5th Street Conditional Use Permit

Stormwater Site Plan Report

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Prepared for

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1. PROJECT OVERVIEW

The proposed 5th Street Conditional Use Permit project is located on the south side of the alley between East Main and the railroad tracks, and between 5th Street SE and 7th Street SE within Section 20, Township 20 North, Range 04 East, W.M., City of Puyallup, WA. The site is located on Parcel 7282000112, addressed 111 5th Street SE, Puyallup, WA 98372, zoned CG (General Commercial) and encompasses an area of 10,000 square feet (0.23 acre). The City of Puyallup Comprehensive Plan classifies the site as Auto Oriented Commercial. The proposed use includes a combination of light industrial uses and ancillary storage associated with the primary use within the units. The CG zone does allow for the operation of light industrial uses as a conditional use, per Puyallup Municipal code 20.30.010.

The approximately 3,150 square foot building is proposed to be divided into (4) four units and used as partial workspace and storage of associated materials. Other proposed site improvements include but may not be limited to: 24.17-foot drive aisle, (4) four parking stalls, 5-foot walkway, 12-foot pedestrian plaza, landscape buffers and a 4-foot of Right-of-Way dedication to the City of Puyallup to provide a City standard 20-foot wide alley. Utility work will include a connection to the existing water line within 7th Street SE and storm connections to the existing catch basins within the alley to the north. Additionally, the sewer main from East Main will be extended south within 7th Street SE to the intersection of the alley, then west along the frontage of the site.

The project site contains no existing improvements. Proposed improvements will encompass the entire property. As such, the entire site will be cleared and grubbed. Runoff from the parking lot and sidewalk will be collected and piped to Structure D4-06593 within the alley north of the project site. Runoff from the driveway will sheet flow into the alley and into the same catch basin. Building roof runoff will be collected and piped to Structure D4-06625 within the alley north of the project site. Runoff from the Pedestrian Plaza will sheet flow into the alley and into the same catch basin. Both catch basins eventually discharge into the Puyallup River but take different flow paths to reach their respective discharge point into the River. See Section 7 of this report for a detailed discussion of the downstream flow path. See Figure 1.1 for a Vicinity Map and see Appendix ‘A’ for a Developed Conditions Map.

Figure 1.1: Vicinity Map

Stormwater design for the project is in accordance with the 2019 Washington State Department of Ecology Stormwater Management Manual for Western Washington (SWMMWW, the "Manual"), and the City of Puyallup Public Works Engineering & Construction Standards, which set the methodology and design criteria for the project. A Geotechnical Engineering Report and City of Puyallup Traffic Scoping Worksheet have been prepared for this project and are included with this submittal under separate cover.

2. EXISTING CONDTIONS SUMMARY

The project site is located on parcel 7282000112, which encompasses 10,000 square feet (0.23 acre). The site is trapezoidal in shape, measuring approximately 113.5-feet in the east-west direction and approximately 47- and 90.5-feet in the north-south direction. In general, this site is relatively flat, with elevations of approximately 49.5 along the north property line and between approximately 49.6 and 51.2 in the southwest and southeast property corners, respectively. There is a single low area near the center of the site with elevation of approximately 48.9 feet. Site slopes are generally between approximately 2- to 7-percent.

The property contains (2) Threshold Discharge Areas (TDAs). TDA #1 encompasses 1,678 sf (0.039 Ac.) on the western side of the site and TDA #2 encompasses the remaining 8,322 sf (0.191 Ac.). See the Pre-Developed Basin Map within Appendix 'A'.

The subject property is currently undeveloped and vacant. Land cover is primarily scrub grass and dirt. The project site is bordered to the east, north and west by a parking lot, an alleyway

and urban commercial development (single-story retail and warehouse structure), respectively. The property is bordered to the south by a double-track main rail line elevated about 2- to 3-feet above the property on an embankment of railroad ballast.

See Appendix 'A' for an Existing Conditions Map.

3. INFILTRATION RATES / SOILS REPORTS

The Natural Resources Conservation Service (NRCS) describes on-site soils as Puyallup Fine Sandy Loam (Map Unit 31A). See Appendix 'C' for the NRCS Data Soil Map and Soil Map Unit Data.

A Geotechnical Engineering Report was created by Icicle Creek Engineers (dated July 20, 2022, with the purpose of exploring and evaluating subsurface soil and groundwater conditions as a basis for evaluating foundation support and stormwater infiltration feasibility.

Subsurface conditions at the site were explored by drilling two test borings (Borings B-1 and B-2) to depths of 20 and 31.5 feet (respectively) on March 2, 2022. The soil types encountered in each boring is described in the following paragraphs.

Boring B-1: Boring B-1 encountered about 1½ feet of Fill, consisting of loose gravel with silt and sand. Coarse-grained Alluvium was encountered from about 1½ to 6 feet, consisting of loose fine to medium sand with silt. Fine-grained Alluvium was encountered from about 6 to 7½ feet, consisting of soft silt. Coarse-grained Alluvium was encountered from about 7½ to 17 feet, consisting of very loose to loose silty sand. Fine-grained Alluvium was encountered from about 17 to 20 feet at the completion depth of Boring B-1, consisting of medium stiff silt with sand.

Boring B-2: Boring B-2 encountered about ½ foot of Fill, consisting of 5/8-inch-minus crushed rock. Coarse-grained Alluvium was encountered from about ½ to 3½ feet, consisting of very loose silty sand with gravel. Fine-grained Alluvium was encountered from about 3½ to 6 feet, consisting of soft silt with sand. Coarse-grained Alluvium was encountered from about 6 to 15½ feet, consisting of very loose to medium dense sand with occasional fine gravel. Fine-grained Alluvium was encountered from about 15½ to 22½ feet, consisting of stiff silt with sand. Coarse-grained Alluvium was encountered from about 22½ to 31½ feet at the completion depth of Boring B-2, consisting of medium dense sand with silt grading to silty sand at about 27½ feet.

At the time of drilling, groundwater was encountered in Borings B-1 and B-2 at depths of about 4.4 feet and 4.8 feet, respectively.

A preliminary evaluation of infiltration rates in accordance with the Manual (Volume V, Section 5.4, Option 3: Soil Grain Size Analysis Method. Figure 3.1 provides the locations of the borings and samples and Table 3.1 provides the Short- and Long-term infiltration rates.

The Geotechnical Report also states that, due to the shallow groundwater table and the relatively shallow depth to low-permeability soil, disposal of stormwater by infiltration may be infeasible. However, permeable pavement may be feasible depending on subgrade elevation and depth of ponding within the base course.

Figure 3.1: Boring and Sample Locations

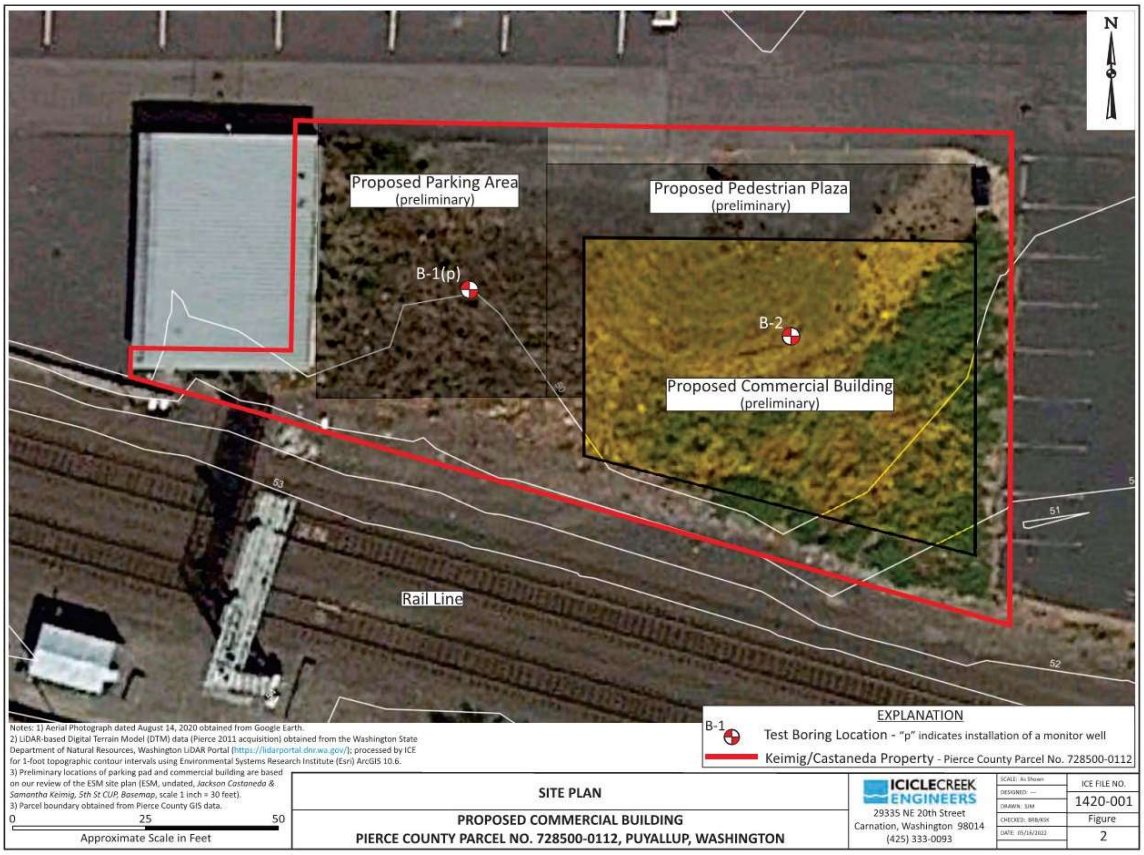


Table 3.1: Short and Long-Term Infiltration Rates

Test Boring / Sample Number	Short-Term Infiltration Rate (in./hr.)	Long-Term Infiltration Rate (in./hr.)
B-1 / S-1	31	8.4
B-2 / S-2 & S-3	0.6	0.16

The Geotechnical Engineering Report is included with this submittal under separate cover.

4. WELLS AND SEPTIC TANKS

There does not appear to be any groundwater wells or septic systems on-site or within 100 feet from the site. In the developed condition, domestic water and sewer will be provided by the City of Puyallup.

5. FUEL TANKS

There are no fuel tanks present to the best of our knowledge.

6. FLOOD PLAIN ANALYSIS

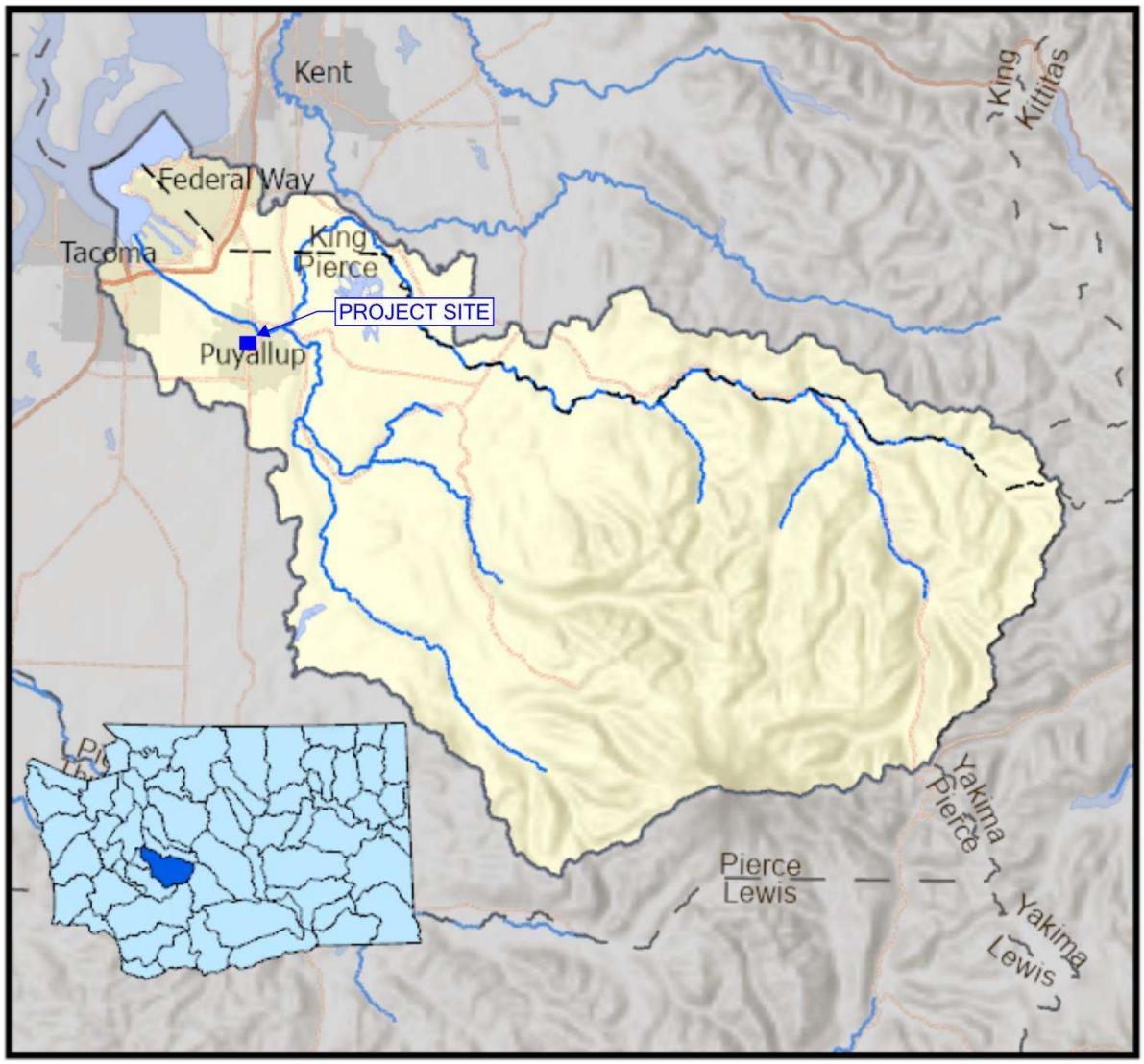
According to Federal Emergency Management Program Flood Insurance Rate Map 53053C10333E, effective 2017-03-07, the project lies within Zone X and is not screened, "Area of Minimal Flood Hazard". A FirmETTE has been created for this project and is presented as Appendix 'D'.

7. OFFSITE ANALYSIS

Study Area

The 5th Street CUP project is located within the Puyallup-White Watershed – Water Resource Inventory Area (WRIA) 10. See Figure 7.1 for a map of the Puyallup-White WRIA.

Figure 7.1: Puyallup-White Water Resource Inventory Area (WRIA #10)



Adopted Basin Plans

The following document was located regarding the Puyallup-White Watershed an is incorporated into this document by reference

- Watershed Restoration and Enhancement Plan: WRIA 10 – Puyallup White Watershed

Tributary Run-on

There are no upstream areas that produce stormwater runoff tributary to the project site.

Downstream Analysis

The project site contains two Threshold Discharge Areas. See Appendix 'F' for the downstream flow path for each TDA. Stormwater runoff from the project site that doesn't infiltrate into the underlying soils sheet flows to the alley to the north, where TDA #1 drains into Structure D4-06593, enters Pipe D1-08661 and flows approximately 130 feet west within a 12-inch PVC pipe to Structure D4-06591. TDA #2 drains into Structure D4-06625, flows approximately 158 feet east within an 8-inch pipe to Structure D4-06626.

Tables 7.1 and 7.2 provide the downstream flow paths for TDA #1 and #2, respectively.

Table 7.1: Downstream Flow Path – TDA #1

Upstream Structure		Storm Pipe					Downstream Structure
ID	Type	ID	Material	Dia. (in)	Length (ft)	Flow Direction	ID
D4-06593	CB1	D1-08661	PVC	12	130	West	D4-06591
D4-06591	CB1	D1-08662	PVC	12	102	North	D4-06588
D4-06588	CB2	D1-08665	PVC	12	53	Northwest	D5-00300
D5-00300	MH2	D1-08666	Conc.	15	43	North	D5-00301
D5-00301	MH2	D1-08674	Conc.	15	267	North	D5-00292
D5-00292	MH2	D1-08604	Conc.	18	141	North	D4-06543
D4-06543	CB2	D1-08605	Conc.	18	155	North	D5-00293
D5-00293	MH2	D1-08609	Conc.	24	200	North	D5-00294
D5-00294	MH2	D1-08610	Conc.	24	103	North	D5-00295
D5-00295	MH2	D1-08614	Conc.	24	47	East	Tee w/ 12"
Tee w/ 12".	Tee	D1-08616	Conc.	24	193	East	D4-06550
D4-06550	CB2	D1-08621	Conc.	24	227	East	D5-00297
D5-00297	MH2	D1-08630	Conc.	24	48	North	Unknown
Unknown	--	D1-08631	CMP	21	144	East / Northeast	Puyallup River

Table 7.2: Downstream Flow Path – TDA #2

Upstream Structure		Storm Pipe					Downstream Structure
ID	Type	ID	Material	Dia. (in)	Length (ft)	Flow Direction	ID
D4-06625	CB1	D1-08702	Conc.	8	158	East	D4-06626
D4-06626	CB1	D1-08704	Conc.	12	113	North	Pipe
Pipe	--	D1-08705	PVC	12	23	Northeast	D4-06621
D4-06621	CB1	D1-08698	PVC	12	34	North	D4-06620
D4-06620	CB1	D1-08707	Conc.	24	164	East	D4-06629
D4-06629	CB2	D1-08718	Conc.	24	139	East	D5-00305
D5-00305	MH2	D1-08735	Conc.	24	94	East	D4-06652
D4-06652	CB2	D1-08736	Conc.	24	132	East	D4-06653
D4-06653	CB2	D1-08739	Conc.	24	111	East	D5-00306
D5-00306	MH2	D1-08741	Conc.	24	30	East	D5-00303
D5-00303	MH2	D1-08744	Steel	18	260	North	Tee w/ 8”
Tee w/ 8”	Tee	D1-08748	Conc.	36	195	North	Puyallup River

Water Quality Assessment

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

The Puyallup River has (3) three Category 5 listings, as follows:

- Bacteria – Fecal Coliform:

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Criterion 2	Aggregate 2	Calculated Value 2
2015	1	14	200 #col/100ml	Highest daily average	210	100 #col/100ml	Three-month geometric mean	102

Basis Statement

HISTORICAL INFORMATION

Location ID: [10A070], [10-PUY-8.5], [10-PUY-5.7], [10A050] -- In water year 2005, 0 of 12 sample values (0%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 19.3 does not exceed the geometric mean criterion (100 cfu/100mL).

Location ID: [10A070], [10-PUY-8.5], [10-PUY-5.7], [10A050] -- In water year 2004, 1 of 12 sample values (8%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 21.8 does not exceed the geometric mean criterion (100 cfu/100mL).

Remarks

Ecology placed this listing in Category 4A when the candidate 2018 WQA was submitted to EPA for review. EPA determined there was not sufficient information to conclude the impairment is addressed by an existing TMDL and did not approve moving this listing to Category 4A in their final approval.

SWRO TMDL lead confirmed this impairment is addressed by the Puyallup River Bacteria TMDL, EPA approved 9/19/2011.

Assessment Cycle 2018 - A historic Category 4A determination was carried forward from a previous assessment or administrative decision. See Historic Basis Statement for previous assessment information.

Combined Listing: Listing IDs 46241, 46240, 46060, 16712 were rolled into this listing

- Temperature:

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value	Criterion 2	Aggregate 2	Calculated Value 2
2015	1	14	200 #col/100ml	Highest daily average	210	100 #col/100ml	Three-month geometric mean	102

Basis Statement

HISTORICAL INFORMATION

Location ID: [10A070], [10-PUY-8.5], [10-PUY-5.7], [10A050] -- In water year 2005, 0 of 12 sample values (0%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 19.3 does not exceed the geometric mean criterion (100 cfu/100mL).

Location ID: [10A070], [10-PUY-8.5], [10-PUY-5.7], [10A050] -- In water year 2004, 1 of 12 sample values (8%) showed an excursion of the % criterion for this waterbody (200 cfu/100mL). The geometric mean of 21.8 does not exceed the geometric mean criterion (100 cfu/100mL).

Remarks

Ecology placed this listing in Category 4A when the candidate 2018 WQA was submitted to EPA for review. EPA determined there was not sufficient information to conclude the impairment is addressed by an existing TMDL and did not approve moving this listing to Category 4A in their final approval.

SWRO TMDL lead confirmed this impairment is addressed by the Puyallup River Bacteria TMDL, EPA approved 9/19/2011.

Assessment Cycle 2018 - A historic Category 4A determination was carried forward from a previous assessment or administrative decision. See Historic Basis Statement for previous assessment information.

Combined Listing: Listing IDs 46241, 46240, 46060, 16712 were rolled into this listing

- Mercury:

Basis Table

Assessment Year

2018

Sampling Year	Excursion Count	Sample Count	Criterion/Threshold	Aggregate	Calculated Value
2015	1	6	0.012 ug/L	Toxic aquatic 4-day average	
2017	1	6	0.012 ug/L	Toxic aquatic 4-day average	

Basis Statement

HISTORICAL INFORMATION

Location ID(s) [10A070] -- In 2005, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Chronic criterion.

Location ID(s) [10A050] -- In 2003, 1 of 4 sample event(s) exceeded Washington's Aquatic Life Chronic criterion.

Location ID(s) [10A050] -- In 2002, 2 of 2 sample event(s) did not exceed Washington's Aquatic Life Chronic criterion.

Puyallup Tribe of Indians unpublished data (submitted by Char Naylor on 3 March 2003) show 1 excursion beyond the chronic criterion from 3 samples collected in 2002 at RM 5.8 and no excursions beyond the chronic criterion from 2 samples collected in 2002 at RM

Remarks

Assessment Cycle 2018 - During 2015 to 2017, two or more sample values collected in a three-year period exceeded the aquatic life criterion.

Combined Listing: Listing IDs 45375, 35421, 35332 were rolled into this listing

See Figure 7.2 for the 303(d) Map of Polluted Waters

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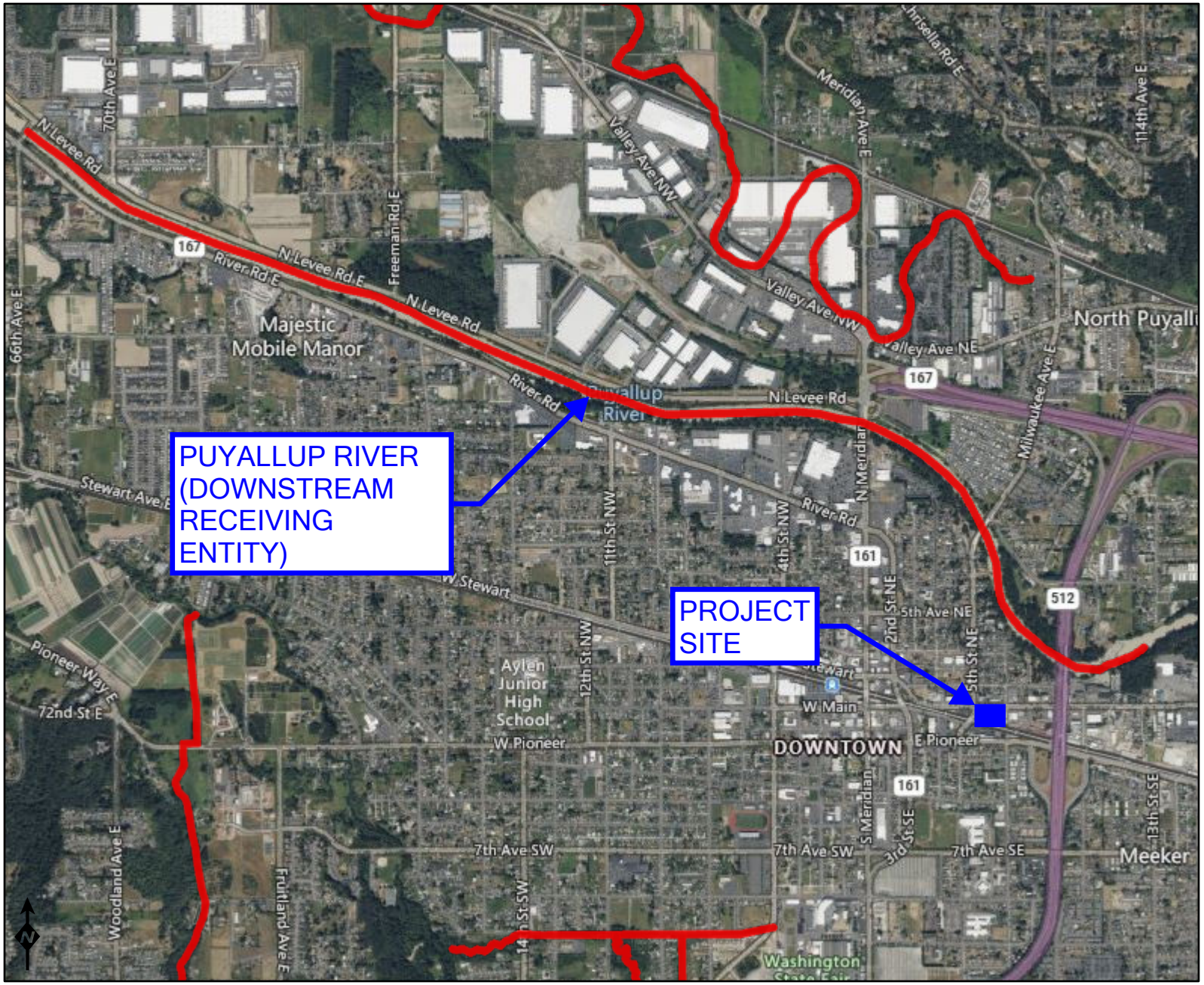
FIGURE 7.2: 303(d) MAP OF POLLUTED WATERS



Assessed Water/Sediment

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

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

Miles
0 0.23 0.45 0.9

DEPARTMENT OF ECOLOGY
State of Washington

8. CRITICAL AREAS

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

- Lahar Hazard
- Critical Aquifer Recharge Area
- Geologic Hazard Area - Volcanic Hazard Area
- Geologic Hazard Area - Seismic Hazard Areas

9. PERFORMANCE GOALS AND STANDARDS

Hydrology Model

The approved hydrology model used for this project is the 2012 Western Washington Hydrology Model (WWHM) software, which incorporates all the methods required for determining compliance with the flow control and water quality standards specified below.

Flow Control

The project site is required to release stormwater to the performance standards provided in the 2019 Manual. To meet the prescriptive performance standards, stormwater discharges shall match Developed discharges to Pre-Developed durations for the range of Pre-Developed discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow. The Pre-Developed condition to be matched shall be a forested land cover unless:

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

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

Runoff Treatment

Treatment facilities shall be sized for the entire area that drains to them, even if some of those areas are not pollution-generating or were not included in the project site threshold decisions or the treatment threshold decisions of this minimum requirement.

Water Quality Design Storm Volume:

- When using an approved continuous runoff model, the water quality design storm volume shall be equal to the simulated daily volume that represents the upper limit of the range of daily volumes that accounts for 91% of the entire runoff volume over a multi-decade period of record.

Water Quality Design Flow Rate:

- Preceding Detention Facilities or when Detention Facilities are not required:

  The flow rate at or below which 91% of the runoff volume, as estimated by an approved continuous runoff model, will be treated.

- Downstream of Detention BMPs:

  The Water Quality Design Flow Rate Shall be the full 2-year release rate from the detention BMP

Conveyance

The 2019 Manual does not provide specific guidance on conveyance analysis. Sections 204.2(1), 204.2(3) and 204.2(4) of the City of Puyallup Standards for Public Works Engineering and Construction Manual (Revised 08/22) state the following:

- **204.2(1):** All new pipe systems, both onsite and offsite, shall be designed with sufficient capacity to convey and contain (at minimum) the 25-year storm flow event, assuming developed conditions for onsite tributary areas, and existing conditions for any offsite tributary areas.
- **204.2(4):** Pipe system structures may overtop for runoff events that exceed the 25-year design capacity provided the overflow from a 100-year runoff event does not create or aggravate an existing flooding problem or erosion problem. Any overflow occurring onsite for runoff events up to and including the 100-year event must discharge at the natural location for the project site. In residential subdivisions, this overflow must be contained within an onsite drainage easement, tract, covenant, or public right-of-way.
- **204.3(3):** Pipe systems shall be designed to accommodate the developed condition 25-year storm flow event with a minimum 0-feet of freeboard without overtopping catch basins and manholes.

10. PERMANENT STORMWATER CONTROL PLAN

In the existing condition, stormwater generally sheet flows from south to north, with elevations of approximately 49.5 along the north property line and 51.2 along the south property line. A slight high point exists on the property line and alley to the north (approximate elevation 49.8) that creates two distinct downstream flow paths that do not combine within 1/4 mile downstream. As such, the two contributing Threshold Discharge Areas are analyzed separately. TDA #1 generally encompasses the western half of the project site and TDA #2 generally encompasses the eastern half. There are no properties that contribute tributary stormwater run-on to the project site.

Pre-Developed Site Hydrology

The project will disturb the entire site area of 0.23 acres. TDA #1 and TDA #2 are connected to Point of Compliance #1 and #2, respectively, such that they can be analyzed independently.

Table 10.1 presents the Pre-Developed land use and associated areas for both drainage basins. The Pre-Developed condition is modeled as “C, Forest, Flat” in accordance with the Manual.

Table 10.1: Pre-Developed Land Use & Area

TDA	C, Forest, Flat sf (ac)	C, Lawn, Flat** sf (ac)	Rooftops, Flat sf (ac)	Roads, Flat sf (ac)	Total sf (ac)
TDA #1 (POC #1)	1,678 (0.039)	-	-	-	1,678 (0.039)
TDA #2 (POC #2)	8,322 (0.191)	-	-	-	8,322 (0.191)
TOTAL:	10,000 (0.230)	-	-	-	10,000 (0.230)

Pre-Developed flows are presented in Table 10.3 and a Pre-Developed Basin Map is presented in Appendix ‘A’

Developed Site Hydrology

In the Post-Construction scenario, existing TDAs are maintained to the maximum extent practicable. However, due to land cover and site constraints, TDA #1 area increased from 1,678 square feet to 3,369 square feet, an increase of 1,691 square feet (0.038 acre). TDA #2 decreased by the same amount to 6,631 square feet (0.152 acre.)

Runoff from the parking lot and sidewalk (TDA #1) will be collected and piped to Structure D4-06593 within the alley north of the project site. Runoff from the driveway will sheet flow into the alley and into the same catch basin.

It is proposed that the building roof runoff (TDA #2) be collected and piped to Structure D4-06625 within the alley north of the project site.

Table 10.2 is comprehensive summary of land use and areas for the Developed Condition. See Appendix 'A' for the Developed Basin Map.

Table 10.2: Developed Land Use and Areas

TDA	C, Pasture, Flat* sf (ac)	Parking, Flat sf (ac)	Rooftops, Flat sf (ac)	Roads, Flat sf (ac)	Sidewalks, Flat sf (ac)	Total sf (ac)
TDA #1 (POC #1)	1,124 (0.026)	2,061 (0.047)	-	-	184 (0.004)	3,369 (0.077)
TDA #2 (POC #2)	2,134 (0.049)	-	3,150 (0.073)	1,347 (0.031)	-	6,631 (0.153)
TOTAL:	3,258 (0.075)	2,061 (0.047)	3,150 (0.073)	1,358 (0.031)	184 (0.004)	**10,000 (0.230)**

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

Table 10.3 presents the Pre-Developed and Developed peak flows (2-, 25-, and 100-Year storm recurrence events) for both Threshold Discharge Areas.

Table 10.3: Pre-Developed and Developed Flows

STORM RECURRENCE EVENT:	PRE-DEVELOPED PEAK FLOWS TDA #1 (POC #1) (CFS)	DEVELOPED PEAK FLOWS TDA #1 (POC #1) (CFS)	PRE-DEVELOPED PEAK FLOWS - TDA #2 (POC #2) (CFS)	DEVELOPED PEAK FLOWS TDA #2 (POC #2) (CFS)
2-Year	0.0008	0.0182	0.0040	0.0370
25-Year	0.0018	0.0351	0.0087	0.0715
100-Year	0.0021	0.0453	0.0101	0.0923

The increase in peak flow during the 100-Year Storm Recurrence Event is 0.0432 cfs and 0.0822 cfs for TDA #1 and TDA #2, respectively.

Flow Control System

Flow control is not required for either TDA #1 or TDA #2 as:

- Neither TDA has a total of 10,000 square feet or more of effective impervious surfaces,
- Neither TDA converts 3/4 acres or more of native vegetation, pasture, scrub/shrub, or unmaintained non-native vegetation to lawn or landscape, or convert 2.5 acres or more of native vegetation to pasture, and from which there is a surface discharge in a natural or man-made conveyance system from the TDA

- Neither TDA, through a combination of effective hard surfaces and converted vegetation areas, cause a 0.15 cfs or greater increase in the 100-year flow frequency as estimated using an approved continuous simulation and 15-minute time steps.

Water Quality System

Water Quality is not required for this project as:

- The project does not create 5,000 square feet or more of Pollution-Generating Hard Surface (PGHS) in a single Threshold Discharge Area.
- The project does not create (not including permeable pavements) a total of 3/4 or more of Pollution-Generating Pervious Surface (PGPS) in a single Threshold Discharge Area, and from which there will be a surface discharge in a natural or man-made conveyance system from the site.

Conveyance System Analysis and Design

The design of the stormwater conveyance system ensures that the peak stormwater runoff from the 100-Year Storm Recurrence event can be contained without any overtopping of structures. Calculations indicate that the peak runoff for the aforementioned 100-Year Storm Recurrence Events are 0.0453 cfs (TDA #1) and 0.0923 cfs (TDA #2). The smallest diameter/slope of pipe is a 6-inch pipe laid at 0.50%. Calculations indicate that this pipe can convey 0.462 cfs.

Pipe capacity was analyzed using Hydraflow Express. All stormwater calculations are presented in Appendix 'B'.

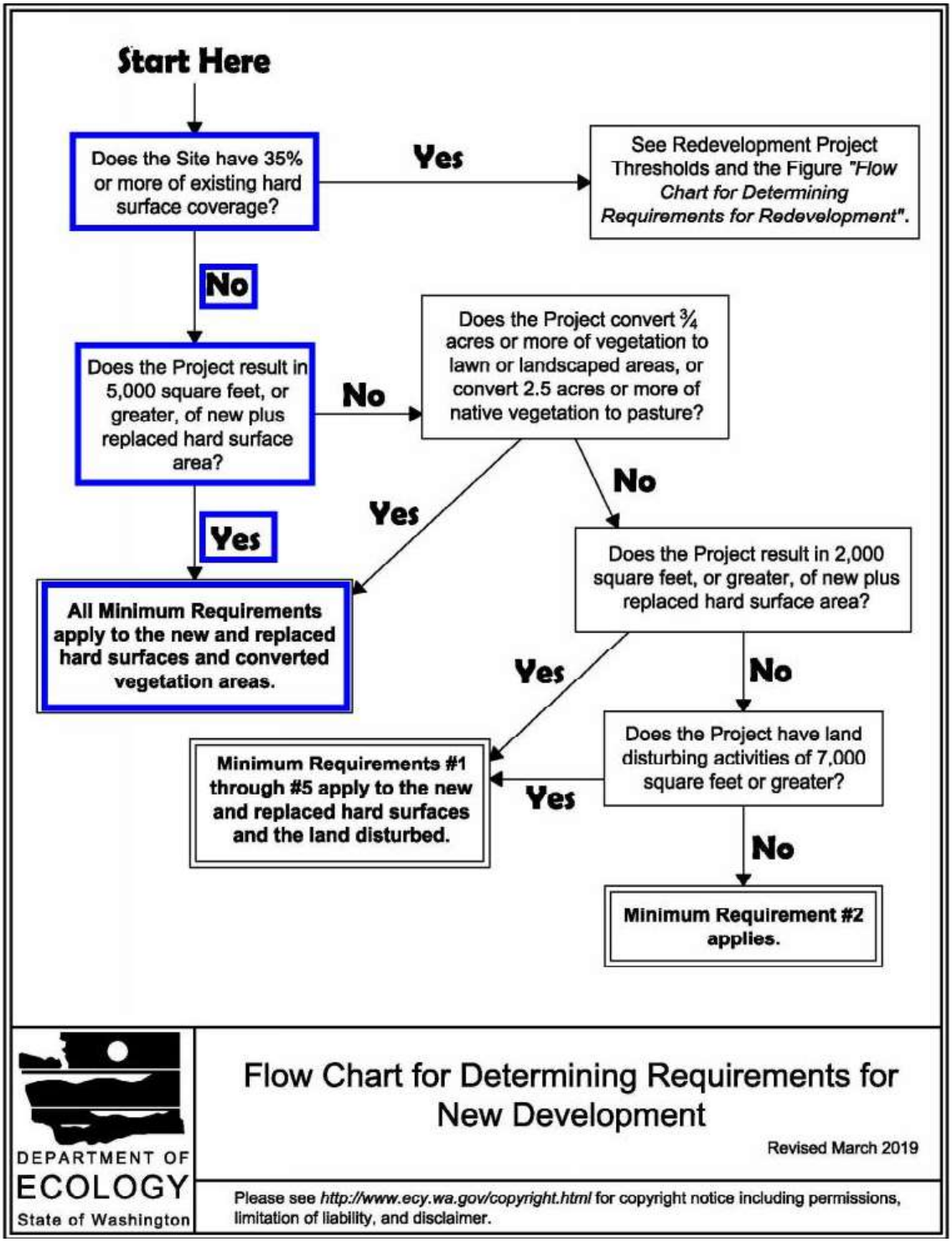
Flow Control BMPs / Low Impact Development BMPs

Due to infeasibility, which is discussed in detail within Section 11, Minimum Requirement #5 for each Flow Control/Low Impact Development BMP from List #2, the only BMP from List #2 that will be implemented on each lot to satisfy Minimum Requirement #5 is BMP T5.13: Post-Construction Soil Quality and Depth.

11. DISCUSSION OF MINIMUM REQUIREMENTS

Referencing Figure 11.1 (Flow Chart for Determining Requirements for New Development) of the Manual, the site does not have 35% or more of existing hard surface coverage and results in 5,000 square feet or greater of new plus replaced hard surface area. As such, all Minimum Requirements apply to the new and replaced hard surfaces and converted vegetation areas. Below are Minimum Requirements #1 though #9 with a discussion as to how each are applicable to this project. For each Minimum Requirement, the feasibility is applicable to both Threshold Discharge Area unless otherwise indicated.

Figure 11.1: Flow Chart for Determining Requirements for New Development



Minimum Requirement #1 - Preparation of Stormwater Site Plans

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

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

A Construction Stormwater Pollution Prevention Plan (SWPPP) will be included as a separate report further in the Design/Approval/Permitting process.

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

Minimum Requirement #3 – Source Control of Pollution

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

- BMPs for Dust Control at Disturbed Land Areas and Unpaved Roadways and Parking Lots (S407)
- BMPs for Illicit Discharges to Storm Drains (S410)
- BMPs for Landscaping and Lawn/Vegetation Management (S411)
- BMPs for Maintenance and Repair of Vehicles and Equipment (S414)
- BMPs for Maintenance of Stormwater Drainage and Treatment Systems (S417)
- BMPs for Parking and Storage of Vehicles and Equipment (S421)
- BMPs for Formation of a Pollution Prevention Team (S453)
- BMPs for Preventative Maintenance / Good Housekeeping (S454)
- BMPs for Spill Prevention and Cleanup (S455)
- BMPs for Employee Training (S456)
- BMPs for Inspections (S457)
- BMPs for Record Keeping (S458)

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

The project site maintains the natural drainage pattern of the existing site to the maximum extent practicable.

There are two Threshold Discharge Areas on the subject property. It is proposed that the discharge points to existing storm conveyance infrastructure be maintained in the as-constructed condition.

TDA #1: Runoff from the parking lot and sidewalk will be collected and piped to Structure D4-06593 within the alley north of the project site. Runoff from the driveway will sheet flow into the alley and into the same catch basin.

TDA #2: Building roof runoff will be collected and piped to Structure D4-06625 within the alley north of the project site. Runoff from the Pedestrian Plaza will sheet flow into the alley and into the same catch basin.

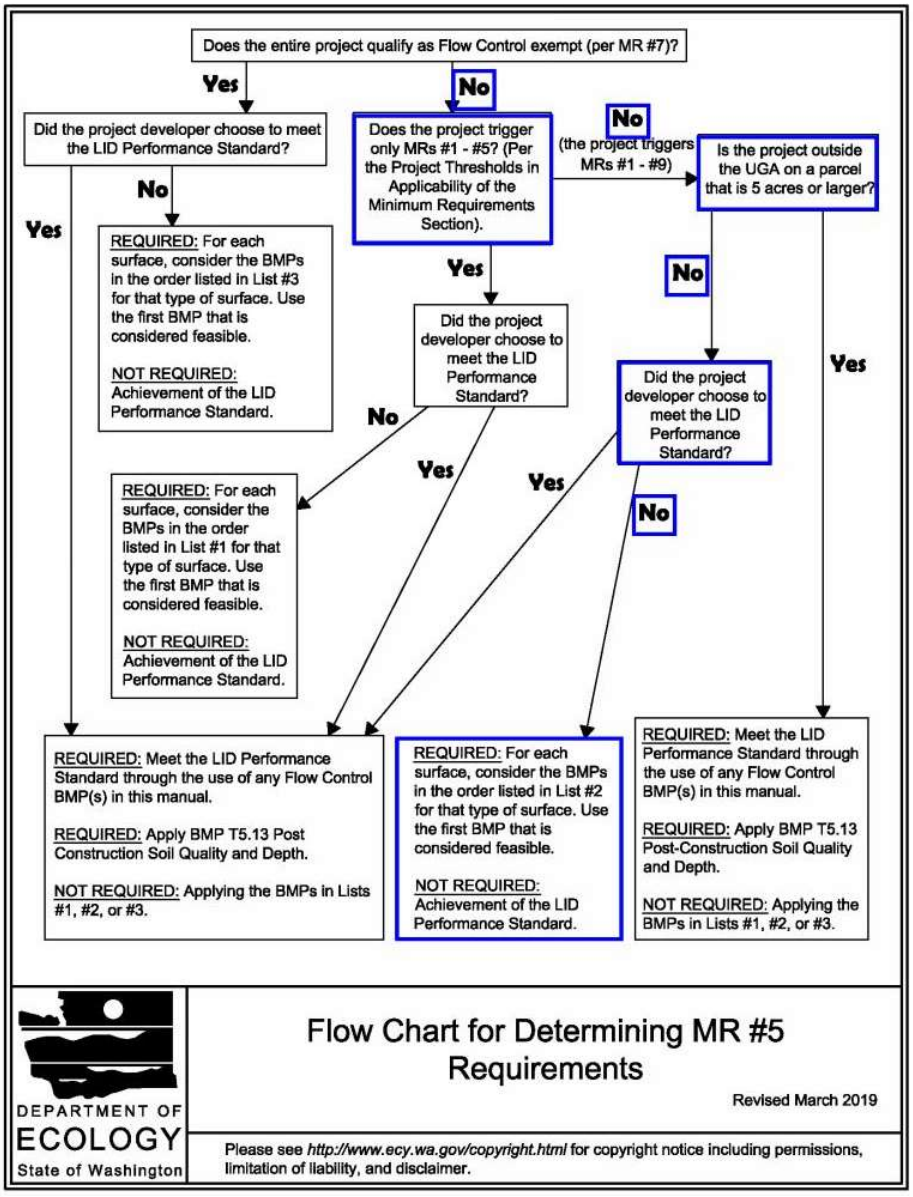
Minimum Requirement #5 - On-site Stormwater Management

Referencing Figure 11.2 (Flow Chart for Determining LID MR #5 Requirements) and Table 11.1 (Minimum Requirement #5 Compliance Options for Projects Triggering Minimum Requirements #1 - #9), this project:

- Does not quality as Flow Control exempt per Minimum Requirement #7.
- Triggers Minimum Requirements #1 - #9 per the Project Thresholds in Applicability of the Minimum Requirements
- Is not located outside the UGA on a parcel that is 5 acres or larger

Therefore, it is required that, for each surface, the BMPs listed in List #2 be considered for that type of surface. The first BMP that is considered feasible shall be used. The other available option (not required) is to demonstrate achievement of the LID Performance Standard. This project uses the List #2 approach.

Figure 11.2: Flow Chart for Determining LID MR #5 Requirements



- Surface Lawn and Landscaped Areas
  - BMP T5.13: Post-Construction Soil Quality and Depth.
    - Feasible and implemented on the project for all disturbed areas that will not receive hard surfacing in the Post-Developed condition.
- Roofs – (Only Applicable to TDA #2. TDA #1 contains no roof area)
  - BMP T5.30: Full Dispersion
    - Not Feasible: The required length of the vegetated flow path cannot be established.
  - BMP T5.10A: Downspout Full Infiltration.
    - Not feasible: Feasibility Criteria #3 of the Manual states, "Downspout Full Infiltration is considered feasible on lots or sites that meet all of the following:"
      - 3 feet or more of permeable soil from the proposed final grade to the seasonal high ground water table.
      - At least 1-foot of clearance from the expected bottom elevation of the infiltration trench or dry well to the seasonal high ground water table.
      - "From the Geotechnical Engineering Report, prepared by Icicle Creek Engineers, dated July 20, 2022, the locations of Boring B-1 and B-2 are within the parking area and proposed building area, respectively. As such, only the Boring location B-1 is acceptable due to the required 10-foot setback a trench must have from any structure. Figure 4 (Boring Log B-1) of the Report indicates that Approximate Ground Surface Elevation is 50 feet and groundwater was measured at 4.4' below (Elevation 45.6). Section 204.4(3) of the City of Puyallup Public Works Engineering & Construction Standards indicates that privately maintained pipes (with the exception of Ductile Iron) shall have 3-feet of cover. Three feet of cover places the top of infiltration pipe at elevation 47. Per Figure V-4.1 of the Manual, the infiltration piping consists of either 4" rigid or 6" flexible perforated pipe, for an invert elevation of 46.67 or 46.50, respectively. Figure V4.1 also shows 12-inches of washed rock below the trench. As such, the bottom of trench is 45.67 (4" rigid) or 45.50 (6" flexible). If 6-inches is placed underneath the perforated pipe, the elevations become 46.17 and 46.00, respectively. Vertical separation of 1-foot between bottom of trench and high water table cannot be achieved.
  - BMP T7.30: Bioretention
    - Not Feasible: Insufficient space. Per City of Puyallup Standard 02.07.01, 24-inches transition zone is required next to parking. Using 6-inches of freeboard at 3:1 side slopes, only 12-foot of area is left at the top of ponding, 0.4% of the roof area.

- BMP T5.10B: Downspout Dispersion Systems
    - **Not feasible: Insufficient room available for the required setback and vegetated flow path.**
- BMP T5.10C: Perforated Stub-Out Connection
    - **Not Feasible: The Stub-Out Connection would be under impervious / or heavily compacted surfacing.**

- **Other Hard Surfaces**
    - NOTE: Per the Pierce County Aquifer – Recharge Areas Interactive Map, located at: (https://open.piercecountywa.gov/dataset/Aquifer-Recharge-Areas/aqr3-4b7t), the Site is within an Aquifer Recharge Area. Additionally, the 2021-07-27 Pre-Application Meeting notes state a Critical Aquifer Recharge Area is known or suspected on or in the vicinity of the subject site. As such, Water Quality treatment will be provided to protect groundwater from pollutants from PGIS runoff to the maximum extent practicable using Flow Control BMPs.
    - BMP T5.30: Full Dispersion
        - **Not Feasible: The required length of the vegetated flow path cannot be established.**
    - BMP T5.15: Permeable Pavements
        - **Not Feasible: The vertical clearance of 3-feet between bottom of the Permeable Pavement section must be 3-feet above the groundwater table, which was encountered at 4.4-feet below grade. The section underneath the paved surface would be 12" permeable ballast over 6" treatment layer, for a total section depth of 4.5-feet, including the required vertical separation.**
    - BMP T7.30: Bioretention
        - **Not Feasible: Insufficient space. Per City of Puyallup Standard 02.07.01, 24-inches transition zone is required next to parking. Using 6-inches of freeboard at 3:1 side slopes, only 12-foot of area is left at the top of ponding, which represents 0.58% and 0.89% of the parking area and pedestrian plaza, respectively.**
    - BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion
        - **Not Feasible: There is insufficient space for Sheet Flow Dispersion or Concentrated Flow Dispersion with the required vegetated Flowpath.**

Minimum Requirement #6 - Runoff Treatment

Runoff treatment is not required for this project as the project does not exceed any of the thresholds within a single TDA. See Section 10 for additional discussion.

Minimum Requirement #7 - Flow Control

Flow Control is not required for this project as the project does not exceed any of the thresholds within a single TDA. See Section 10 for additional discussion.

Minimum Requirement #8 - Wetlands Protection

There are no wetlands on or in the vicinity of the project site.

Minimum Requirement #9 - Operations and Maintenance

An Operations and Maintenance Manual will be included as a separate report further in the Design/Approval/Permitting process.

12. SPECIAL REPORTS AND STUDIES

The following reports were prepared for this project, are incorporated into this Stormwater Site Plan Report by reference, and submitted under separate cover:

- *Report - Geotechnical Engineering Services*, Icicle Creek Engineers, Dated July 20, 2022
- *City of Puyallup Traffic Scoping Worksheet*, Heath & Associates, May 8, 2022

13. BOND QUANTITIES, DEDICATIONS, EASEMENTS

Paperwork and forms for any required Bond, Assignment of Funds, Construction Cost Estimate will be submitted further in the Design/Approval/Permitting process.

The following dedication is proposed for this project:

- Right-of-Way dedication along north property line to provide a City standard 20-foot wide alley

The following buffers are proposed as part of this project:

- North: 12-foot Plaza Space and Type II Landscaping
- South: 6-foot Type II Landscaping
- East: 6-foot Type III Landscaping
- West: 6-foot Type III Landscaping

APPENDIX A

Existing Conditions Map

Developed Conditions Map

Pre-Developed Basin Map

Developed Basin Map

A PORTION OF THE SW 1/4 OF SECTION 27, T. 20 N., R. 4 E., W.M.

SCALE : 1"=20'

20' 10' 0 20' 40'

1' CONTOUR INTERVAL

FOUND 3" BRASS DISC WITH "X" SET IN CONCRETE, DOWN 0.7', IN CASE (JANUARY 2022)

LEGAL DESCRIPTION

LOT 2, CITY OF PUYALLUP SHORT PLAT NUMBER P-13-0085, ACCORDING TO THE PLAT THEREOF RECORDED MAY 14, 2014 UNDER RECORDING NUMBER 201405145001, RECORDS OF THE PIERCE COUNTY AUDITOR;

SITUATE IN THE CITY OF PUYALLUP, COUNTY OF PIERCE, STATE OF WASHINGTON.

NOTES

1. THE LEGAL DESCRIPTION HEREON DESCRIBES THE SAME PROPERTY AS INSURED IN FIRST AMERICAN TITLE INSURANCE COMPANY ALTA COMMITMENT FOR TITLE INSURANCE FILE NO. 4265-3676271 DATED JANUARY 26, 2021. THERE ARE NO TITLE GAPS OR OVERLAPS BETWEEN THE LEGAL DESCRIPTIONS OF THE PROPERTIES ADJOINING THE SURVEYED PROPERTY.
2. NO CORNERS HAVE BEEN SET IN CONJUNCTION WITH THIS SURVEY.
3. THE ADDRESS FOR THE SURVEYED PROPERTY IS 111 5TH STREET S.E., PUYALLUP, WA 98371.
4. THE SURVEYED PROPERTY DEPICTED AND DESCRIBED HEREON ENCLOSES A TOTAL AREA OF 9,995 SQUARE FEET (0.229 ACRES), MORE OR LESS.
5. THE SURVEYED PROPERTY ADJOINS A PUBLIC ALLEY WHICH CONNECTS TO 5TH STREET S.E. AND 7TH STREET S.E.
6. ALL TIES ARE SHOWN EITHER ALONG THE PROPERTY LINE OR PERPENDICULAR TO THE PROPERTY LINE OF THE SURVEYED PROPERTY. OFFSET DISTANCES ARE SHOWN ON THE SAME SIDE OF THE PROPERTY LINE THAT THE OBJECT APPEARS.
7. SURVEYED PROPERTY IS PIERCE COUNTY ASSESSOR PARCEL NO. 7285000112.
8. THERE ARE NO PLOTTABLE EASEMENTS AFFECTING THE SURVEYED PROPERTY. SEE THE ABOVE REFERENCED REPORT FOR OTHER ENCUMBRANCES WHICH APPLY TO THE SURVEYED PROPERTY.
9. THE POSITION OF SURFACE FEATURES (CATCH BASINS, LIGHTS, BUILDING, ETC) ARE FROM ACTUAL FIELD LOCATIONS. THE POSITION OF UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON THE FOLLOWING SOURCES: SURVEYED LOCATIONS OF VISIBLE SURFACE INDICATIONS OBSERVED IN THE FIELD; AND UNDERGROUND UTILITY LOCATES PROVIDED BY MT. VIEW LOCATING SERVICES LLC, IN JANUARY 2022. THE LOCATION OF BURIED UTILITIES SHOWN HEREON SHOULD BE CONSIDERED APPROXIMATE AND REQUIRES FIELD VERIFICATION PRIOR TO ANY DEMOLITION OR CONSTRUCTION WORK ON OR AROUND THE SITE.

REFERENCE SURVEYS

R1 PLAT OF D.M. ROSS FIRST ADDITION TO THE TOWN OF PUYALLUP RECORDED 1889-04-05

R2 SURVEY BY WHITACRE ENGINEERS, INC. - RS 19761006 #1468

R3 SURVEY BY RIIPINEN SURVEYING - RECORDING NO. 9509200250

R4 SURVEYS BY DELTA SURVEYING - RECORDING NOS. 9603270728 AND 9703120051

R5 SURVEY BY PARAMETRIX, INC. - RECORDING NO. 200307015003

R6 SURVEY BY AZURE GREEN - RECORDING NO. 200703215007

R7 SURVEYS BY CASCADE LAND SURVEYING - RECORDING NOS. 200808195005 AND SP FOR SITE 201405145001

R8 SURVEY BY SADLER/BARNARD & ASSOC. INC. - RECORDING NO. 201407085003

R9 SURVEYS BY PRIZM SURVEYING - RECORDING NOS. 201503275002 AND 201606155003

LEGEND

- GATE END
- GUARD POST/BOLLARD
- SIGN
- GAS METER
- GAS VALVE
- POWER CONDUIT
- POWER GUY ANCHOR
- POWER POLE
- POWER POLE WITH DROP
- POWER POLE WITH LIGHT
- POWER TRANSFORMER
- STORM CB
- STORM CO
- STORM MANHOLE
- SANITARY SEWER MANHOLE
- FOUND MONUMENT IN CASE AS NOTED
- FOUND PK AND WASHER AS NOTED
- FOUND REBAR AND CAP AS NOTED
- TELEPHONE POLE
- WATER FIRE HYDRANT
- WATER METER
- WATER VALVE

- BUILDING LINE
- BUILDING OVERHANG
- BOARD FENCE
- CHAIN LINK FENCE
- EDGE GRAVEL/RIPRAP
- RAILROAD TRACKS
- G — GAS
- P — POWER UNDERGROUND
- P — P — POWER OVERHEAD
- S — SANITARY SEWER
- D — STORM DRAINAGE
- T — TELEPHONE UNDERGROUND
- T — T — TELEPHONE OVERHEAD
- W — WATER

FOUND 3" BRASS DISC WITH PUNCH SET IN CONCRETE, DOWN 0.6', IN CASE (JANUARY 2022)

7TH STREET S.E. (PUBLIC RIGHT-OF-WAY)

SDCB, RIM=48.77
IE=45.77 6"ø PVC NE
IE=45.31 12"ø PVC S

SDCB, RIM=49.01
IE=44.86 12"ø PIPE N
IE=44.23 24"ø PIPE E
IE=44.21 12"ø PIPE W

SDCB, RIM=48.61
IE=46.31 8"ø DIP SE

SDCB, RIM=48.66
UNABLE TO OPEN
AT TIME OF SURVEY

CONCRETE WALK

DRIVEWAY

650.11' (R8)
650.15' (R6,R7)
650.17' (R3,R4)
650.15' (ESM)

N 88°56'56" W

ASPHALT

TURN LANE

E. MAIN AVENUE
(PUBLIC RIGHT-OF-WAY)

30'

N 88°56'56" W 15.00' (ESM)
15.00' (R2,R5,R6,R9)

SDCB, RIM=48.53
IE=45.63 12"ø PVC N
IE=46.06 8"ø PVC E
IE=45.98 12"ø PVC W

8"ø SIGN POST

SSMH, RIM=49.02
MID 12" CHANNEL
IE=42.84 (N, W-E)
IE=43.42 12" S

STOP

97°00'00" (ESM)
90°00'00" (R7)
90°00'05" (R4)

GROUND

20'

PLAT OF
D.M. ROSS' FIRST ADDITION
TO THE TOWN OF PUYALLUP
VOLUME 3 OF PLATS, PAGE 12

114.9'

7TH STREET S.E. (PUBLIC RIGHT-OF-WAY)

114.80' (R7)
115.13' (R4)
115.14' (R2)
115' (R1)
114.90' (ESM)

N 01°03'04" W

5' BOARD FENCE

GATE

CO

1 STORY MASONRY BUILDING

SDCB, RIM=49.12
IE=46.77 12"ø PVC W
IE=47.19 6"ø PVC SW

1 STORY WOOD FRAME BUILDING

SDCB 24"ø, RIM=48.26
IE=47.01 6"ø CONC SE

1 STORY MASONRY BUILDING

SHED

SDCB, RIM=49.18
IE=46.28 12"ø PVC N
IE=46.40 12"ø PVC E

FOUND 1/2" REBAR AND CAP STAMPED "CASCADE LS 37540" N 0.1' W 0.0' ASPHALT S 0.3'

ALLEY (PUBLIC)

S 1.3'

W 0.2'

SDCB, RIM=49.94
IE=46.66 12"ø CONC N
IE=46.66 8"ø CONC W
IE=46.59 8"ø CONC SE

FOUND PK NAIL AND WASHER N 0.2' W 0.0'

N 88°56'56" W 105.38' (ESM)=(R7)

FOUND PK NAIL AND WASHER AT PROPERTY CORNER

N 01°03'04" E 27.27' (ESM) 27.45' (R7)

SDCB, RIM=49.00
IE=47.68 6"ø PVC NE

FOUND PK NAIL AND WASHER N 0.1' W 0.0'

LOT 1

EASTERLY FACE OF GARAGE IS W 0.05'

4 CAR GARAGE

30.10' (R7)
N 88°56'56" W
30.10' (ESM)

N 01°03'04" E 42.98' (ESM) 43.10' (R7)

N 88°56'56" W 133.62' (ESM)
133.62' (R7)

SDCB, RIM=49.00
IE=46.80 8"ø CONC E
IE=46.82 6"ø CONC NW

FOUND PK NAIL AND WASHER AT PROPERTY CORNER

LOT 2
CITY OF PUYALLUP
SHORT PLAT NO. P-13-0085
RECORDING NO. 201405145001

SITE
97,775 S.F.
(2.244 ACRES)

N 88°56'56" W 138.50' (ESM)
138.5' (R1)
138.50' (R7)

FOUND REBAR WITH DAMAGED CAP S 0.5' E 0.0'

GRAVEL

5' (ESM) R1,R4,R6,R7

20'

15'

LOT 14
PLAT OF
D.M. ROSS' FIRST ADDITION
TO THE TOWN OF PUYALLUP
VOLUME 3 OF PLATS, PAGE 12

127.28' (R7)
127.40' (R4)
126.77' (R2)
127.45' (R1)
127.38' (ESM)

N 01°03'04" E

SDCB, RIM=50.20
IE=48.55 8"ø CONC NW

RAILROAD TRACKS

ECO-BLOCK WALL

RIPRAP

N 74°05'47" W 77.86' (R7) 77.88' (ESM)

N 01°03'04" E 4.25' (ESM) 4.25' (R7)

ECO-BLOCK WALL

SOUTHERLY FACE OF GARAGE IS N 0.1'

FOUND PK NAIL AND WASHER N 0.0' W 0.0'

N 74°05'47" W 169.35' (R7) 169.38' (ESM)

NPRR RIGHT OF WAY

FOUND 1/2" REBAR AND CAP STAMPED "CASCADE LS 37540" S 0.0' W 0.1'

N 74°05'47" W 148.43' (R7) 143.29' (ESM)

495.10' (R6)
495.21' (R5)
495.24' (R4)
495.32' (R2)
495.17' (ESM)

495.28' (R6)
495.21' (R4)
495.17' (R2)
N 01°22'00" E 495.17' (ESM)

FOUND 2" DOME BRASS CAP NO PUNCH, SET IN CONCRETE, IN CASE (JANUARY 2022)

N 88°43'32" W 5.53' (ESM)
5.58' (R4)
5.56' (R6)
5.55' (R9)

FOUND 2" DOME BRASS CAP WITH PUNCH, SET IN CONCRETE, IN CASE (JANUARY 2022)

BASIS OF HORIZONTAL DATUM:

WASHINGTON COORDINATE SYSTEM (WCS) - SOUTH ZONE (BASED UPON NAD 83/2011) UTILIZING THE WASHINGTON STATE REFERENCE NETWORK (WSRN) IN JANUARY OF 2022.

BASIS OF VERTICAL DATUM:

NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) UTILIZING THE WASHINGTON STATE REFERENCE NETWORK (WSRN) IN JANUARY OF 2022.

SURVEY INSTRUMENTATION

SURVEYING PERFORMED IN CONJUNCTION WITH THIS RECORD OF SURVEY UTILIZED THE FOLLOWING EQUIPMENT AND PROCEDURES:

TWO LEICA SYSTEM 500 DUAL FREQUENCY GPS RECEIVERS, ONE 10" TOTAL STATION MAINTAINED TO MANUFACTURER'S SPECIFICATIONS AS REQUIRED BY WAC-332-130-100

PROCEDURE USED : REAL TIME KINEMATIC AND RAPID STATIC GPS AND FIELD TRAVERSE WITH ACCURACY MEETING OR EXCEEDING THE REQUIREMENTS OF WAC-332-130-090

File: \\esm8\ENGR\ESM-JOBS\2218\001\021\plotsa\Pre-Developed Basin Map.dwg
Plotted: 10/21/2022 3:29 PM
Plotted By: Michael Norton

REVISIONS

NO.	DESCRIPTION/DATE	BY

ZACHARY T. LENTON
STATE OF WASHINGTON
44925
REGISTERED
PROFESSIONAL LAND SURVEYOR

ESM CONSULTING ENGINEERS, LLC
Seattle, WA 98105 | Federal Way, WA 98003
(253) 838-6113 | (425) 207-2800
FEDERAL WAY | EVERETT
www.esmcivil.com
Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture

CASTANEDA & KEIMIG

5TH STREET S.E. CUP

EXISTING CONDITIONS MAP

CITY OF PUYALLUP WASHINGTON

JOB NO.:	2218-001-021
DWG. NAME:	EX-01
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
DATE:	2022-10-21
DATE OF PRINT:	

EX-01

1 OF 1 SHEETS

A PORTION OF THE SE 1/4 OF SEC 27, TWP 20 N, RGE 04 E

5TH STREET CONDITIONAL USE PERMIT

DEVELOPED CONDITIONS MAP

IMPERVIOUS SURFACING

OFFSITE:	
NEW:	379 SF
REPLACED:	0 SF
TOTAL (OFFSITE):	379 SF
ON-SITE:	
NEW (PLAZA/WALK):	1,128 SF
NEW (PARKING):	1,872 SF
NEW (BUILDING):	3,150 SF
REPLACED:	0 SF
TOTAL (ON-SITE):	6,150 SF
TOTAL IMPERVIOUS:	6,529 DF

SITE DATA

SITE ADDRESS:	111 5TH ST SE PUYALLUP WA, 98372
PARCEL NUMBER:	7285000112
SITE AREA GROSS:	10,000 SF = 0.23 AC
ZONING:	GENERAL COMMERCIAL
GROSS FLOOR AREA:	
FOOTPRINT:	3,150 SF
MEZZANINE:	838 SF
TOTAL:	3,988 SF

PARKING

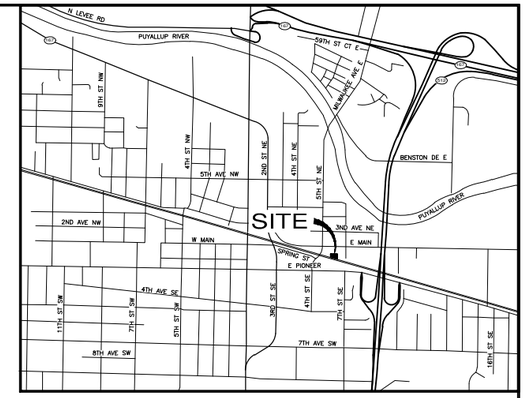
PARKING PROVIDED: 4 SPACES

n

SCALE: 1" = 10'

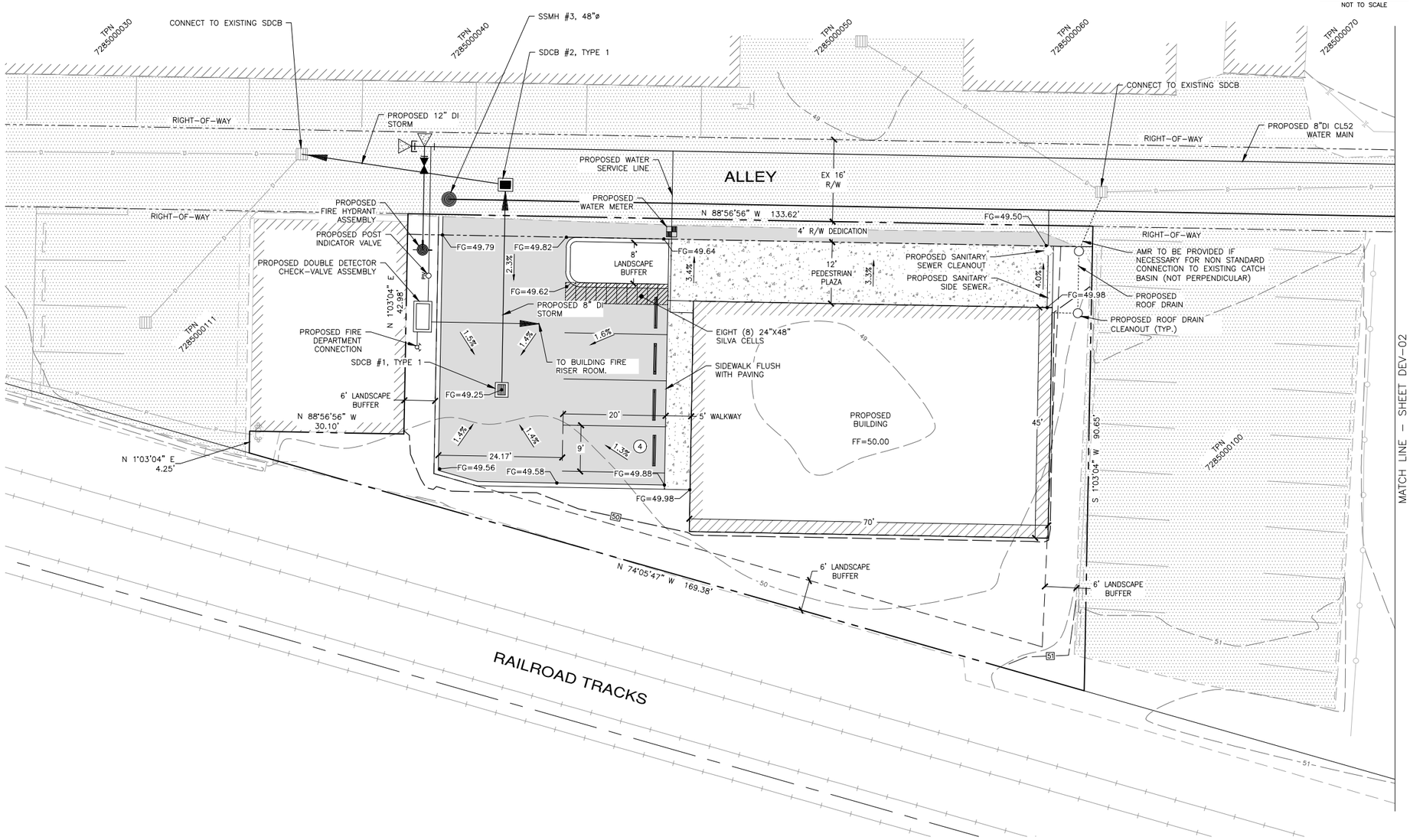
10 5 0 10 20

CONTOUR INTERVAL = 1'



VICINITY MAP

NOT TO SCALE



REVISIONS		
NO.	DESCRIPTION/DATE	BY

ESM CONSULTING ENGINEERS, LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
www.esmcivil.com
FEDERAL WAY (253) 838-6113
EVERETT (425) 337-3600
Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture

JACKSON CASTANEDA & SAMANTHA KEIMIG

5TH ST CONDITIONAL USE PERMIT

CITY OF PUYALLUP | WASHINGTON

DEVELOPED CONDITIONS MAP

JOB NO.:	2218-001-021
DWG. NAME:	DEV-01
DESIGNED BY:	BML
DRAWN BY:	DCL
CHECKED BY:	
DATE:	3/23/2023
DATE OF PRINT:	

DEV-01

1 OF 2 SHEETS

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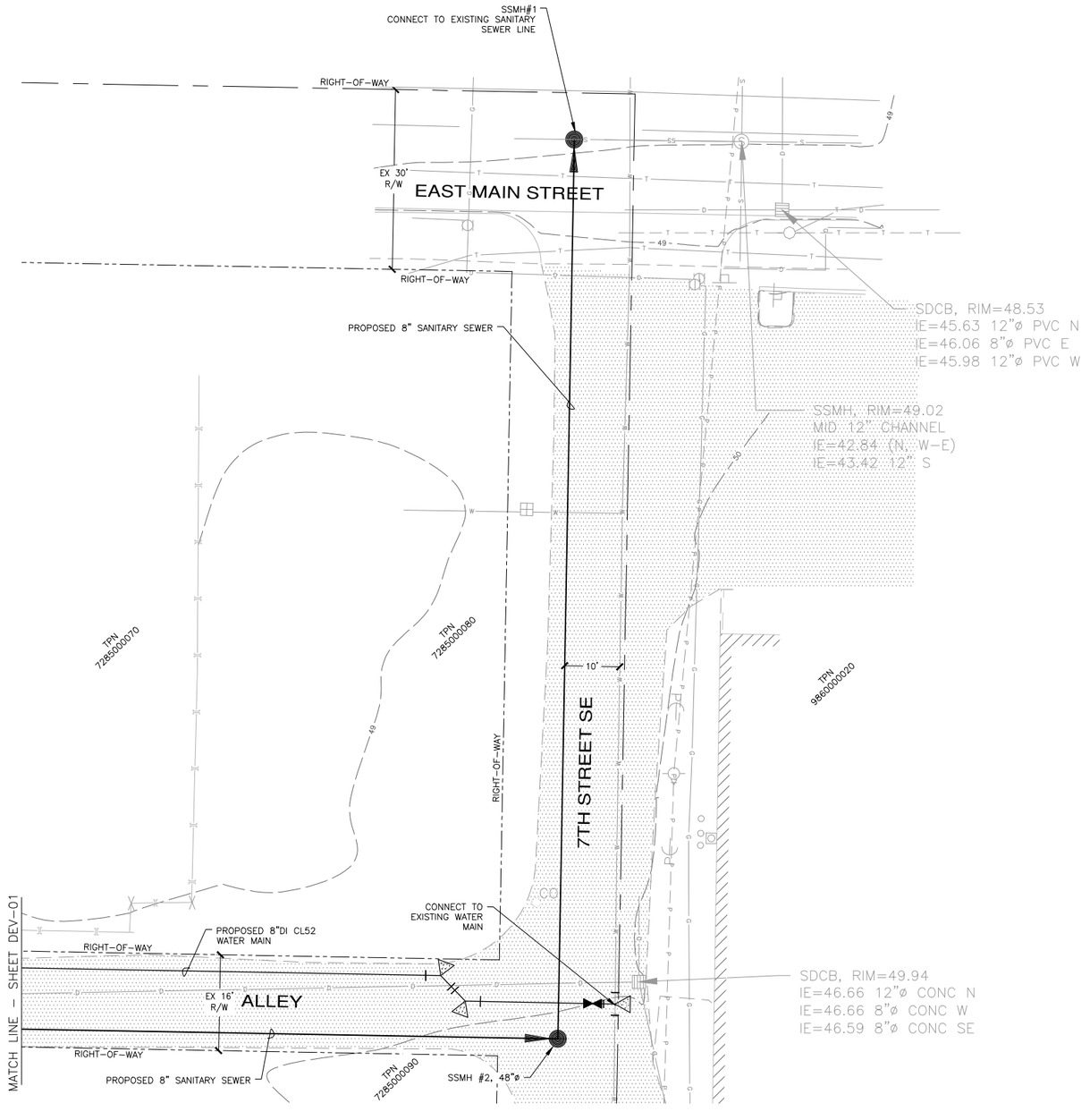
Plotted: 4/6/2023 9:50 AM
Plotted By: Michael Norton

A PORTION OF THE SE 1/4 OF SEC 27, TWP 20 N, RGE 04 E

5TH STREET CONDITIONAL USE PERMIT

DEVELOPED CONDITIONS MAP



n

SCALE: 1" = 10'

10 5 0 10 20

CONTOUR INTERVAL = 1'

REVISIONS		
NO.	DESCRIPTION/DATE	BY

ESM CONSULTING ENGINEERS, LLC
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Public Works | Project Management | Landscape Architecture

JACKSON CASTANEDA & SAMANTHA KEIMIG

5TH ST CONDITIONAL USE PERMIT

DEVELOPED CONDITIONS MAP

CITY OF PUYALLUP WASHINGTON

JOB NO.:	2218-001-021
DWG. NAME:	DEV-02
DESIGNED BY:	BML
DRAWN BY:	DCL
CHECKED BY:	
DATE:	03/23/2023
DATE OF PRINT:	

DEV-02

2 OF 2 SHEETS

File: \\esm8\ENGR\ESM-JOBS\2218\001\021\exhibits\DEV-02.dwg
Plotted: 4/6/2023 9:57 AM
Plotted By: Michael Horton

A PORTION OF THE SW 1/4 OF SECTION 27, T. 20 N., R. 4 E., W.M.

5TH STREET CONDITIONAL USE PERMIT

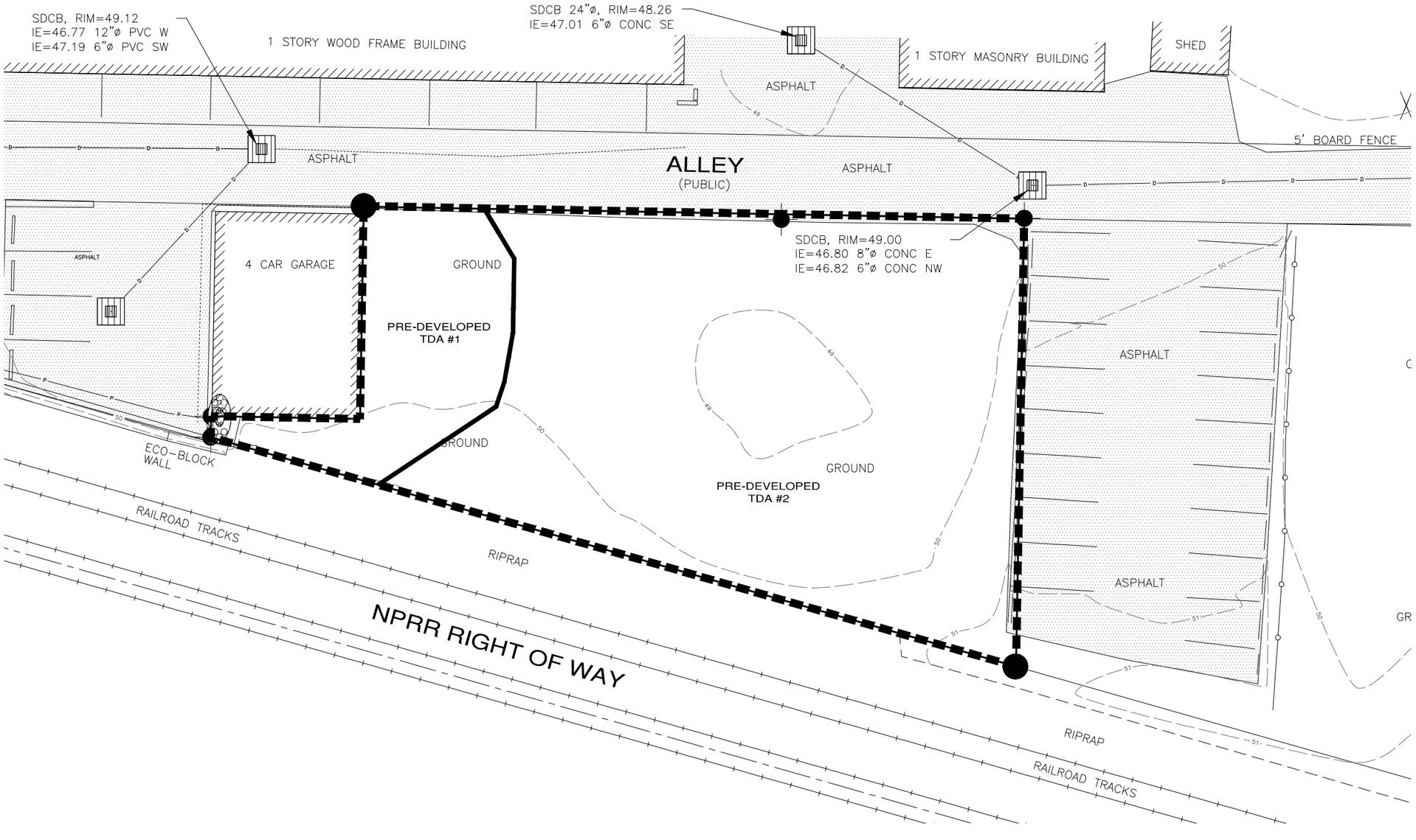
PRE-DEVELOPED BASIN MAP

PRE-DEVELOPED AREAS		
DESC.	AREA (AC)	MODELED AS
TDA #1	0.039	C, FOREST, FLAT
TDA #2	0.191	C, FOREST, FLAT
TOTAL:	0.230	

n

SCALE : 1"=20'

20' 10' 0 20' 40'



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Plotted: 4/6/2023 10:17 AM
Plotted By: Michael Norton

REVISIONS		
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CONSULTING ENGINEERS LLC
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CASTANEDA & KEIMIG

5TH STREET S.E. CUP

PRE-DEVLOPED BASIN MAP

CITY OF PUYALLUP WASHINGTON

JOB NO.:	2218-001-021
DWG. NAME:	P-DEV-1
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
DATE:	2022-10-21
DATE OF PRINT:	

PDEV-1

1 OF 1 SHEETS

A PORTION OF THE SW 1/4 OF SECTION 27, T. 20 N., R. 4 E., W.M.

5TH STREET CONDITIONAL USE PERMIT

DEVELOPED BASIN MAP

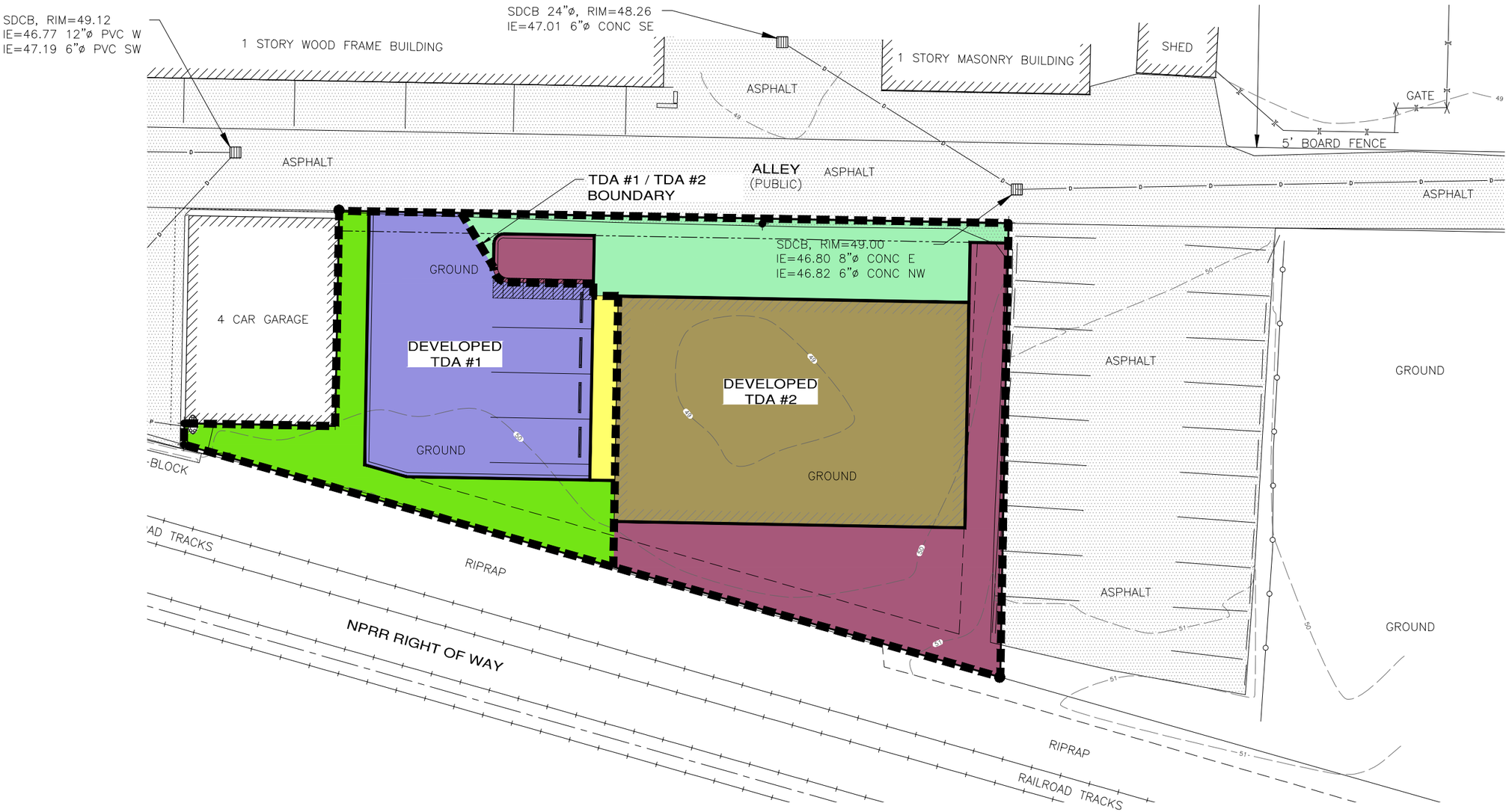
TDA #1			
COLOR	DESC.	AREA (AC)	MODELED AS
	LAWN/ LANDSCAPING	0.026	C, PASTURE, FLAT
	DRIVEWAY/ PARKING	0.047	PARKING, FLAT
	SIDEWALK	0.004	SIIDEWALKS, FLAT
	TOTAL:	0.077	

TDA #2			
COLOR	DESC.	AREA (AC)	MODELED AS
	LAWN/ LANDSCAPING	0.050	C, PASTURE, FLAT
	PLAZA	0.031	ROADS, FLAT
	BUILDING	0.073	ROOF TOPS, FLAT
	TOTAL:	0.153	

n

SCALE : 1"=10'

20' 10' 0 20' 40'



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Plotted By: Michael Horton

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ESM CONSULTING ENGINEERS, LLC
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CASTANEDA & KEIMIG

5TH STREET S.E. CUP

DEVLOPED BASIN MAP

CITY OF PUYALLUP WASHINGTON

JOB NO.:	2218-001-021
DWG. NAME:	DBAS-01
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
DATE:	2022-10-21
DATE OF PRINT:	

DBAS-01

1 OF 1 SHEETS

APPENDIX B

Stormwater Design Calculations

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Apr 6 2023

TDA #2 6-Inch Roof Drain Capacity

Circular

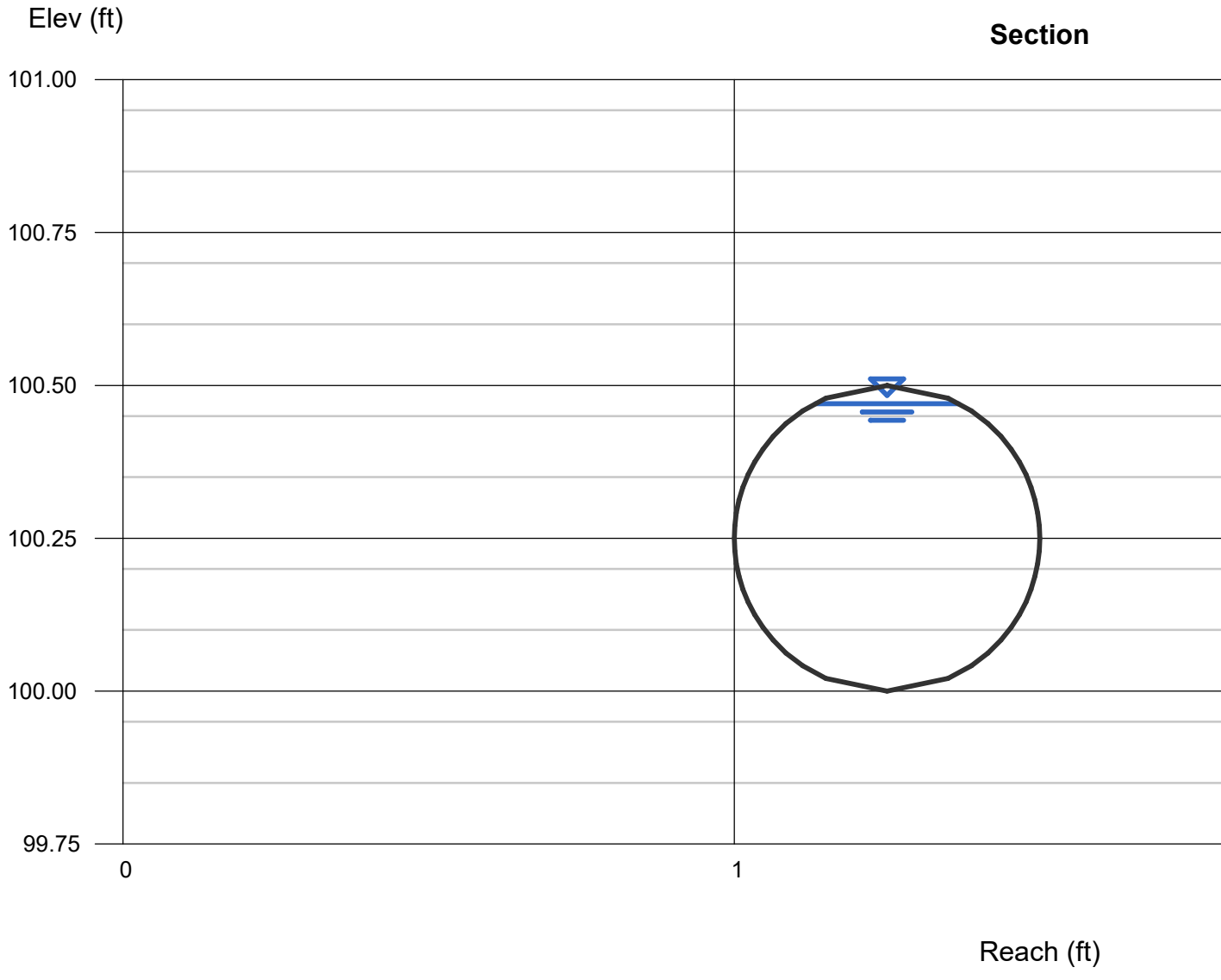
Diameter (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

Calculations

Compute by:	Q vs Depth
No. Increments	= 50

Highlighted

Depth (ft)	= 0.47
Q (cfs)	= 0.462
Area (sqft)	= 0.19
Velocity (ft/s)	= 2.41
Wetted Perim (ft)	= 1.33
Crit Depth, Yc (ft)	= 0.35
Top Width (ft)	= 0.24
EGL (ft)	= 0.56



5th Street Conditional Use Permit
Site Storm Calculations
2023-04-06

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	2023-04-06 5th Street Site Calculations
Site Name:	5th Street CUP
Site Address:	111 5th Street SE
City:	Puyallup
Report Date:	4/6/2023
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

TDA #1 Pre-Developed

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.039
Pervious Total	0.039
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.039

Element Flows To:

Surface	Interflow	Groundwater

TDA #2 Pre-Developed

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.191
Pervious Total	0.191
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.191

Element Flows To:

Surface	Interflow	Groundwater

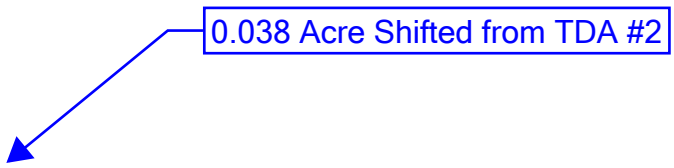
Mitigated Land Use

TDA #1 Developed

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	0.026
Pervious Total	0.026

Impervious Land Use	acre
SIDEWALKS FLAT	0.004
PARKING FLAT	0.047
Impervious Total	0.051
Basin Total	0.077



Element Flows To:

Surface	Interflow	Groundwater

TDA #2 Developed

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	0.049
Pervious Total	0.049

Impervious Land Use	acre
ROADS FLAT	0.031
ROOF TOPS FLAT	0.073
Impervious Total	0.104
Basin Total	0.153

Element Flows To:

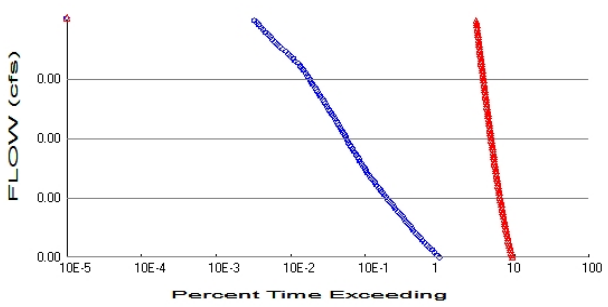
Surface	Interflow	Groundwater

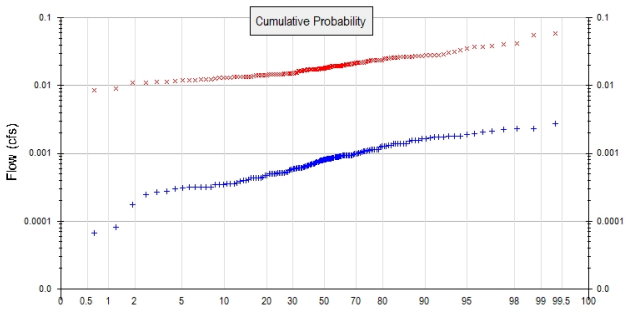
Routing Elements
Predeveloped Routing

Mitigated Routing

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.039
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0.026
Total Impervious Area: 0.051

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.000822
5 year	0.001279
10 year	0.001527
25 year	0.001779
50 year	0.001929
100 year	0.002053

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.018166
5 year	0.024387
10 year	0.028909
25 year	0.035098
50 year	0.040065
100 year	0.045348

Increase = 0.0432 cfs < 1.5 cfs **(OK)**

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.001	0.021
1903	0.001	0.023
1904	0.001	0.028
1905	0.000	0.012
1906	0.000	0.013
1907	0.001	0.019
1908	0.001	0.015
1909	0.001	0.018
1910	0.001	0.017
1911	0.001	0.020

1912	0.003	0.035
1913	0.001	0.014
1914	0.000	0.059
1915	0.001	0.012
1916	0.001	0.023
1917	0.000	0.008
1918	0.001	0.018
1919	0.001	0.011
1920	0.001	0.015
1921	0.001	0.013
1922	0.001	0.021
1923	0.001	0.014
1924	0.000	0.026
1925	0.000	0.011
1926	0.001	0.021
1927	0.001	0.017
1928	0.001	0.013
1929	0.001	0.026
1930	0.001	0.027
1931	0.001	0.013
1932	0.001	0.014
1933	0.001	0.014
1934	0.002	0.023
1935	0.001	0.012
1936	0.001	0.017
1937	0.001	0.025
1938	0.001	0.012
1939	0.000	0.015
1940	0.001	0.027
1941	0.000	0.027
1942	0.001	0.021
1943	0.001	0.020
1944	0.001	0.028
1945	0.001	0.022
1946	0.001	0.017
1947	0.000	0.013
1948	0.002	0.018
1949	0.002	0.028
1950	0.000	0.016
1951	0.001	0.024
1952	0.002	0.028
1953	0.002	0.026
1954	0.001	0.015
1955	0.001	0.014
1956	0.000	0.013
1957	0.001	0.015
1958	0.002	0.019
1959	0.001	0.019
1960	0.000	0.014
1961	0.001	0.041
1962	0.001	0.018
1963	0.000	0.013
1964	0.000	0.038
1965	0.002	0.017
1966	0.000	0.014
1967	0.001	0.020
1968	0.001	0.017
1969	0.001	0.015

1970	0.001	0.018
1971	0.002	0.017
1972	0.001	0.055
1973	0.001	0.032
1974	0.001	0.023
1975	0.002	0.025
1976	0.001	0.026
1977	0.000	0.011
1978	0.002	0.019
1979	0.000	0.019
1980	0.001	0.019
1981	0.001	0.018
1982	0.000	0.015
1983	0.001	0.020
1984	0.001	0.020
1985	0.001	0.023
1986	0.001	0.012
1987	0.002	0.020
1988	0.001	0.012
1989	0.001	0.011
1990	0.001	0.015
1991	0.001	0.021
1992	0.001	0.020
1993	0.001	0.023
1994	0.002	0.017
1995	0.000	0.013
1996	0.002	0.017
1997	0.001	0.015
1998	0.001	0.018
1999	0.000	0.019
2000	0.001	0.017
2001	0.000	0.014
2002	0.001	0.026
2003	0.001	0.015
2004	0.001	0.022
2005	0.002	0.041
2006	0.001	0.019
2007	0.001	0.022
2008	0.001	0.018
2009	0.001	0.014
2010	0.001	0.018
2011	0.000	0.018
2012	0.001	0.017
2013	0.000	0.016
2014	0.000	0.016
2015	0.001	0.027
2016	0.000	0.016
2017	0.001	0.026
2018	0.002	0.017
2019	0.002	0.025
2020	0.001	0.020
2021	0.001	0.017
2022	0.000	0.027
2023	0.001	0.034
2024	0.002	0.038
2025	0.001	0.018
2026	0.001	0.019
2027	0.000	0.022

2028	0.000	0.008
2029	0.001	0.014
2030	0.002	0.028
2031	0.001	0.009
2032	0.000	0.015
2033	0.001	0.019
2034	0.000	0.014
2035	0.002	0.019
2036	0.001	0.014
2037	0.000	0.019
2038	0.001	0.019
2039	0.000	0.037
2040	0.000	0.015
2041	0.001	0.018
2042	0.002	0.021
2043	0.001	0.024
2044	0.001	0.016
2045	0.001	0.013
2046	0.001	0.015
2047	0.001	0.018
2048	0.001	0.015
2049	0.001	0.022
2050	0.001	0.017
2051	0.001	0.024
2052	0.001	0.018
2053	0.001	0.015
2054	0.001	0.030
2055	0.000	0.018
2056	0.000	0.023
2057	0.001	0.012
2058	0.001	0.022
2059	0.001	0.027

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	**Predeveloped**	**Mitigated**
1	0.0027	0.0587
2	0.0023	0.0549
3	0.0023	0.0413
4	0.0022	0.0407
5	0.0021	0.0384
6	0.0021	0.0378
7	0.0020	0.0371
8	0.0019	0.0352
9	0.0018	0.0337
10	0.0018	0.0318
11	0.0018	0.0303
12	0.0018	0.0285
13	0.0017	0.0283
14	0.0017	0.0277
15	0.0017	0.0277
16	0.0017	0.0277
17	0.0016	0.0275
18	0.0016	0.0273
19	0.0016	0.0271
20	0.0015	0.0269
21	0.0015	0.0268
22	0.0014	0.0265

23	0.0014	0.0262
24	0.0014	0.0262
25	0.0014	0.0260
26	0.0014	0.0260
27	0.0014	0.0260
28	0.0013	0.0256
29	0.0013	0.0254
30	0.0013	0.0251
31	0.0013	0.0247
32	0.0013	0.0239
33	0.0012	0.0237
34	0.0012	0.0235
35	0.0011	0.0234
36	0.0011	0.0234
37	0.0011	0.0234
38	0.0011	0.0234
39	0.0011	0.0233
40	0.0011	0.0231
41	0.0011	0.0225
42	0.0011	0.0221
43	0.0011	0.0219
44	0.0011	0.0218
45	0.0010	0.0216
46	0.0010	0.0215
47	0.0010	0.0215
48	0.0010	0.0215
49	0.0010	0.0213
50	0.0010	0.0212
51	0.0009	0.0211
52	0.0009	0.0206
53	0.0009	0.0205
54	0.0009	0.0204
55	0.0009	0.0203
56	0.0009	0.0203
57	0.0009	0.0201
58	0.0009	0.0199
59	0.0009	0.0199
60	0.0009	0.0196
61	0.0009	0.0196
62	0.0009	0.0195
63	0.0009	0.0194
64	0.0009	0.0194
65	0.0009	0.0193
66	0.0009	0.0193
67	0.0009	0.0193
68	0.0008	0.0193
69	0.0008	0.0192
70	0.0008	0.0191
71	0.0008	0.0189
72	0.0008	0.0187
73	0.0008	0.0187
74	0.0008	0.0185
75	0.0008	0.0185
76	0.0008	0.0185
77	0.0008	0.0184
78	0.0008	0.0181
79	0.0008	0.0180
80	0.0008	0.0180

81	0.0008	0.0180
82	0.0008	0.0180
83	0.0008	0.0179
84	0.0008	0.0179
85	0.0008	0.0178
86	0.0008	0.0176
87	0.0007	0.0176
88	0.0007	0.0175
89	0.0007	0.0175
90	0.0007	0.0175
91	0.0007	0.0174
92	0.0007	0.0174
93	0.0007	0.0173
94	0.0007	0.0173
95	0.0007	0.0173
96	0.0007	0.0172
97	0.0007	0.0171
98	0.0007	0.0171
99	0.0006	0.0169
100	0.0006	0.0168
101	0.0006	0.0167
102	0.0006	0.0167
103	0.0006	0.0166
104	0.0006	0.0164
105	0.0006	0.0163
106	0.0006	0.0163
107	0.0006	0.0157
108	0.0006	0.0156
109	0.0006	0.0154
110	0.0006	0.0152
111	0.0006	0.0152
112	0.0006	0.0151
113	0.0006	0.0149
114	0.0005	0.0149
115	0.0005	0.0149
116	0.0005	0.0149
117	0.0005	0.0148
118	0.0005	0.0148
119	0.0005	0.0148
120	0.0005	0.0147
121	0.0005	0.0147
122	0.0005	0.0146
123	0.0005	0.0146
124	0.0005	0.0145
125	0.0005	0.0145
126	0.0005	0.0144
127	0.0005	0.0143
128	0.0005	0.0143
129	0.0004	0.0143
130	0.0004	0.0142
131	0.0004	0.0140
132	0.0004	0.0140
133	0.0004	0.0136
134	0.0004	0.0136
135	0.0004	0.0135
136	0.0004	0.0134
137	0.0004	0.0133
138	0.0004	0.0133

139	0.0004	0.0133
140	0.0004	0.0132
141	0.0004	0.0131
142	0.0003	0.0130
143	0.0003	0.0130
144	0.0003	0.0127
145	0.0003	0.0123
146	0.0003	0.0122
147	0.0003	0.0122
148	0.0003	0.0120
149	0.0003	0.0119
150	0.0003	0.0119
151	0.0003	0.0115
152	0.0003	0.0113
153	0.0003	0.0112
154	0.0002	0.0111
155	0.0002	0.0109
156	0.0001	0.0089
157	0.0001	0.0085
158	0.0000	0.0084

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0004	54243	518716	956	Fail
0.0004	50226	508799	1013	Fail
0.0004	46697	499825	1070	Fail
0.0005	43301	490296	1132	Fail
0.0005	40304	481930	1195	Fail
0.0005	37556	473842	1261	Fail
0.0005	34891	465476	1334	Fail
0.0005	32603	458052	1404	Fail
0.0005	30409	450906	1482	Fail
0.0005	28260	443593	1569	Fail
0.0006	26448	436779	1651	Fail
0.0006	24842	430297	1732	Fail
0.0006	23279	423538	1819	Fail
0.0006	21944	417388	1902	Fail
0.0006	20681	411405	1989	Fail
0.0006	19407	405256	2088	Fail
0.0007	18304	399771	2184	Fail
0.0007	17263	394286	2283	Fail
0.0007	16149	388635	2406	Fail
0.0007	15158	383594	2530	Fail
0.0007	14304	378663	2647	Fail
0.0007	13446	373456	2777	Fail
0.0007	12676	368802	2909	Fail
0.0008	11967	364148	3042	Fail
0.0008	11235	359384	3198	Fail
0.0008	10582	355063	3355	Fail
0.0008	9994	350741	3509	Fail
0.0008	9374	346476	3696	Fail
0.0008	8859	342431	3865	Fail
0.0009	8349	338387	4053	Fail
0.0009	7856	334177	4253	Fail
0.0009	7468	330299	4422	Fail
0.0009	7047	326642	4635	Fail
0.0009	6609	322764	4883	Fail
0.0009	6277	319163	5084	Fail
0.0009	5989	315617	5269	Fail
0.0010	5701	311906	5471	Fail
0.0010	5446	308637	5667	Fail
0.0010	5208	305258	5861	Fail
0.0010	4943	301878	6107	Fail
0.0010	4707	298776	6347	Fail
0.0010	4519	295618	6541	Fail
0.0011	4335	292405	6745	Fail
0.0011	4159	289358	6957	Fail
0.0011	3964	286255	7221	Fail
0.0011	3766	283097	7517	Fail
0.0011	3586	280216	7814	Fail
0.0011	3421	277446	8110	Fail
0.0011	3263	274344	8407	Fail
0.0012	3135	271685	8666	Fail
0.0012	3030	268970	8876	Fail
0.0012	2928	266200	9091	Fail
0.0012	2815	263541	9362	Fail
0.0012	2685	260937	9718	Fail

Duration does need to pass as the threshold for flow control has not been exceeded.

0.0012	2556	258167	10100	Fail
0.0013	2454	255674	10418	Fail
0.0013	2364	253236	10712	Fail
0.0013	2256	250632	11109	Fail
0.0013	2143	248195	11581	Fail
0.0013	2043	245868	12034	Fail
0.0013	1952	243375	12467	Fail
0.0013	1862	240993	12942	Fail
0.0014	1786	238666	13363	Fail
0.0014	1690	236284	13981	Fail
0.0014	1620	234123	14452	Fail
0.0014	1564	231962	14831	Fail
0.0014	1483	229636	15484	Fail
0.0014	1410	227530	16136	Fail
0.0015	1343	225370	16781	Fail
0.0015	1270	223098	17566	Fail
0.0015	1219	221104	18138	Fail
0.0015	1166	219110	18791	Fail
0.0015	1103	217060	19679	Fail
0.0015	1057	215065	20346	Fail
0.0015	1008	213182	21149	Fail
0.0016	964	211243	21913	Fail
0.0016	920	209193	22738	Fail
0.0016	874	207254	23713	Fail
0.0016	815	205315	25192	Fail
0.0016	776	203487	26222	Fail
0.0016	738	201714	27332	Fail
0.0017	695	199775	28744	Fail
0.0017	638	198002	31034	Fail
0.0017	602	196174	32587	Fail
0.0017	555	194235	34997	Fail
0.0017	517	192517	37237	Fail
0.0017	478	190855	39927	Fail
0.0017	434	189138	43580	Fail
0.0018	394	187365	47554	Fail
0.0018	364	185758	51032	Fail
0.0018	339	184096	54305	Fail
0.0018	311	182490	58678	Fail
0.0018	297	180883	60903	Fail
0.0018	273	179276	65668	Fail
0.0019	253	177725	70247	Fail
0.0019	237	176174	74335	Fail
0.0019	223	174623	78306	Fail
0.0019	206	173127	84042	Fail
0.0019	195	171631	88015	Fail
0.0019	180	170025	94458	Fail

Duration does need to pass as the threshold for flow control has not been exceeded.

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

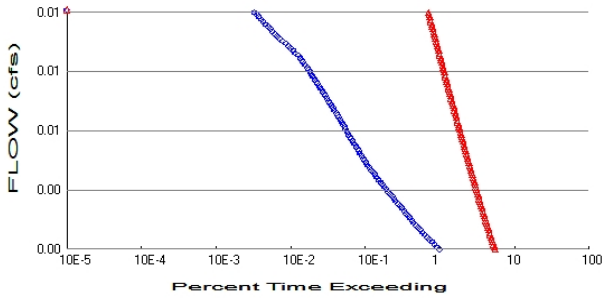
Water Quality BMP Flow and Volume for POC #1

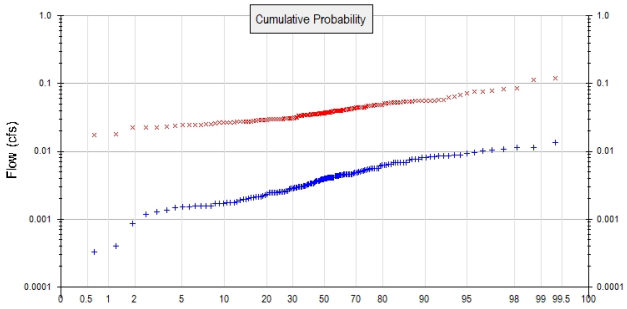
On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
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: 0.191
Total Impervious Area: 0

Mitigated Landuse Totals for POC #2
Total Pervious Area: 0.049
Total Impervious Area: 0.104

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	**Flow(cfs)**
2 year	0.004025
5 year	0.006262
10 year	0.007477
25 year	0.008714
50 year	0.009449
100 year	0.010054

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	**Flow(cfs)**
2 year	0.036998
5 year	0.049667
10 year	0.058874
25 year	0.071477
50 year	0.081592
100 year	0.092349

Increase = 0.0822 cfs < 1.5 cfs **(OK)**

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	**Predeveloped**	**Mitigated**
1902	0.003	0.043
1903	0.002	0.048
1904	0.004	0.056
1905	0.002	0.024
1906	0.001	0.027
1907	0.006	0.038
1908	0.005	0.030
1909	0.005	0.037
1910	0.006	0.035
1911	0.004	0.040
1912	0.013	0.071

1913	0.006	0.028
1914	0.002	0.120
1915	0.003	0.025
1916	0.004	0.046
1917	0.001	0.017
1918	0.004	0.037
1919	0.003	0.023
1920	0.004	0.031
1921	0.005	0.027
1922	0.005	0.042
1923	0.004	0.029
1924	0.002	0.053
1925	0.002	0.023
1926	0.004	0.043
1927	0.003	0.035
1928	0.003	0.027
1929	0.006	0.052
1930	0.004	0.055
1931	0.004	0.027
1932	0.003	0.029
1933	0.003	0.029
1934	0.008	0.048
1935	0.004	0.024
1936	0.003	0.034
1937	0.005	0.050
1938	0.003	0.025
1939	0.000	0.031
1940	0.004	0.055
1941	0.002	0.054
1942	0.006	0.042
1943	0.003	0.041
1944	0.005	0.058
1945	0.005	0.044
1946	0.002	0.035
1947	0.002	0.027
1948	0.009	0.037
1949	0.007	0.056
1950	0.002	0.032
1951	0.003	0.048
1952	0.011	0.057
1953	0.010	0.053
1954	0.004	0.030
1955	0.003	0.028
1956	0.001	0.027
1957	0.005	0.030
1958	0.011	0.038
1959	0.007	0.038
1960	0.002	0.029
1961	0.007	0.083
1962	0.004	0.036
1963	0.002	0.026
1964	0.002	0.077
1965	0.008	0.036
1966	0.002	0.029
1967	0.003	0.041
1968	0.003	0.034
1969	0.003	0.031
1970	0.005	0.036

1971	0.008	0.035
1972	0.005	0.112
1973	0.007	0.065
1974	0.004	0.047
1975	0.009	0.051
1976	0.005	0.053
1977	0.002	0.022
1978	0.008	0.039
1979	0.002	0.039
1980	0.004	0.039
1981	0.004	0.037
1982	0.002	0.030
1983	0.007	0.041
1984	0.003	0.041
1985	0.004	0.047
1986	0.004	0.024
1987	0.008	0.041
1988	0.005	0.025
1989	0.004	0.023
1990	0.005	0.030
1991	0.004	0.044
1992	0.006	0.042
1993	0.005	0.048
1994	0.008	0.034
1995	0.002	0.026
1996	0.009	0.035
1997	0.003	0.031
1998	0.004	0.038
1999	0.000	0.039
2000	0.003	0.035
2001	0.002	0.028
2002	0.006	0.053
2003	0.005	0.030
2004	0.004	0.044
2005	0.008	0.084
2006	0.003	0.039
2007	0.003	0.044
2008	0.004	0.037
2009	0.003	0.028
2010	0.002	0.036
2011	0.002	0.037
2012	0.003	0.035
2013	0.002	0.033
2014	0.002	0.032
2015	0.003	0.055
2016	0.001	0.033
2017	0.006	0.053
2018	0.011	0.035
2019	0.011	0.051
2020	0.003	0.040
2021	0.006	0.034
2022	0.002	0.056
2023	0.005	0.069
2024	0.009	0.078
2025	0.004	0.036
2026	0.007	0.039
2027	0.002	0.044
2028	0.002	0.017

2029	0.005	0.029
2030	0.009	0.056
2031	0.003	0.018
2032	0.002	0.030
2033	0.002	0.038
2034	0.002	0.030
2035	0.010	0.039
2036	0.005	0.030
2037	0.001	0.040
2038	0.004	0.039
2039	0.000	0.076
2040	0.002	0.030
2041	0.003	0.038
2042	0.009	0.043
2043	0.005	0.048
2044	0.006	0.033
2045	0.004	0.027
2046	0.005	0.030
2047	0.004	0.037
2048	0.005	0.030
2049	0.004	0.045
2050	0.003	0.034
2051	0.004	0.049
2052	0.002	0.036
2053	0.004	0.030
2054	0.006	0.062
2055	0.002	0.037
2056	0.002	0.048
2057	0.003	0.023
2058	0.004	0.045
2059	0.007	0.056

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	0.0134	0.1197
2	0.0113	0.1120
3	0.0113	0.0841
4	0.0109	0.0829
5	0.0105	0.0779
6	0.0102	0.0770
7	0.0096	0.0757
8	0.0093	0.0713
9	0.0088	0.0688
10	0.0088	0.0649
11	0.0087	0.0617
12	0.0086	0.0581
13	0.0085	0.0575
14	0.0084	0.0565
15	0.0083	0.0565
16	0.0082	0.0563
17	0.0081	0.0560
18	0.0077	0.0557
19	0.0076	0.0551
20	0.0076	0.0548
21	0.0074	0.0546
22	0.0068	0.0541
23	0.0068	0.0535

24	0.0068	0.0533
25	0.0068	0.0531
26	0.0068	0.0528
27	0.0067	0.0527
28	0.0064	0.0522
29	0.0064	0.0514
30	0.0062	0.0510
31	0.0062	0.0505
32	0.0062	0.0486
33	0.0061	0.0483
34	0.0056	0.0480
35	0.0056	0.0478
36	0.0056	0.0477
37	0.0056	0.0476
38	0.0055	0.0476
39	0.0054	0.0474
40	0.0054	0.0469
41	0.0053	0.0459
42	0.0052	0.0450
43	0.0052	0.0447
44	0.0052	0.0444
45	0.0050	0.0441
46	0.0050	0.0439
47	0.0049	0.0438
48	0.0049	0.0438
49	0.0049	0.0434
50	0.0047	0.0432
51	0.0046	0.0431
52	0.0046	0.0419
53	0.0046	0.0417
54	0.0046	0.0417
55	0.0046	0.0414
56	0.0046	0.0414
57	0.0045	0.0409
58	0.0045	0.0407
59	0.0045	0.0406
60	0.0045	0.0399
61	0.0045	0.0399
62	0.0044	0.0397
63	0.0044	0.0395
64	0.0043	0.0394
65	0.0043	0.0394
66	0.0043	0.0393
67	0.0043	0.0393
68	0.0041	0.0392
69	0.0041	0.0390
70	0.0041	0.0388
71	0.0041	0.0383
72	0.0041	0.0379
73	0.0041	0.0379
74	0.0041	0.0378
75	0.0040	0.0377
76	0.0040	0.0375
77	0.0040	0.0375
78	0.0040	0.0370
79	0.0040	0.0368
80	0.0039	0.0368
81	0.0039	0.0367

82	0.0039	0.0366
83	0.0039	0.0366
84	0.0038	0.0365
85	0.0037	0.0362
86	0.0037	0.0358
87	0.0037	0.0358
88	0.0037	0.0357
89	0.0036	0.0357
90	0.0036	0.0356
91	0.0034	0.0354
92	0.0034	0.0353
93	0.0034	0.0353
94	0.0033	0.0352
95	0.0033	0.0352
96	0.0033	0.0349
97	0.0033	0.0348
98	0.0033	0.0348
99	0.0032	0.0344
100	0.0031	0.0342
101	0.0031	0.0340
102	0.0030	0.0339
103	0.0030	0.0337
104	0.0030	0.0334
105	0.0030	0.0333
106	0.0030	0.0332
107	0.0030	0.0319
108	0.0029	0.0318
109	0.0029	0.0314
110	0.0029	0.0310
111	0.0028	0.0310
112	0.0028	0.0306
113	0.0028	0.0305
114	0.0026	0.0304
115	0.0026	0.0304
116	0.0025	0.0304
117	0.0025	0.0302
118	0.0025	0.0301
119	0.0025	0.0301
120	0.0025	0.0301
121	0.0025	0.0299
122	0.0025	0.0298
123	0.0025	0.0297
124	0.0024	0.0296
125	0.0024	0.0295
126	0.0023	0.0293
127	0.0023	0.0291
128	0.0022	0.0291
129	0.0021	0.0291
130	0.0021	0.0289
131	0.0021	0.0286
132	0.0021	0.0285
133	0.0021	0.0277
134	0.0020	0.0277
135	0.0020	0.0276
136	0.0019	0.0272
137	0.0019	0.0272
138	0.0018	0.0271
139	0.0017	0.0270

140	0.0017	0.0269
141	0.0017	0.0267
142	0.0017	0.0266
143	0.0017	0.0265
144	0.0017	0.0258
145	0.0016	0.0251
146	0.0016	0.0249
147	0.0016	0.0248
148	0.0015	0.0243
149	0.0015	0.0243
150	0.0015	0.0243
151	0.0015	0.0235
152	0.0013	0.0231
153	0.0013	0.0228
154	0.0012	0.0227
155	0.0009	0.0222
156	0.0004	0.0181
157	0.0003	0.0173
158	0.0002	0.0172

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0020	54309	304981	561	Fail
0.0021	50182	297280	592	Fail
0.0022	46603	289745	621	Fail
0.0022	43345	282377	651	Fail
0.0023	40293	275397	683	Fail
0.0024	37451	268693	717	Fail
0.0025	34913	262211	751	Fail
0.0025	32564	255896	785	Fail
0.0026	30326	249968	824	Fail
0.0027	28271	244095	863	Fail
0.0028	26432	238444	902	Fail
0.0028	24797	233015	939	Fail
0.0029	23296	227752	977	Fail
0.0030	21922	222544	1015	Fail
0.0031	20631	217669	1055	Fail
0.0031	19418	212905	1096	Fail
0.0032	18282	208196	1138	Fail
0.0033	17219	203653	1182	Fail
0.0034	16160	199221	1232	Fail
0.0034	15147	194844	1286	Fail
0.0035	14277	190634	1335	Fail
0.0036	13451	186589	1387	Fail
0.0037	12659	182545	1442	Fail
0.0037	11933	178778	1498	Fail
0.0038	11235	175011	1557	Fail
0.0039	10559	171410	1623	Fail
0.0040	9972	167753	1682	Fail
0.0040	9374	164207	1751	Fail
0.0041	8847	160828	1817	Fail
0.0042	8332	157449	1889	Fail
0.0043	7861	154180	1961	Fail
0.0043	7457	150911	2023	Fail
0.0044	7030	147809	2102	Fail
0.0045	6609	144651	2188	Fail
0.0046	6271	141715	2259	Fail
0.0046	5978	138834	2322	Fail
0.0047	5701	135953	2384	Fail
0.0048	5438	133239	2450	Fail
0.0049	5198	130524	2511	Fail
0.0049	4940	127754	2586	Fail
0.0050	4703	125205	2662	Fail
0.0051	4511	122602	2717	Fail
0.0052	4335	120164	2771	Fail
0.0052	4157	117726	2831	Fail
0.0053	3958	115400	2915	Fail
0.0054	3766	113073	3002	Fail
0.0055	3581	110801	3094	Fail
0.0055	3414	108585	3180	Fail
0.0056	3259	106425	3265	Fail
0.0057	3134	104264	3326	Fail
0.0058	3026	102159	3376	Fail
0.0058	2926	100164	3423	Fail
0.0059	2814	98115	3486	Fail
0.0060	2682	96176	3585	Fail

Duration does need to pass as the threshold for flow control has not been exceeded.

0.0061	2555	94236	3688	Fail
0.0061	2451	92353	3767	Fail
0.0062	2358	90525	3839	Fail
0.0063	2255	88807	3938	Fail
0.0064	2140	87090	4069	Fail
0.0064	2038	85317	4186	Fail
0.0065	1952	83600	4282	Fail
0.0066	1860	81938	4405	Fail
0.0067	1778	80331	4518	Fail
0.0067	1690	78669	4654	Fail
0.0068	1619	77118	4763	Fail
0.0069	1561	75566	4840	Fail
0.0070	1482	74126	5001	Fail
0.0070	1407	72686	5166	Fail
0.0071	1338	71245	5324	Fail
0.0072	1270	69916	5505	Fail
0.0073	1217	68531	5631	Fail
0.0073	1163	67256	5782	Fail
0.0074	1103	65927	5977	Fail
0.0075	1055	64653	6128	Fail
0.0076	1005	63323	6300	Fail
0.0076	963	62104	6449	Fail
0.0077	919	60996	6637	Fail
0.0078	872	59833	6861	Fail
0.0079	814	58725	7214	Fail
0.0079	774	57561	7436	Fail
0.0080	738	56509	7657	Fail
0.0081	694	55351	7975	Fail
0.0082	636	54315	8540	Fail
0.0082	601	53295	8867	Fail
0.0083	553	52248	9448	Fail
0.0084	517	51246	9912	Fail
0.0085	478	50276	10517	Fail
0.0085	434	49295	11358	Fail
0.0086	394	48315	12262	Fail
0.0087	363	47379	13052	Fail
0.0088	339	46465	13706	Fail
0.0088	310	45506	14679	Fail
0.0089	295	44620	15125	Fail
0.0090	273	43728	16017	Fail
0.0091	252	42897	17022	Fail
0.0091	237	42071	17751	Fail
0.0092	223	41296	18518	Fail
0.0093	206	40526	19672	Fail
0.0094	194	39733	20480	Fail
0.0094	179	38941	21754	Fail

Duration does need to pass as the threshold for flow control has not been exceeded.

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 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
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

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

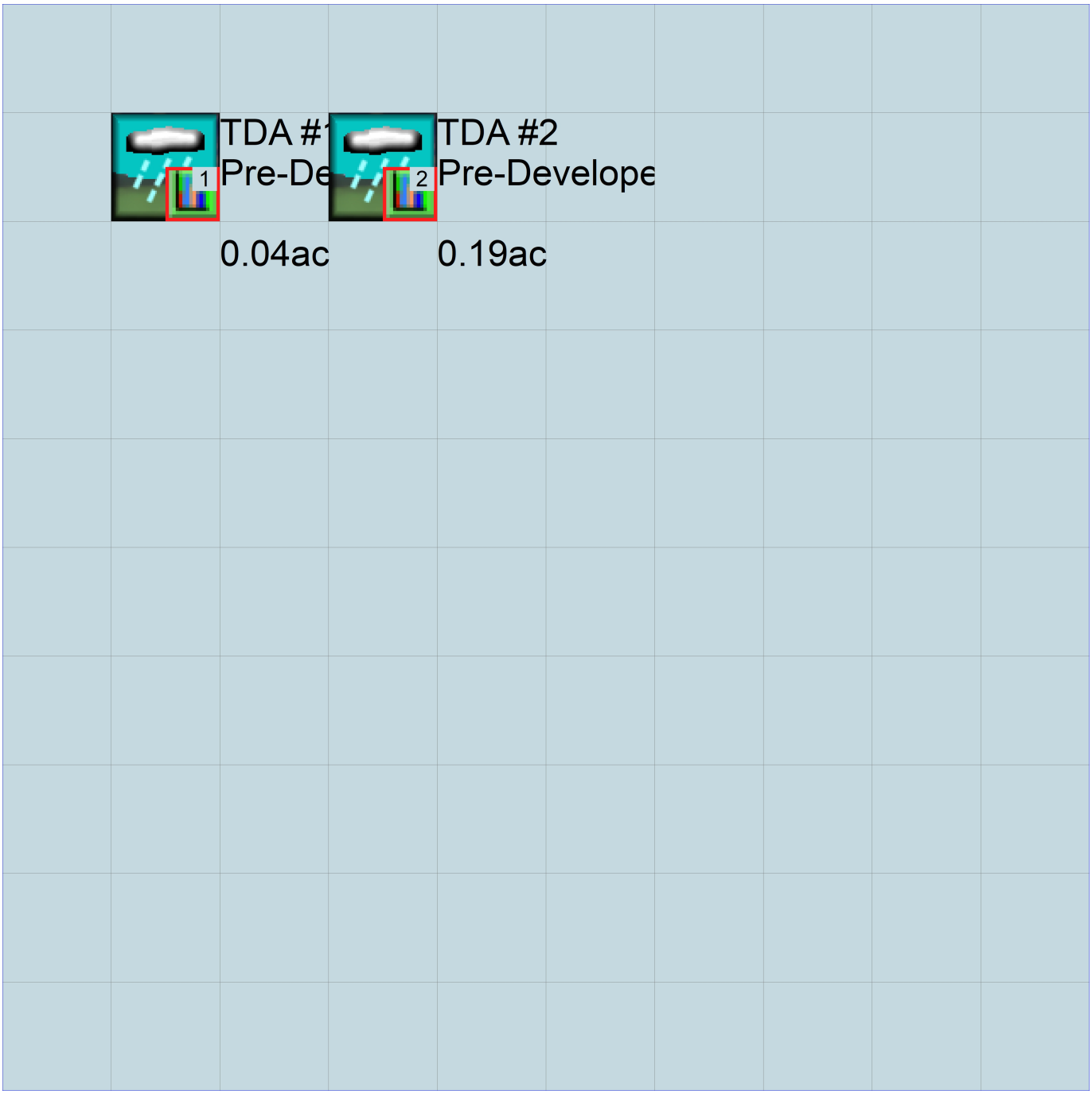
No PERLND changes have been made.

IMPLND Changes

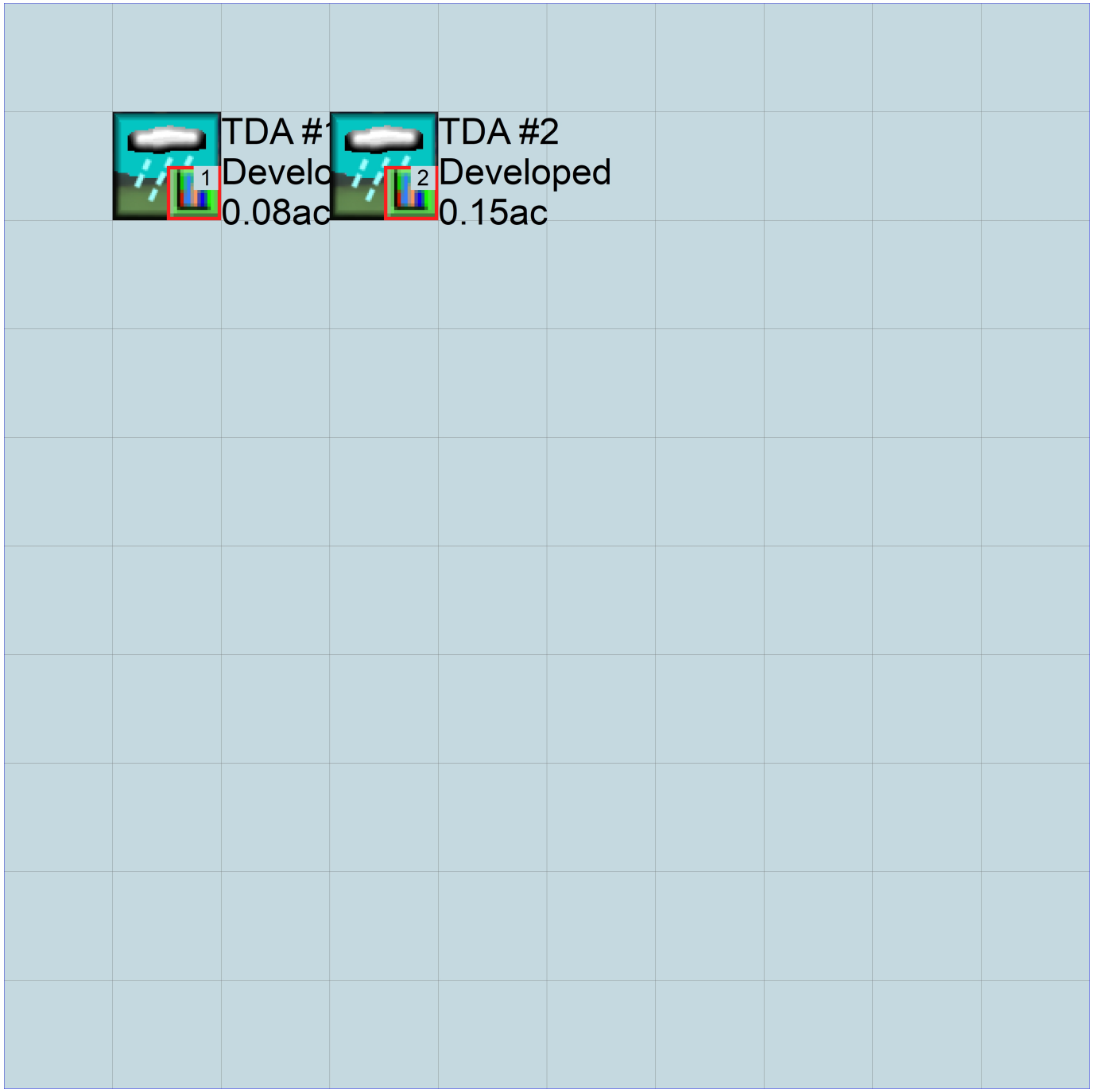
No IMPLND changes have been made.

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   2023-04-06 5th Street Site Calculations.wdm
MESSU       25   Pre2023-04-06 5th Street Site Calculations.MES
            27   Pre2023-04-06 5th Street Site Calculations.L61
            28   Pre2023-04-06 5th Street Site Calculations.L62
            30   POC2023-04-06 5th Street Site Calculations1.dat
            31   POC2023-04-06 5th Street Site Calculations2.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        TDA #1 Pre-Developed        MAX                   1    2   30    9
    2        TDA #2 Pre-Developed        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#   ***
TDA #1 Pre-Developed***
PERLND  10                         0.039     COPY   501     12
PERLND  10                         0.039     COPY   501     13
TDA #2 Pre-Developed***
PERLND  10                         0.191     COPY   502     12
PERLND  10                         0.191     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   2023-04-06 5th Street Site Calculations.wdm
MESSU       25   Mit2023-04-06 5th Street Site Calculations.MES
            27   Mit2023-04-06 5th Street Site Calculations.L61
            28   Mit2023-04-06 5th Street Site Calculations.L62
            30   POC2023-04-06 5th Street Site Calculations1.dat
            31   POC2023-04-06 5th Street Site Calculations2.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      13
      IMPLND       8
      IMPLND      11
      IMPLND       1
      IMPLND       4
      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        TDA #1 Developed           MAX                    1    2   30    9
    2        TDA #2 Developed           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           ***
   13     C, Pasture, Flat        1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

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

```
 13         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
 13         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
 13         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
 13              0       4.5      0.06       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
 13              0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
 13           0.15       0.4       0.3         6       0.5       0.4
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
 13              0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    8      SIDEWALKS/FLAT         1    1    1   27    0
   11      PARKING/FLAT           1    1    1   27    0
    1      ROADS/FLAT             1    1    1   27    0
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    8         0    0    1    0    0    0
   11         0    0    1    0    0    0
    1         0    0    1    0    0    0
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    8         0    0    4    0    0    0    1    9
   11         0    0    4    0    0    0    1    9
    1         0    0    4    0    0    0    1    9
    4         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     ***
    8         0    0    0    0    0
   11         0    0    0    0    0
    1         0    0    0    0    0
    4         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    8            400      0.01       0.1       0.1
   11            400      0.01       0.1       0.1
    1            400      0.01       0.1       0.1
    4            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    8              0         0
   11              0         0
    1              0         0
    4              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    8              0         0
   11              0         0
    1              0         0
    4              0         0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
TDA #1 Developed***
PERLND  13                      0.026     COPY   501     12
PERLND  13                      0.026     COPY   501     13
IMPLND   8                      0.004     COPY   501     15
IMPLND  11                      0.047     COPY   501     15
TDA #2 Developed***
PERLND  13                      0.049     COPY   502     12
PERLND  13                      0.049     COPY   502     13
IMPLND   1                      0.031     COPY   502     15
IMPLND   4                      0.073     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                               ***
  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     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
```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

Legal Notice

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APPENDIX C

NRCS Soil Map and Soil Unit Data

Pierce County Area, Washington

31A—Puyallup fine sandy loam

Map Unit Setting

National map unit symbol: 2hq9
Elevation: 0 to 390 feet
Mean annual precipitation: 35 to 60 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Puyallup and similar soils: 85 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Puyallup

Setting

Landform: Terraces, flood plains
Parent material: Alluvium

Typical profile

H1 - 0 to 13 inches: ashy fine sandy loam
H2 - 13 to 29 inches: loamy fine sand
H3 - 29 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 48 to 79 inches
Frequency of flooding: OccasionalNone
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A
Ecological site: F002XA008WA - Puget Lowlands Riparian Forest
Forage suitability group: Droughty Soils (G002XN402WA)
Other vegetative classification: Droughty Soils (G002XN402WA)
Hydric soil rating: No

Minor Components

Briscot, undrained
Percent of map unit: 2 percent
Landform: Depressions
Other vegetative classification: Seasonally Wet Soils (G002XN202WA)
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 18, Sep 8, 2022

Soil Map—Pierce County Area, Washington
(5th Street CUP - Soil Map)

Map Scale: 1:276 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 4 8 16 24

Feet: 0 10 20 40 60

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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

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

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

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

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

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

Soil Survey Area: Pierce County Area, Washington
Survey Area Data: Version 18, Sep 8, 2022

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

Date(s) aerial images were photographed: Jul 18, 2020—Aug 2, 2020

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
31A	Puyallup fine sandy loam	0.2	100.0%
Totals for Area of Interest		**0.2**	**100.0%**

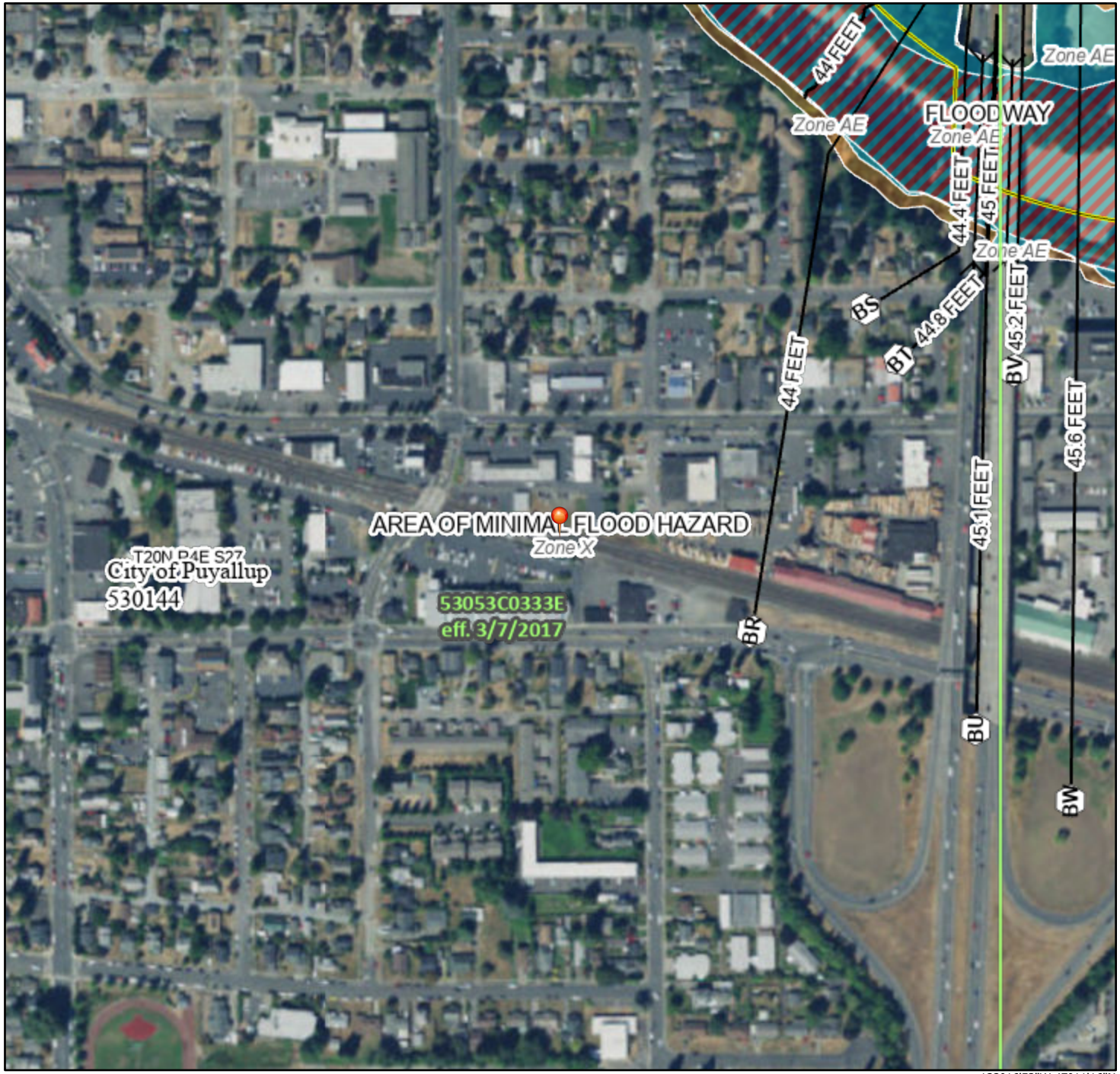
APPENDIX D

Federal Emergency Management Agency Flood Insurance Rate Panel

National Flood Hazard Layer FIRMette

FEMA

122°17'31"W 47°11'40"N



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

1:6,000

122°16'53"W 47°11'16"N

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

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/19/2022 at 6:24 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

APPENDIX E

Bond Quantities, Declaration of Covenant for Privately Maintained Facilities

(To be provided further in the design / approval / permitting process)

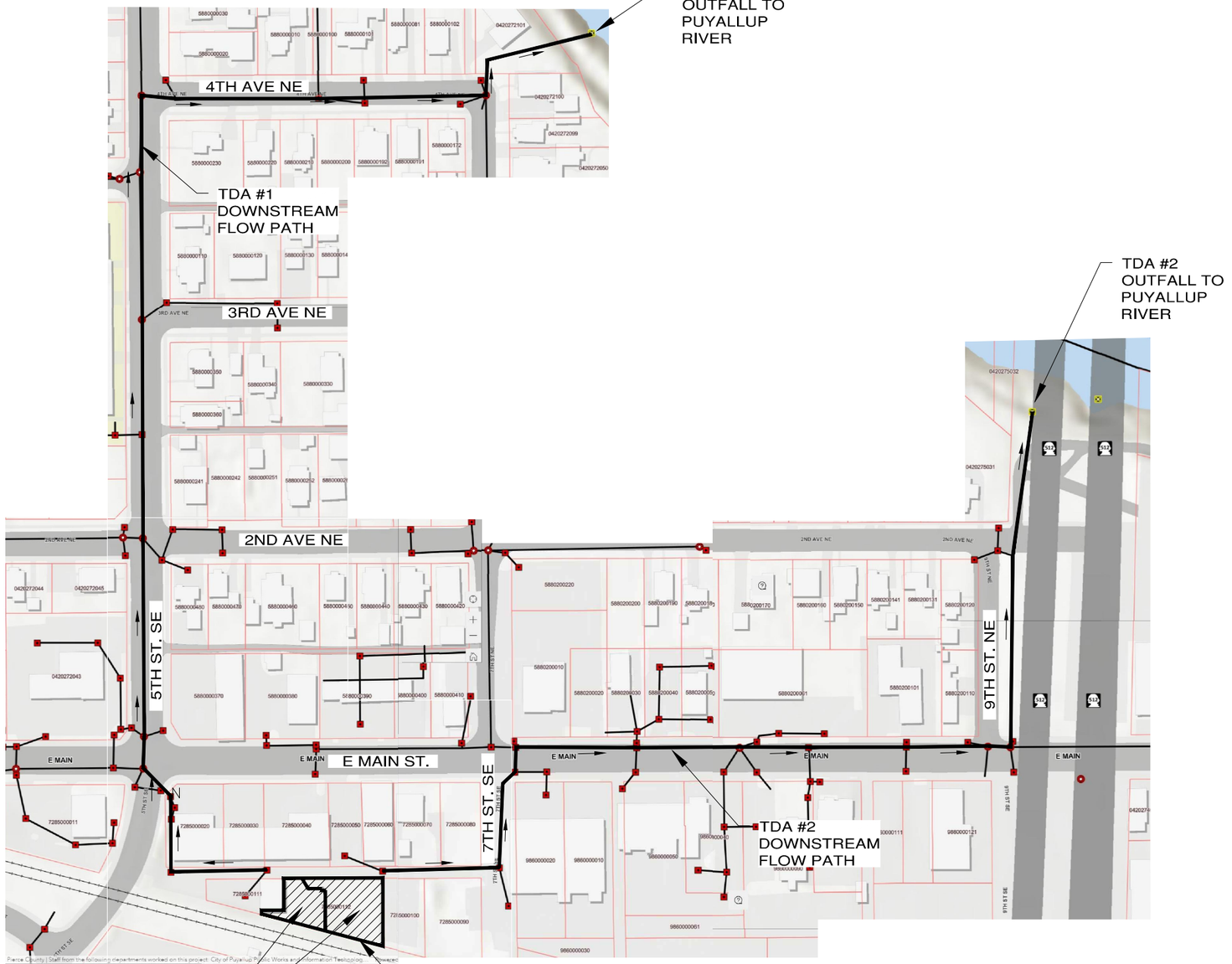
APPENDIX F

Downstream Drainage Path

A PORTION OF THE SW 1/4 OF SECTION 27, T. 20 N., R. 4 E., W.M.

5TH STREET CONDITIONAL USE PERMIT

DOWNSTREAM FLOW PATH



REVISIONS		
NO.	DESCRIPTION/DATE	BY

CONSULTING ENGINEERS LLC
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Civil Engineering | Land Surveying | Land Planning
Public Works | Project Management | Landscape Architecture

CASTANEDA & KEIMIG

5TH STREET S.E. CUP

DOWNSTREAM FLOW PATH

CITY OF PUYALLUP WASHINGTON

JOB NO.:	2218-001-021
DWG. NAME:	DFP-01
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
DATE:	2022-10-24
DATE OF PRINT:	

DFP-01

1 OF 1 SHEETS

File: \\esm9\ENGR\ESM-JOBS\2218\001\021\exhibits\DFP-01.dwg
Plotted: 4/6/2023 12:35 PM
Plotted By: Michael Norton