fail
0.0038	11235	273568	2434	Fail
0.0039	10559	269690	2554	Fail
0.0039	9972	265923	2666	Fail
0.0040	9374	262156	2796	Fail
0.0041	8842	258555	2924	Fail
0.0042	8332	255009	3060	Fail
0.0042	7861	251630	3200	Fail
0.0043	7462	248195	3326	Fail
0.0044	7025	244871	3485	Fail
0.0045	6609	241547	3654	Fail
0.0045	6271	238444	3802	Fail
0.0046	5978	235176	3934	Fail
0.0047	5701	231962	4068	Fail
0.0048	5437	228971	4211	Fail
0.0048	5197	225924	4347	Fail
0.0049	4941	222988	4513	Fail
0.0050	4702	219996	4678	Fail
0.0051	4513	217171	4812	Fail
0.0051	4334	214345	4945	Fail
0.0052	4153	211630	5095	Fail
0.0053	3956	208860	5279	Fail
0.0054	3764	206257	5479	Fail
0.0054	3577	203653	5693	Fail
0.0055	3411	201104	5895	Fail
0.0056	3263	198556	6085	Fail
0.0057	3134	196063	6255	Fail
0.0057	3026	193570	6396	Fail
0.0058	2924	191077	6534	Fail
0.0059	2814	188695	6705	Fail
0.0060	2682	186368	6948	Fail

0.0060	2555	184041	7203	Fail
0.0061	2451	181714	7413	Fail
0.0062	2359	179498	7609	Fail
0.0063	2256	177337	7860	Fail
0.0063	2139	175121	8187	Fail
0.0064	2038	172961	8486	Fail
0.0065	1952	170856	8752	Fail
0.0066	1859	168750	9077	Fail
0.0066	1777	166590	9374	Fail
0.0067	1689	164651	9748	Fail
0.0068	1619	162656	10046	Fail
0.0069	1561	160662	10292	Fail
0.0069	1482	158612	10702	Fail
0.0070	1407	156784	11143	Fail
0.0071	1338	154900	11576	Fail
0.0072	1270	152961	12044	Fail
0.0072	1217	151133	12418	Fail
0.0073	1163	149249	12833	Fail
0.0074	1103	147532	13375	Fail
0.0075	1055	145704	13810	Fail
0.0075	1006	143931	14307	Fail
0.0076	963	142213	14767	Fail
0.0077	919	140441	15281	Fail
0.0078	872	138723	15908	Fail
0.0078	814	137061	16837	Fail
0.0079	772	135399	17538	Fail
0.0080	737	133793	18153	Fail
0.0081	694	132186	19046	Fail
0.0081	636	130635	20540	Fail
0.0082	601	129083	21478	Fail
0.0083	553	127532	23061	Fail
0.0084	517	125981	24367	Fail
0.0084	477	124430	26085	Fail
0.0085	433	122879	28378	Fail
0.0086	394	121438	30821	Fail
0.0087	363	119942	33041	Fail
0.0087	339	118557	34972	Fail
0.0088	310	117117	37779	Fail
0.0089	295	115677	39212	Fail
0.0090	273	114347	41885	Fail
0.0090	252	113017	44848	Fail
0.0091	237	111688	47125	Fail
0.0092	223	110358	49487	Fail
0.0093	206	109084	52953	Fail
0.0093	194	107865	55600	Fail
0.0094	179	106591	59548	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality

Water Quality BMP Flow and Volume for POC #2

On-line facility volume:	0.0156 acre-feet
On-line facility target flow:	0.0206 cfs.
Adjusted for 15 min:	0.0206 cfs.
Off-line facility target flow:	0.0118 cfs.
Adjusted for 15 min:	0.0118 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
Total Volume Infiltrated		0.00	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

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic

Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 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   Bell Place.wdm
MESSU       25   PreBell Place.MES
            27   PreBell Place.L61
            28   PreBell Place.L62
            30   POCBell Place1.dat
            31   POCBell Place2.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      COPY       501
      COPY       502
      DISPLY       1
      DISPLY       2
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        AOB-ON                    MAX                    1    2   30    9
    2        AOB-OFF                   MAX                    1    2   31    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10               0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                 ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10            0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   10              0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

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

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

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

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

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

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

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

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
AOB-ON***
PERLND  10                        0.75     COPY   501     12
PERLND  10                        0.75     COPY   501     13
AOB-OFF***
PERLND  10                        0.19     COPY   502     12
PERLND  10                        0.19     COPY   502     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
COPY   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     INPUT  TIMSER 1



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

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

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

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

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

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

SPEC-ACTIONS
```

```
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              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
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    502 FLOW     ENGL      REPL
END EXT TARGETS

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

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 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   Bell Place.wdm
MESSU       25   MitBell Place.MES
            27   MitBell Place.L61
            28   MitBell Place.L62
            30   POCBell Place1.dat
            31   POCBell Place2.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      16
      IMPLND       1
      IMPLND       4
      IMPLND       8
      RCHRES       1
      COPY       501
      COPY       502
      DISPLY       1
      DISPLY       2
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        AOB-ON                    MAX                    1    2   30    9
    2        AOB-OFF                   MAX                    1    2   31    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

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

```
 16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16            0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
   16              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                    in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         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   ***
    1         0    0    1    0    0    0
    4         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    *********
    1         0    0    4    0    0    0    1    9
    4         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     ***
    1         0    0    0    0    0
    4         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
    1            400      0.01       0.1       0.1
    4            400      0.01       0.1       0.1
    8            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    4              0         0
    8              0         0
  END IWAT-PARM3

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

END IMPLND

SCHEMATIC
<-Source->                <--Area-->     <-Target->   MBLK   ***
<Name>   #                <-factor->     <Name>   #   Tbl#   ***
AOB-ON***
PERLND  16                     0.07     COPY   501     12
PERLND  16                     0.07     COPY   501     13
IMPLND   1                     0.01     COPY   501     15
IMPLND   4                     0.63     COPY   501     15
IMPLND   8                     0.04     COPY   501     15
AOB-OFF***
PERLND  16                     0.01     COPY   502     12
PERLND  16                     0.01     COPY   502     13
IMPLND   1                     0.05     COPY   502     15
IMPLND   8                     0.13     COPY   502     15

******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
COPY   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     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   28    0    1
  END GEN-INFO
  *** Section RCHRES***
```

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50        ***
  <------><--------><--------><--------><--------><--------><--------><--------> ***
    1              1      0.08       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
           *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0        4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   92    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.201174  0.000000  0.000000
  0.077778  0.201174  0.015647  0.000824
  0.155556  0.201174  0.031294  0.001166
  0.233333  0.201174  0.046941  0.001427
  0.311111  0.201174  0.062587  0.001648
  0.388889  0.201174  0.078234  0.001843
  0.466667  0.201174  0.093881  0.002019
  0.544444  0.201174  0.109528  0.002181
  0.622222  0.201174  0.125175  0.002331
  0.700000  0.201174  0.140822  0.002472
  0.777778  0.201174  0.156468  0.002606
  0.855556  0.201174  0.172115  0.002733
  0.933333  0.201174  0.187762  0.002855
  1.011111  0.201174  0.203409  0.002972
  1.088889  0.201174  0.219056  0.003084
  1.166667  0.201174  0.234703  0.003192
  1.244444  0.201174  0.250349  0.003297
  1.322222  0.201174  0.265996  0.003398
  1.400000  0.201174  0.281643  0.003497
  1.477778  0.201174  0.297290  0.003592
  1.555556  0.201174  0.312937  0.003686
  1.633333  0.201174  0.328584  0.003777
  1.711111  0.201174  0.344230  0.003866
  1.788889  0.201174  0.359877  0.003953
  1.866667  0.201174  0.375524  0.004038
  1.944444  0.201174  0.391171  0.004121
  2.022222  0.201174  0.406818  0.004202
  2.100000  0.201174  0.422465  0.004282
```

```
  2.177778  0.201174  0.438111  0.004361
  2.255556  0.201174  0.453758  0.004438
  2.333333  0.201174  0.469405  0.004514
  2.411111  0.201174  0.485052  0.004589
  2.488889  0.201174  0.500699  0.004662
  2.566667  0.201174  0.516346  0.004734
  2.644444  0.201174  0.531992  0.004806
  2.722222  0.201174  0.547639  0.004876
  2.800000  0.201174  0.563286  0.004945
  2.877778  0.201174  0.578933  0.005013
  2.955556  0.201174  0.594580  0.005080
  3.033333  0.201174  0.610227  0.005147
  3.111111  0.201174  0.625873  0.005212
  3.188889  0.201174  0.641520  0.005277
  3.266667  0.201174  0.657167  0.005341
  3.344444  0.201174  0.672814  0.005404
  3.422222  0.201174  0.688461  0.005467
  3.500000  0.201174  0.704108  0.005529
  3.577778  0.201174  0.719755  0.005590
  3.655556  0.201174  0.735401  0.005650
  3.733333  0.201174  0.751048  0.005710
  3.811111  0.201174  0.766695  0.005769
  3.888889  0.201174  0.782342  0.005828
  3.966667  0.201174  0.797989  0.005886
  4.044444  0.201174  0.813636  0.005943
  4.122222  0.201174  0.829282  0.006000
  4.200000  0.201174  0.844929  0.006056
  4.277778  0.201174  0.860576  0.006112
  4.355556  0.201174  0.876223  0.006167
  4.433333  0.201174  0.891870  0.006222
  4.511111  0.201174  0.907517  0.006277
  4.588889  0.201174  0.923163  0.006331
  4.666667  0.201174  0.938810  0.006384
  4.744444  0.201174  0.954457  0.006437
  4.822222  0.201174  0.970104  0.006489
  4.900000  0.201174  0.985751  0.008846
  4.977778  0.201174  1.001398  0.010615
  5.055556  0.201174  1.017044  0.011845
  5.133333  0.201174  1.032691  0.012853
  5.211111  0.201174  1.048338  0.013730
  5.288889  0.201174  1.063985  0.014520
  5.366667  0.201174  1.079632  0.015244
  5.444444  0.201174  1.095279  0.024293
  5.522222  0.201174  1.110925  0.031041
  5.600000  0.201174  1.126572  0.035852
  5.677778  0.201174  1.142219  0.039847
  5.755556  0.201174  1.157866  0.043354
  5.833333  0.201174  1.173513  0.046525
  5.911111  0.201174  1.189160  0.049445
  5.988889  0.201174  1.204806  0.052169
  6.066667  0.201174  1.220453  0.328428
  6.144444  0.201174  1.236100  0.926154
  6.222222  0.201174  1.251747  1.696424
  6.300000  0.201174  1.267394  2.562958
  6.377778  0.201174  1.283041  3.450111
  6.455556  0.201174  1.298688  4.281973
  6.533333  0.201174  1.314334  4.992064
  6.611111  0.201174  1.329981  5.538132
  6.688889  0.201174  1.345628  5.920451
  6.766667  0.201174  1.361275  6.278523
  6.844444  0.201174  1.376922  6.587437
  6.922222  0.201174  1.392569  6.882460
  7.000000  0.201174  1.408215  7.165314
  7.077778  0.201174  1.423862  7.437391
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
```

```
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             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     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
COPY     2 OUTPUT MEAN   1 1     48.4      WDM    702 FLOW     ENGL      REPL
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    802 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

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


END MASS-LINK

END RUN
```

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WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Bell Place
Site Name:	Bell Place
Site Address:	
City:	
Report Date:	9/18/2025
Gage:	38 IN CENTRAL
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2021/08/18
Version:	4.2.18

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year
Low Flow Threshold for POC2:	50 Percent of the 2 Year
High Flow Threshold for POC2:	50 Year

Landuse Basin Data
Predeveloped Land Use

AOB-ON

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.75
Pervious Total	0.75
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.75

Element Flows To:

Surface	Interflow	Groundwater

AOB-OFF

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.19
Pervious Total	0.19
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.19

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

AOB-ON

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.07
Pervious Total	0.07

Impervious Land Use	acre
ROADS FLAT	0.01
ROOF TOPS FLAT	0.63
SIDEWALKS FLAT	0.04
Impervious Total	0.68
Basin Total	0.75

Element Flows To:

Surface	Interflow	Groundwater
Vault	Vault	

AOB-OFF

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Lawn, Flat	0.01
Pervious Total	0.01

Impervious Land Use	acre
ROADS FLAT	0.05
SIDEWALKS FLAT	0.13
Impervious Total	0.18
Basin Total	0.19

Element Flows To:

Surface	Interflow	Groundwater

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault

Width: 20 ft.
Length: 289.446383438717 ft.
Depth: 7 ft.
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 0.27 in. Elevation:0 ft.
Orifice 2 Diameter: 0.58 in. Elevation:4.852 ft.
Orifice 3 Diameter: 0.56 in. Elevation:5.55291666666669 ft.
Element Flows To:
Outlet 1 Outlet 2

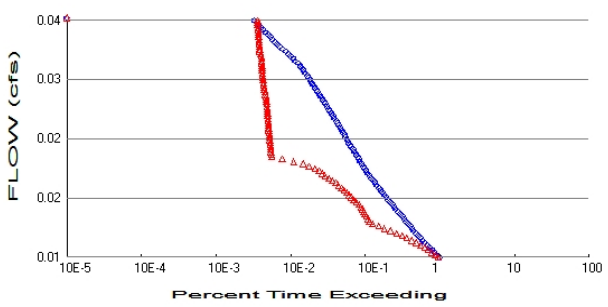
Vault Hydraulic Table

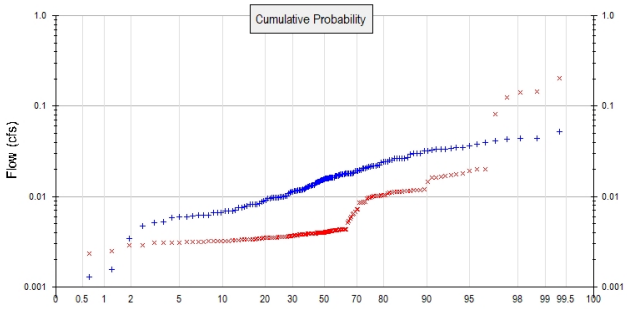
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.132	0.000	0.000	0.000
0.0778	0.132	0.010	0.000	0.000
0.1556	0.132	0.020	0.000	0.000
0.2333	0.132	0.031	0.001	0.000
0.3111	0.132	0.041	0.001	0.000
0.3889	0.132	0.051	0.001	0.000
0.4667	0.132	0.062	0.001	0.000
0.5444	0.132	0.072	0.001	0.000
0.6222	0.132	0.082	0.001	0.000
0.7000	0.132	0.093	0.001	0.000
0.7778	0.132	0.103	0.001	0.000
0.8556	0.132	0.113	0.001	0.000
0.9333	0.132	0.124	0.001	0.000
1.0111	0.132	0.134	0.002	0.000
1.0889	0.132	0.144	0.002	0.000
1.1667	0.132	0.155	0.002	0.000
1.2444	0.132	0.165	0.002	0.000
1.3222	0.132	0.175	0.002	0.000
1.4000	0.132	0.186	0.002	0.000
1.4778	0.132	0.196	0.002	0.000
1.5556	0.132	0.206	0.002	0.000
1.6333	0.132	0.217	0.002	0.000
1.7111	0.132	0.227	0.002	0.000
1.7889	0.132	0.237	0.002	0.000
1.8667	0.132	0.248	0.002	0.000
1.9444	0.132	0.258	0.002	0.000
2.0222	0.132	0.268	0.002	0.000
2.1000	0.132	0.279	0.002	0.000
2.1778	0.132	0.289	0.002	0.000
2.2556	0.132	0.299	0.003	0.000
2.3333	0.132	0.310	0.003	0.000
2.4111	0.132	0.320	0.003	0.000
2.4889	0.132	0.330	0.003	0.000
2.5667	0.132	0.341	0.003	0.000
2.6444	0.132	0.351	0.003	0.000
2.7222	0.132	0.361	0.003	0.000
2.8000	0.132	0.372	0.003	0.000
2.8778	0.132	0.382	0.003	0.000

2.9556	0.132	0.392	0.003	0.000
3.0333	0.132	0.403	0.003	0.000
3.1111	0.132	0.413	0.003	0.000
3.1889	0.132	0.423	0.003	0.000
3.2667	0.132	0.434	0.003	0.000
3.3444	0.132	0.444	0.003	0.000
3.4222	0.132	0.454	0.003	0.000
3.5000	0.132	0.465	0.003	0.000
3.5778	0.132	0.475	0.003	0.000
3.6556	0.132	0.485	0.003	0.000
3.7333	0.132	0.496	0.003	0.000
3.8111	0.132	0.506	0.003	0.000
3.8889	0.132	0.516	0.003	0.000
3.9667	0.132	0.527	0.003	0.000
4.0444	0.132	0.537	0.004	0.000
4.1222	0.132	0.547	0.004	0.000
4.2000	0.132	0.558	0.004	0.000
4.2778	0.132	0.568	0.004	0.000
4.3556	0.132	0.578	0.004	0.000
4.4333	0.132	0.589	0.004	0.000
4.5111	0.132	0.599	0.004	0.000
4.5889	0.132	0.609	0.004	0.000
4.6667	0.132	0.620	0.004	0.000
4.7444	0.132	0.630	0.004	0.000
4.8222	0.132	0.640	0.004	0.000
4.9000	0.132	0.651	0.006	0.000
4.9778	0.132	0.661	0.007	0.000
5.0556	0.132	0.671	0.008	0.000
5.1333	0.132	0.682	0.009	0.000
5.2111	0.132	0.692	0.010	0.000
5.2889	0.132	0.702	0.010	0.000
5.3667	0.132	0.713	0.011	0.000
5.4444	0.132	0.723	0.011	0.000
5.5222	0.132	0.733	0.012	0.000
5.6000	0.132	0.744	0.014	0.000
5.6778	0.132	0.754	0.016	0.000
5.7556	0.132	0.764	0.017	0.000
5.8333	0.132	0.775	0.018	0.000
5.9111	0.132	0.785	0.019	0.000
5.9889	0.132	0.795	0.020	0.000
6.0667	0.132	0.806	0.294	0.000
6.1444	0.132	0.816	0.890	0.000
6.2222	0.132	0.826	1.659	0.000
6.3000	0.132	0.837	2.524	0.000
6.3778	0.132	0.847	3.410	0.000
6.4556	0.132	0.857	4.240	0.000
6.5333	0.132	0.868	4.949	0.000
6.6111	0.132	0.878	5.494	0.000
6.6889	0.132	0.888	5.875	0.000
6.7667	0.132	0.899	6.232	0.000
6.8444	0.132	0.909	6.539	0.000
6.9222	0.132	0.919	6.833	0.000
7.0000	0.132	0.930	7.115	0.000
7.0778	0.132	0.940	7.386	0.000
7.1556	0.000	0.000	7.647	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.75
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.07
Total Impervious Area: 0.68

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.015805
5 year	0.024587
10 year	0.029359
25 year	0.034217
50 year	0.037104
100 year	0.039478

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.004973
5 year	0.010306
10 year	0.016475
25 year	0.029162
50 year	0.043894
100 year	0.065177

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1902	0.012	0.004
1903	0.010	0.003
1904	0.016	0.004
1905	0.008	0.004
1906	0.003	0.003
1907	0.024	0.003
1908	0.018	0.004
1909	0.018	0.004
1910	0.024	0.004
1911	0.016	0.004

1912	0.053	0.016
1913	0.025	0.020
1914	0.006	0.003
1915	0.010	0.004
1916	0.016	0.005
1917	0.005	0.003
1918	0.017	0.018
1919	0.012	0.004
1920	0.016	0.004
1921	0.018	0.010
1922	0.018	0.004
1923	0.014	0.010
1924	0.007	0.004
1925	0.008	0.003
1926	0.015	0.004
1927	0.010	0.004
1928	0.012	0.004
1929	0.025	0.012
1930	0.016	0.004
1931	0.015	0.007
1932	0.012	0.004
1933	0.011	0.006
1934	0.033	0.145
1935	0.015	0.004
1936	0.013	0.010
1937	0.021	0.004
1938	0.013	0.006
1939	0.001	0.002
1940	0.014	0.004
1941	0.007	0.003
1942	0.022	0.010
1943	0.011	0.004
1944	0.020	0.011
1945	0.018	0.007
1946	0.010	0.004
1947	0.006	0.003
1948	0.034	0.004
1949	0.029	0.004
1950	0.008	0.003
1951	0.010	0.004
1952	0.044	0.009
1953	0.040	0.017
1954	0.014	0.004
1955	0.012	0.003
1956	0.006	0.003
1957	0.020	0.004
1958	0.043	0.141
1959	0.026	0.017
1960	0.007	0.003
1961	0.027	0.015
1962	0.014	0.004
1963	0.007	0.003
1964	0.008	0.004
1965	0.030	0.019
1966	0.008	0.003
1967	0.013	0.004
1968	0.013	0.004
1969	0.013	0.004

1970	0.020	0.004
1971	0.032	0.010
1972	0.021	0.009
1973	0.027	0.011
1974	0.014	0.004
1975	0.034	0.011
1976	0.018	0.009
1977	0.006	0.003
1978	0.030	0.020
1979	0.008	0.004
1980	0.017	0.007
1981	0.016	0.004
1982	0.007	0.004
1983	0.027	0.009
1984	0.011	0.003
1985	0.018	0.003
1986	0.016	0.004
1987	0.030	0.012
1988	0.019	0.004
1989	0.017	0.004
1990	0.019	0.004
1991	0.015	0.011
1992	0.022	0.017
1993	0.021	0.010
1994	0.032	0.004
1995	0.006	0.003
1996	0.035	0.124
1997	0.013	0.004
1998	0.016	0.004
1999	0.001	0.003
2000	0.012	0.004
2001	0.006	0.003
2002	0.022	0.004
2003	0.019	0.004
2004	0.018	0.004
2005	0.032	0.010
2006	0.010	0.004
2007	0.010	0.004
2008	0.017	0.004
2009	0.012	0.004
2010	0.010	0.004
2011	0.008	0.004
2012	0.011	0.004
2013	0.009	0.003
2014	0.007	0.003
2015	0.013	0.004
2016	0.005	0.003
2017	0.024	0.006
2018	0.044	0.202
2019	0.041	0.081
2020	0.013	0.004
2021	0.022	0.012
2022	0.009	0.004
2023	0.018	0.012
2024	0.035	0.004
2025	0.016	0.004
2026	0.027	0.012
2027	0.010	0.004

2028	0.008	0.003
2029	0.018	0.011
2030	0.033	0.009
2031	0.011	0.004
2032	0.006	0.003
2033	0.010	0.003
2034	0.010	0.004
2035	0.038	0.004
2036	0.020	0.004
2037	0.005	0.003
2038	0.016	0.010
2039	0.002	0.002
2040	0.009	0.003
2041	0.012	0.003
2042	0.037	0.004
2043	0.018	0.011
2044	0.024	0.016
2045	0.016	0.011
2046	0.019	0.010
2047	0.014	0.004
2048	0.018	0.004
2049	0.016	0.004
2050	0.012	0.003
2051	0.017	0.010
2052	0.010	0.005
2053	0.017	0.011
2054	0.022	0.008
2055	0.007	0.003
2056	0.008	0.003
2057	0.012	0.006
2058	0.015	0.012
2059	0.027	0.018

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0526	0.2019
2	0.0443	0.1452
3	0.0443	0.1407
4	0.0428	0.1241
5	0.0413	0.0811
6	0.0400	0.0201
7	0.0377	0.0198
8	0.0367	0.0190
9	0.0347	0.0178
10	0.0347	0.0178
11	0.0340	0.0173
12	0.0337	0.0168
13	0.0334	0.0167
14	0.0331	0.0163
15	0.0325	0.0162
16	0.0321	0.0146
17	0.0317	0.0120
18	0.0302	0.0119
19	0.0300	0.0119
20	0.0298	0.0118
21	0.0291	0.0116
22	0.0267	0.0116

23	0.0266	0.0114
24	0.0266	0.0114
25	0.0266	0.0112
26	0.0265	0.0112
27	0.0264	0.0112
28	0.0252	0.0111
29	0.0251	0.0110
30	0.0245	0.0108
31	0.0244	0.0104
32	0.0243	0.0104
33	0.0239	0.0104
34	0.0221	0.0102
35	0.0220	0.0102
36	0.0219	0.0101
37	0.0218	0.0101
38	0.0217	0.0099
39	0.0213	0.0096
40	0.0211	0.0096
41	0.0208	0.0095
42	0.0205	0.0087
43	0.0204	0.0087
44	0.0204	0.0086
45	0.0196	0.0086
46	0.0195	0.0085
47	0.0192	0.0072
48	0.0191	0.0071
49	0.0191	0.0067
50	0.0184	0.0064
51	0.0182	0.0063
52	0.0181	0.0060
53	0.0180	0.0057
54	0.0180	0.0053
55	0.0180	0.0051
56	0.0180	0.0043
57	0.0178	0.0043
58	0.0178	0.0043
59	0.0177	0.0043
60	0.0176	0.0043
61	0.0176	0.0043
62	0.0174	0.0043
63	0.0172	0.0043
64	0.0170	0.0043
65	0.0169	0.0043
66	0.0169	0.0043
67	0.0168	0.0042
68	0.0163	0.0042
69	0.0163	0.0042
70	0.0163	0.0042
71	0.0162	0.0042
72	0.0161	0.0042
73	0.0161	0.0041
74	0.0160	0.0041
75	0.0159	0.0041
76	0.0158	0.0041
77	0.0158	0.0040
78	0.0158	0.0040
79	0.0156	0.0040
80	0.0154	0.0040

81	0.0153	0.0040
82	0.0152	0.0040
83	0.0151	0.0040
84	0.0149	0.0040
85	0.0145	0.0040
86	0.0144	0.0040
87	0.0144	0.0039
88	0.0144	0.0039
89	0.0143	0.0039
90	0.0140	0.0039
91	0.0135	0.0039
92	0.0134	0.0039
93	0.0133	0.0039
94	0.0130	0.0039
95	0.0130	0.0039
96	0.0130	0.0039
97	0.0128	0.0039
98	0.0128	0.0039
99	0.0125	0.0038
100	0.0123	0.0038
101	0.0121	0.0038
102	0.0120	0.0038
103	0.0118	0.0038
104	0.0117	0.0038
105	0.0117	0.0038
106	0.0117	0.0037
107	0.0116	0.0037
108	0.0115	0.0037
109	0.0115	0.0037
110	0.0113	0.0037
111	0.0112	0.0037
112	0.0110	0.0036
113	0.0108	0.0036
114	0.0102	0.0036
115	0.0102	0.0036
116	0.0099	0.0036
117	0.0099	0.0036
118	0.0098	0.0036
119	0.0098	0.0035
120	0.0098	0.0035
121	0.0097	0.0035
122	0.0097	0.0035
123	0.0096	0.0035
124	0.0096	0.0035
125	0.0095	0.0035
126	0.0091	0.0035
127	0.0090	0.0035
128	0.0087	0.0034
129	0.0083	0.0034
130	0.0083	0.0034
131	0.0083	0.0034
132	0.0082	0.0034
133	0.0082	0.0034
134	0.0079	0.0033
135	0.0077	0.0033
136	0.0076	0.0033
137	0.0075	0.0033
138	0.0070	0.0033

139	0.0069	0.0033
140	0.0069	0.0032
141	0.0068	0.0032
142	0.0067	0.0032
143	0.0066	0.0032
144	0.0066	0.0032
145	0.0062	0.0032
146	0.0062	0.0032
147	0.0062	0.0031
148	0.0061	0.0031
149	0.0060	0.0031
150	0.0060	0.0031
151	0.0058	0.0031
152	0.0053	0.0031
153	0.0051	0.0031
154	0.0047	0.0029
155	0.0034	0.0029
156	0.0016	0.0025
157	0.0013	0.0024
158	0.0008	0.0023

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0079	54282	52525	96	Pass
0.0082	50160	47489	94	Pass
0.0085	46564	42958	92	Pass
0.0088	43312	38537	88	Pass
0.0091	40260	34504	85	Pass
0.0094	37451	30531	81	Pass
0.0097	34902	26847	76	Pass
0.0100	32553	23307	71	Pass
0.0103	30332	19944	65	Pass
0.0106	28310	17241	60	Pass
0.0109	26432	14493	54	Pass
0.0111	24819	12105	48	Pass
0.0114	23296	9922	42	Pass
0.0117	21950	8388	38	Pass
0.0120	20637	6886	33	Pass
0.0123	19440	6305	32	Pass
0.0126	18282	6005	32	Pass
0.0129	17241	5728	33	Pass
0.0132	16160	5483	33	Pass
0.0135	15158	5281	34	Pass
0.0138	14271	5045	35	Pass
0.0141	13462	4801	35	Pass
0.0144	12665	4543	35	Pass
0.0147	11950	4221	35	Pass
0.0150	11241	3886	34	Pass
0.0153	10582	3615	34	Pass
0.0156	9972	3348	33	Pass
0.0159	9385	3117	33	Pass
0.0162	8847	2870	32	Pass
0.0165	8338	2647	31	Pass
0.0168	7856	2418	30	Pass
0.0170	7462	2223	29	Pass
0.0173	7030	1995	28	Pass
0.0176	6620	1797	27	Pass
0.0179	6271	1595	25	Pass
0.0182	5978	1462	24	Pass
0.0185	5701	1328	23	Pass
0.0188	5444	1168	21	Pass
0.0191	5197	978	18	Pass
0.0194	4946	820	16	Pass
0.0197	4703	608	12	Pass
0.0200	4515	426	9	Pass
0.0203	4334	308	7	Pass
0.0206	4159	306	7	Pass
0.0209	3956	302	7	Pass
0.0212	3770	299	7	Pass
0.0215	3577	297	8	Pass
0.0218	3416	295	8	Pass
0.0221	3259	294	9	Pass
0.0224	3135	291	9	Pass
0.0227	3026	289	9	Pass
0.0229	2928	286	9	Pass
0.0232	2813	285	10	Pass

0.0235	2683	282	10	Pass
0.0238	2555	280	10	Pass
0.0241	2452	279	11	Pass
0.0244	2358	278	11	Pass
0.0247	2256	275	12	Pass
0.0250	2139	274	12	Pass
0.0253	2040	272	13	Pass
0.0256	1952	270	13	Pass
0.0259	1860	269	14	Pass
0.0262	1777	267	15	Pass
0.0265	1691	266	15	Pass
0.0268	1618	264	16	Pass
0.0271	1561	262	16	Pass
0.0274	1482	260	17	Pass
0.0277	1407	258	18	Pass
0.0280	1338	254	18	Pass
0.0283	1270	249	19	Pass
0.0286	1217	244	20	Pass
0.0288	1163	243	20	Pass
0.0291	1105	240	21	Pass
0.0294	1055	239	22	Pass
0.0297	1007	237	23	Pass
0.0300	964	234	24	Pass
0.0303	920	232	25	Pass
0.0306	872	230	26	Pass
0.0309	815	228	27	Pass
0.0312	774	228	29	Pass
0.0315	738	227	30	Pass
0.0318	694	226	32	Pass
0.0321	637	225	35	Pass
0.0324	601	225	37	Pass
0.0327	556	223	40	Pass
0.0330	517	218	42	Pass
0.0333	478	213	44	Pass
0.0336	434	213	49	Pass
0.0339	394	211	53	Pass
0.0342	363	209	57	Pass
0.0344	340	208	61	Pass
0.0347	310	208	67	Pass
0.0350	297	205	69	Pass
0.0353	273	204	74	Pass
0.0356	252	204	80	Pass
0.0359	237	204	86	Pass
0.0362	223	202	90	Pass
0.0365	206	199	96	Pass
0.0368	195	198	101	Pass
0.0371	180	198	110	Pass

Water Quality

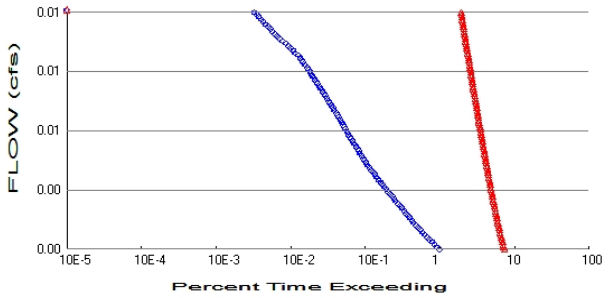
Water Quality BMP Flow and Volume for POC #1

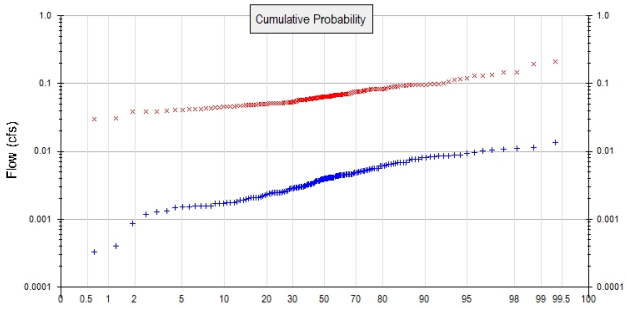
On-line facility volume:	0.0156 acre-feet
On-line facility target flow:	0.0206 cfs.
Adjusted for 15 min:	0.0206 cfs.
Off-line facility target flow:	0.0874 cfs.
Adjusted for 15 min:	0.0874 cfs.

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
Vault POC	☐	259.78			☐	0.00			
Total Volume Infiltrated		259.78	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

POC 2





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #2
Total Pervious Area: 0.19
Total Impervious Area: 0

Mitigated Landuse Totals for POC #2
Total Pervious Area: 0.01
Total Impervious Area: 0.18

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	**Flow(cfs)**
2 year	0.004004
5 year	0.006229
10 year	0.007438
25 year	0.008668
50 year	0.0094
100 year	0.010001

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	0.063477
5 year	0.085344
10 year	0.101257
25 year	0.123058
50 year	0.140569
100 year	0.159207

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	**Predeveloped**	**Mitigated**
1902	0.003	0.075
1903	0.002	0.083
1904	0.004	0.095
1905	0.002	0.042
1906	0.001	0.047
1907	0.006	0.064
1908	0.005	0.052
1909	0.005	0.064
1910	0.006	0.061
1911	0.004	0.069
1912	0.013	0.116

1913	0.006	0.049
1914	0.002	0.209
1915	0.003	0.043
1916	0.004	0.079
1917	0.001	0.030
1918	0.004	0.064
1919	0.003	0.039
1920	0.004	0.052
1921	0.005	0.045
1922	0.005	0.071
1923	0.004	0.049
1924	0.002	0.092
1925	0.002	0.039
1926	0.004	0.075
1927	0.003	0.061
1928	0.003	0.046
1929	0.006	0.091
1930	0.004	0.095
1931	0.004	0.046
1932	0.003	0.049
1933	0.003	0.049
1934	0.008	0.081
1935	0.004	0.042
1936	0.003	0.059
1937	0.005	0.087
1938	0.003	0.043
1939	0.000	0.054
1940	0.004	0.095
1941	0.002	0.094
1942	0.005	0.071
1943	0.003	0.070
1944	0.005	0.101
1945	0.005	0.076
1946	0.002	0.060
1947	0.002	0.046
1948	0.009	0.064
1949	0.007	0.098
1950	0.002	0.055
1951	0.003	0.084
1952	0.011	0.096
1953	0.010	0.089
1954	0.004	0.052
1955	0.003	0.048
1956	0.001	0.047
1957	0.005	0.051
1958	0.011	0.064
1959	0.007	0.064
1960	0.002	0.050
1961	0.007	0.145
1962	0.004	0.062
1963	0.002	0.046
1964	0.002	0.135
1965	0.008	0.060
1966	0.002	0.050
1967	0.003	0.071
1968	0.003	0.059
1969	0.003	0.053
1970	0.005	0.061

1971	0.008	0.059
1972	0.005	0.196
1973	0.007	0.112
1974	0.004	0.082
1975	0.009	0.086
1976	0.005	0.091
1977	0.002	0.039
1978	0.008	0.066
1979	0.002	0.069
1980	0.004	0.067
1981	0.004	0.063
1982	0.002	0.052
1983	0.007	0.070
1984	0.003	0.070
1985	0.004	0.080
1986	0.004	0.040
1987	0.008	0.070
1988	0.005	0.042
1989	0.004	0.039
1990	0.005	0.051
1991	0.004	0.077
1992	0.006	0.072
1993	0.005	0.082
1994	0.008	0.057
1995	0.002	0.044
1996	0.009	0.059
1997	0.003	0.053
1998	0.004	0.063
1999	0.000	0.068
2000	0.003	0.060
2001	0.002	0.048
2002	0.006	0.089
2003	0.005	0.051
2004	0.004	0.076
2005	0.008	0.146
2006	0.002	0.068
2007	0.002	0.077
2008	0.004	0.063
2009	0.003	0.048
2010	0.002	0.062
2011	0.002	0.065
2012	0.003	0.061
2013	0.002	0.057
2014	0.002	0.055
2015	0.003	0.094
2016	0.001	0.058
2017	0.006	0.093
2018	0.011	0.057
2019	0.010	0.084
2020	0.003	0.068
2021	0.006	0.057
2022	0.002	0.097
2023	0.005	0.119
2024	0.009	0.130
2025	0.004	0.062
2026	0.007	0.068
2027	0.002	0.076
2028	0.002	0.030

2029	0.005	0.049
2030	0.008	0.098
2031	0.003	0.031
2032	0.002	0.052
2033	0.002	0.065
2034	0.002	0.051
2035	0.010	0.064
2036	0.005	0.051
2037	0.001	0.069
2038	0.004	0.066
2039	0.000	0.131
2040	0.002	0.052
2041	0.003	0.065
2042	0.009	0.075
2043	0.004	0.083
2044	0.006	0.057
2045	0.004	0.046
2046	0.005	0.051
2047	0.004	0.063
2048	0.005	0.052
2049	0.004	0.077
2050	0.003	0.058
2051	0.004	0.082
2052	0.002	0.062
2053	0.004	0.053
2054	0.006	0.107
2055	0.002	0.064
2056	0.002	0.083
2057	0.003	0.041
2058	0.004	0.078
2059	0.007	0.097

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	0.0133	0.2094
2	0.0112	0.1961
3	0.0112	0.1459
4	0.0108	0.1447
5	0.0105	0.1345
6	0.0101	0.1311
7	0.0096	0.1298
8	0.0093	0.1190
9	0.0088	0.1161
10	0.0088	0.1122
11	0.0086	0.1069
12	0.0085	0.1014
13	0.0085	0.0978
14	0.0084	0.0977
15	0.0082	0.0970
16	0.0081	0.0967
17	0.0080	0.0962
18	0.0076	0.0953
19	0.0076	0.0948
20	0.0075	0.0946
21	0.0074	0.0943
22	0.0068	0.0936
23	0.0067	0.0929

24	0.0067	0.0919
25	0.0067	0.0910
26	0.0067	0.0909
27	0.0067	0.0890
28	0.0064	0.0888
29	0.0064	0.0873
30	0.0062	0.0860
31	0.0062	0.0839
32	0.0061	0.0836
33	0.0061	0.0831
34	0.0056	0.0827
35	0.0056	0.0827
36	0.0056	0.0824
37	0.0055	0.0824
38	0.0055	0.0818
39	0.0054	0.0806
40	0.0054	0.0803
41	0.0053	0.0795
42	0.0052	0.0778
43	0.0052	0.0774
44	0.0052	0.0769
45	0.0050	0.0765
46	0.0049	0.0764
47	0.0049	0.0762
48	0.0048	0.0759
49	0.0048	0.0751
50	0.0047	0.0748
51	0.0046	0.0746
52	0.0046	0.0721
53	0.0046	0.0713
54	0.0046	0.0708
55	0.0046	0.0708
56	0.0046	0.0705
57	0.0045	0.0704
58	0.0045	0.0701
59	0.0045	0.0701
60	0.0045	0.0689
61	0.0045	0.0687
62	0.0044	0.0685
63	0.0044	0.0683
64	0.0043	0.0681
65	0.0043	0.0680
66	0.0043	0.0680
67	0.0043	0.0671
68	0.0041	0.0662
69	0.0041	0.0661
70	0.0041	0.0655
71	0.0041	0.0653
72	0.0041	0.0648
73	0.0041	0.0644
74	0.0040	0.0641
75	0.0040	0.0640
76	0.0040	0.0640
77	0.0040	0.0637
78	0.0040	0.0636
79	0.0040	0.0636
80	0.0039	0.0635
81	0.0039	0.0634

82	0.0039	0.0633
83	0.0038	0.0632
84	0.0038	0.0631
85	0.0037	0.0620
86	0.0037	0.0619
87	0.0036	0.0619
88	0.0036	0.0619
89	0.0036	0.0612
90	0.0036	0.0611
91	0.0034	0.0610
92	0.0034	0.0605
93	0.0034	0.0601
94	0.0033	0.0601
95	0.0033	0.0596
96	0.0033	0.0594
97	0.0032	0.0593
98	0.0032	0.0592
99	0.0032	0.0591
100	0.0031	0.0581
101	0.0031	0.0577
102	0.0030	0.0574
103	0.0030	0.0573
104	0.0030	0.0571
105	0.0030	0.0567
106	0.0030	0.0566
107	0.0029	0.0552
108	0.0029	0.0549
109	0.0029	0.0538
110	0.0029	0.0534
111	0.0028	0.0529
112	0.0028	0.0527
113	0.0027	0.0524
114	0.0026	0.0521
115	0.0026	0.0520
116	0.0025	0.0519
117	0.0025	0.0517
118	0.0025	0.0517
119	0.0025	0.0515
120	0.0025	0.0515
121	0.0025	0.0512
122	0.0024	0.0512
123	0.0024	0.0511
124	0.0024	0.0511
125	0.0024	0.0511
126	0.0023	0.0503
127	0.0023	0.0501
128	0.0022	0.0495
129	0.0021	0.0493
130	0.0021	0.0492
131	0.0021	0.0490
132	0.0021	0.0489
133	0.0021	0.0480
134	0.0020	0.0479
135	0.0019	0.0478
136	0.0019	0.0471
137	0.0019	0.0470
138	0.0018	0.0465
139	0.0017	0.0461

140	0.0017	0.0458
141	0.0017	0.0458
142	0.0017	0.0455
143	0.0017	0.0449
144	0.0017	0.0440
145	0.0016	0.0428
146	0.0016	0.0427
147	0.0016	0.0422
148	0.0015	0.0421
149	0.0015	0.0420
150	0.0015	0.0406
151	0.0015	0.0404
152	0.0013	0.0392
153	0.0013	0.0386
154	0.0012	0.0386
155	0.0009	0.0385
156	0.0004	0.0308
157	0.0003	0.0300
158	0.0002	0.0297

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0020	54265	403871	744	Fail
0.0021	50187	396170	789	Fail
0.0022	46586	388802	834	Fail
0.0022	43312	381600	881	Fail
0.0023	40287	374785	930	Fail
0.0024	37462	368193	982	Fail
0.0025	34919	361877	1036	Fail
0.0025	32553	355617	1092	Fail
0.0026	30337	349744	1152	Fail
0.0027	28265	343761	1216	Fail
0.0027	26432	338221	1279	Fail
0.0028	24781	332792	1342	Fail
0.0029	23296	327639	1406	Fail
0.0030	21928	322432	1470	Fail
0.0030	20631	317279	1537	Fail
0.0031	19429	312404	1607	Fail
0.0032	18288	307640	1682	Fail
0.0033	17219	302875	1758	Fail
0.0033	16149	298277	1847	Fail
0.0034	15147	294122	1941	Fail
0.0035	14271	289856	2031	Fail
0.0036	13446	285590	2123	Fail
0.0036	12654	281491	2224	Fail
0.0037	11939	277446	2323	Fail
0.0038	11235	273568	2434	Fail
0.0039	10559	269690	2554	Fail
0.0039	9972	265923	2666	Fail
0.0040	9374	262156	2796	Fail
0.0041	8842	258555	2924	Fail
0.0042	8332	255009	3060	Fail
0.0042	7861	251630	3200	Fail
0.0043	7462	248195	3326	Fail
0.0044	7025	244871	3485	Fail
0.0045	6609	241547	3654	Fail
0.0045	6271	238444	3802	Fail
0.0046	5978	235176	3934	Fail
0.0047	5701	231962	4068	Fail
0.0048	5437	228971	4211	Fail
0.0048	5197	225924	4347	Fail
0.0049	4941	222988	4513	Fail
0.0050	4702	219996	4678	Fail
0.0051	4513	217171	4812	Fail
0.0051	4334	214345	4945	Fail
0.0052	4153	211630	5095	Fail
0.0053	3956	208860	5279	Fail
0.0054	3764	206257	5479	Fail
0.0054	3577	203653	5693	Fail
0.0055	3411	201104	5895	Fail
0.0056	3263	198556	6085	Fail
0.0057	3134	196063	6255	Fail
0.0057	3026	193570	6396	Fail
0.0058	2924	191077	6534	Fail
0.0059	2814	188695	6705	Fail
0.0060	2682	186368	6948	Fail

0.0060	2555	184041	7203	Fail
0.0061	2451	181714	7413	Fail
0.0062	2359	179498	7609	Fail
0.0063	2256	177337	7860	Fail
0.0063	2139	175121	8187	Fail
0.0064	2038	172961	8486	Fail
0.0065	1952	170856	8752	Fail
0.0066	1859	168750	9077	Fail
0.0066	1777	166590	9374	Fail
0.0067	1689	164651	9748	Fail
0.0068	1619	162656	10046	Fail
0.0069	1561	160662	10292	Fail
0.0069	1482	158612	10702	Fail
0.0070	1407	156784	11143	Fail
0.0071	1338	154900	11576	Fail
0.0072	1270	152961	12044	Fail
0.0072	1217	151133	12418	Fail
0.0073	1163	149249	12833	Fail
0.0074	1103	147532	13375	Fail
0.0075	1055	145704	13810	Fail
0.0075	1006	143931	14307	Fail
0.0076	963	142213	14767	Fail
0.0077	919	140441	15281	Fail
0.0078	872	138723	15908	Fail
0.0078	814	137061	16837	Fail
0.0079	772	135399	17538	Fail
0.0080	737	133793	18153	Fail
0.0081	694	132186	19046	Fail
0.0081	636	130635	20540	Fail
0.0082	601	129083	21478	Fail
0.0083	553	127532	23061	Fail
0.0084	517	125981	24367	Fail
0.0084	477	124430	26085	Fail
0.0085	433	122879	28378	Fail
0.0086	394	121438	30821	Fail
0.0087	363	119942	33041	Fail
0.0087	339	118557	34972	Fail
0.0088	310	117117	37779	Fail
0.0089	295	115677	39212	Fail
0.0090	273	114347	41885	Fail
0.0090	252	113017	44848	Fail
0.0091	237	111688	47125	Fail
0.0092	223	110358	49487	Fail
0.0093	206	109084	52953	Fail
0.0093	194	107865	55600	Fail
0.0094	179	106591	59548	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.
The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

Water Quality

Water Quality BMP Flow and Volume for POC #2

On-line facility volume:	0.0156 acre-feet
On-line facility target flow:	0.0206 cfs.
Adjusted for 15 min:	0.0206 cfs.
Off-line facility target flow:	0.0118 cfs.
Adjusted for 15 min:	0.0118 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
Total Volume Infiltrated		0.00	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

POC 3

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

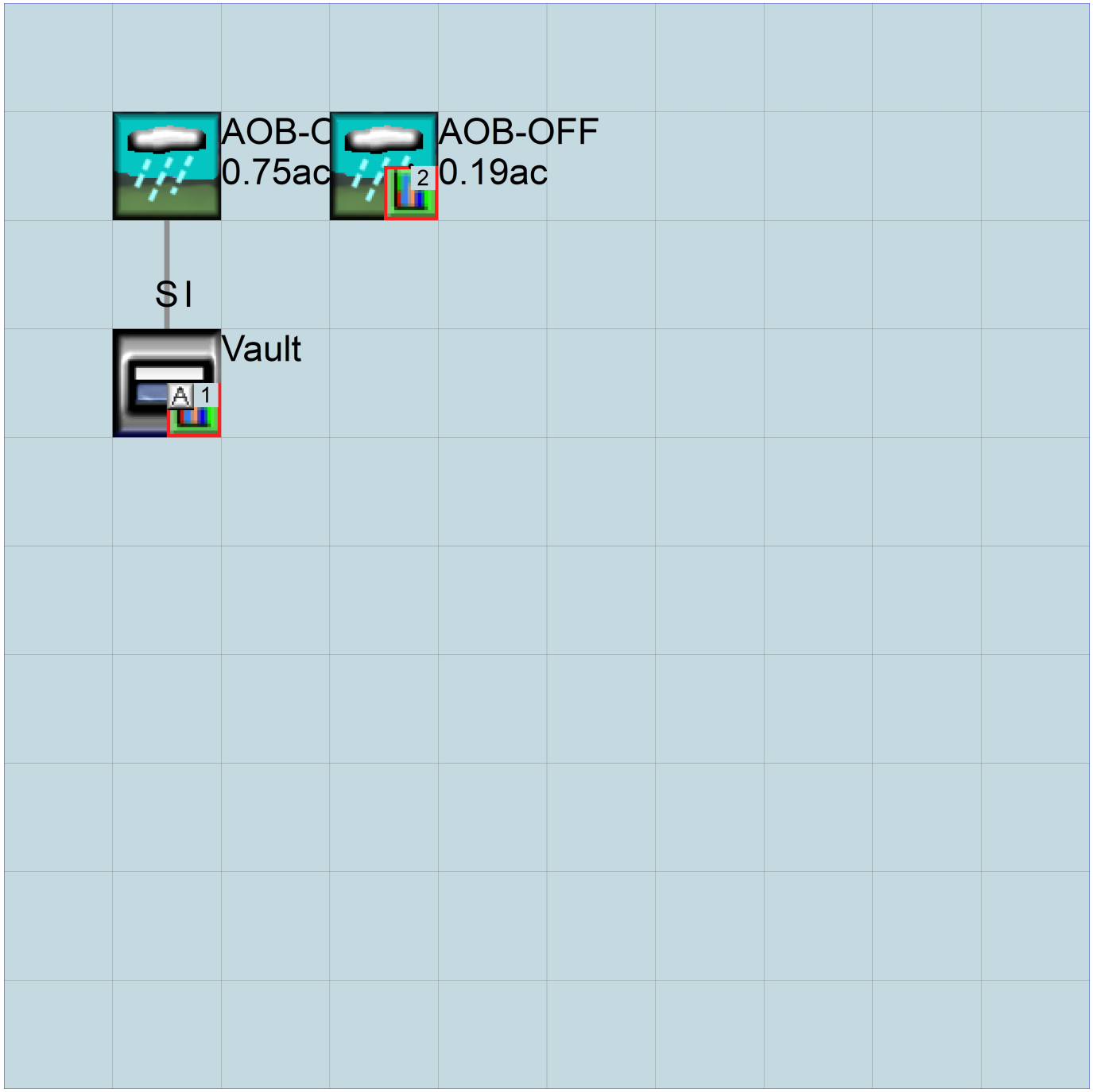
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 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   Bell Place.wdm
MESSU       25   PreBell Place.MES
            27   PreBell Place.L61
            28   PreBell Place.L62
            30   POCBell Place1.dat
            31   POCBell Place2.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      10
      COPY       501
      COPY       502
      DISPLY       1
      DISPLY       2
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title---------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        AOB-ON                    MAX                    1    2   30    9
    2        AOB-OFF                   MAX                    1    2   31    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  502         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                          in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
```

```
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10               0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                 ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10            0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
             ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS       GWVS
   10              0         0         0          0       2.5          1          0
  END PWAT-STATE1

END PERLND

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

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

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

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

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

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

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

END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
AOB-ON***
PERLND  10                        0.75     COPY   501     12
PERLND  10                        0.75     COPY   501     13
AOB-OFF***
PERLND  10                        0.19     COPY   502     12
PERLND  10                        0.19     COPY   502     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
COPY   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     INPUT  TIMSER 1



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

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

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

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

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

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

SPEC-ACTIONS
```

```
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              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
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    502 FLOW     ENGL      REPL
END EXT TARGETS

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

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


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 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   Bell Place.wdm
MESSU       25   MitBell Place.MES
            27   MitBell Place.L61
            28   MitBell Place.L62
            31   POCBell Place2.dat
            30   POCBell Place1.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      16
      IMPLND       1
      IMPLND       4
      IMPLND       8
      RCHRES       1
      COPY       502
      COPY         1
      COPY       501
      DISPLY       2
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    2        AOB-OFF                    MAX                    1    2   31    9
    1        Vault                      MAX                    1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  502         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           ***
   16     C, Lawn, Flat           1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
```

```
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   16         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   16         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   16         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   16              0       4.5      0.03       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   16              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                                  ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   16          0.1      0.25      0.25         6       0.5      0.25
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS       IFWS       LZS       AGWS      GWVS
   16              0         0         0         0       2.5          1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         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   ***
    1         0    0    1    0    0    0
    4         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    *********
    1         0    0    4    0    0    0    1    9
    4         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     ***
    1         0    0    0    0    0
    4         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
    1            400      0.01       0.1       0.1
    4            400      0.01       0.1       0.1
    8            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    1              0         0
    4              0         0
    8              0         0
  END IWAT-PARM3

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

END IMPLND

SCHEMATIC
<-Source->                <--Area-->     <-Target->   MBLK   ***
<Name>   #                <-factor->     <Name>   #   Tbl#   ***
AOB-ON***
PERLND  16                      0.07     RCHRES   1      2
PERLND  16                      0.07     RCHRES   1      3
IMPLND   1                      0.01     RCHRES   1      5
IMPLND   4                      0.63     RCHRES   1      5
IMPLND   8                      0.04     RCHRES   1      5
AOB-OFF***
PERLND  16                      0.01     COPY   502     12
PERLND  16                      0.01     COPY   502     13
IMPLND   1                      0.05     COPY   502     15
IMPLND   8                      0.13     COPY   502     15

******Routing******
PERLND  16                      0.07     COPY     1     12
IMPLND   1                      0.01     COPY     1     15
IMPLND   4                      0.63     COPY     1     15
IMPLND   8                      0.04     COPY     1     15
PERLND  16                      0.07     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   502 OUTPUT MEAN   1 1   48.4        DISPLY   2     INPUT  TIMSER 1
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   28    0    1
  END GEN-INFO
  *** Section RCHRES***

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

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

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

  HYDR-PARM2
    # -  #    FTABNO       LEN      DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1              1      0.05       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                      ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft      for each possible exit        for each possible exit
  <------><--------> <---><---><---><---><---> *** <---><---><---><---><--->
    1            0       4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
  FTABLE      1
   92    4
     Depth      Area    Volume  Outflow1 Velocity  Travel Time***
      (ft)   (acres) (acre-ft)   (cfs)   (ft/sec)    (Minutes)***
  0.000000  0.132895  0.000000  0.000000
  0.077778  0.132895  0.010336  0.000552
  0.155556  0.132895  0.020673  0.000780
  0.233333  0.132895  0.031009  0.000956
  0.311111  0.132895  0.041345  0.001103
  0.388889  0.132895  0.051682  0.001234
  0.466667  0.132895  0.062018  0.001351
  0.544444  0.132895  0.072354  0.001460
  0.622222  0.132895  0.082691  0.001560
  0.700000  0.132895  0.093027  0.001655
  0.777778  0.132895  0.103363  0.001745
  0.855556  0.132895  0.113699  0.001830
  0.933333  0.132895  0.124036  0.001911
  1.011111  0.132895  0.134372  0.001989
  1.088889  0.132895  0.144708  0.002064
  1.166667  0.132895  0.155045  0.002137
  1.244444  0.132895  0.165381  0.002207
  1.322222  0.132895  0.175717  0.002275
  1.400000  0.132895  0.186054  0.002341
  1.477778  0.132895  0.196390  0.002405
  1.555556  0.132895  0.206726  0.002467
```

1.633333	0.132895	0.217063	0.002528
1.711111	0.132895	0.227399	0.002588
1.788889	0.132895	0.237735	0.002646
1.866667	0.132895	0.248072	0.002703
1.944444	0.132895	0.258408	0.002759
2.022222	0.132895	0.268744	0.002813
2.100000	0.132895	0.279081	0.002867
2.177778	0.132895	0.289417	0.002919
2.255556	0.132895	0.299753	0.002971
2.333333	0.132895	0.310089	0.003022
2.411111	0.132895	0.320426	0.003072
2.488889	0.132895	0.330762	0.003121
2.566667	0.132895	0.341098	0.003169
2.644444	0.132895	0.351435	0.003217
2.722222	0.132895	0.361771	0.003264
2.800000	0.132895	0.372107	0.003310
2.877778	0.132895	0.382444	0.003356
2.955556	0.132895	0.392780	0.003401
3.033333	0.132895	0.403116	0.003445
3.111111	0.132895	0.413453	0.003489
3.188889	0.132895	0.423789	0.003533
3.266667	0.132895	0.434125	0.003576
3.344444	0.132895	0.444462	0.003618
3.422222	0.132895	0.454798	0.003660
3.500000	0.132895	0.465134	0.003701
3.577778	0.132895	0.475471	0.003742
3.655556	0.132895	0.485807	0.003782
3.733333	0.132895	0.496143	0.003822
3.811111	0.132895	0.506479	0.003862
3.888889	0.132895	0.516816	0.003901
3.966667	0.132895	0.527152	0.003940
4.044444	0.132895	0.537488	0.003978
4.122222	0.132895	0.547825	0.004017
4.200000	0.132895	0.558161	0.004054
4.277778	0.132895	0.568497	0.004092
4.355556	0.132895	0.578834	0.004129
4.433333	0.132895	0.589170	0.004165
4.511111	0.132895	0.599506	0.004202
4.588889	0.132895	0.609843	0.004238
4.666667	0.132895	0.620179	0.004274
4.744444	0.132895	0.630515	0.004309
4.822222	0.132895	0.640852	0.004344
4.900000	0.132895	0.651188	0.006379
4.977778	0.132895	0.661524	0.007651
5.055556	0.132895	0.671861	0.008567
5.133333	0.132895	0.682197	0.009324
5.211111	0.132895	0.692533	0.009987
5.288889	0.132895	0.702869	0.010583
5.366667	0.132895	0.713206	0.011132
5.444444	0.132895	0.723542	0.011642
5.522222	0.132895	0.733878	0.012122
5.600000	0.132895	0.744215	0.014423
5.677778	0.132895	0.754551	0.016017
5.755556	0.132895	0.764887	0.017254
5.833333	0.132895	0.775224	0.018328
5.911111	0.132895	0.785560	0.019298
5.988889	0.132895	0.795896	0.020194
6.066667	0.132895	0.806233	0.294729
6.144444	0.132895	0.816569	0.890818
6.222222	0.132895	0.826905	1.659528
6.300000	0.132895	0.837242	2.524567
6.377778	0.132895	0.847578	3.410285
6.455556	0.132895	0.857914	4.240763
6.533333	0.132895	0.868251	4.949517
6.611111	0.132895	0.878587	5.494290
6.688889	0.132895	0.888923	5.875354
6.766667	0.132895	0.899260	6.232204
6.844444	0.132895	0.909596	6.539931
6.922222	0.132895	0.919932	6.833795
7.000000	0.132895	0.930268	7.115518

```
  7.077778  0.132895  0.940605  7.386491
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             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     2 OUTPUT MEAN   1 1     48.4      WDM    702 FLOW     ENGL       REPL
COPY   502 OUTPUT MEAN   1 1     48.4      WDM    802 FLOW     ENGL       REPL
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>                <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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