5th Street Conditional Use Permit

Stormwater Site Plan Report

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Prepared for

Samantha Keimig and Jackson Castaneda
1113 27th St. Pl. NW
Puyallup, WA 98371

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Submitted by

ESM Consulting Engineers, LLC
33400 8th Avenue S, Suite 205
Federal Way, WA 98003

Clark Kunitsugu, P.E.
(253) 838-6113
clark.kunitsugu @esmcivil.com

www.esmcivil.com

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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 (east-west direction) and between 5th Street SE and 7th Street SE, which flow in the north-south direction within Section 20, Township 20 North, Range 04 East, W.M., City of Puyallup, WA. The site is located on Parcel 7282000112, addressed 115 5th Street SE, Puyallup, WA 98372, zoned CG (General Commercial) with 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 for partial workspace and associated materials. Other proposed site improvements include but may not be limited to: 24-foot one-way driveway, (4) four parking stalls, 6-foot walkway, 12-foot pedestrian plaza, and landscape buffers. The main drive access to the site will be upgraded to meet current city standards for commercial access, and a Right-of-Way dedication along the north property line will be implemented to provide a City standard 20-foot wide alley. Utility work will include the replacement of the existing 4-inch water line within 7th Street SE to an 8-inch line to ensure adequate water supply for the required on-site fire hydrant. Additionally, the sewer main from East Main will be extended to the intersection of the alley, then west along the sites frontage. An existing storm main may need to be extended to provide a connection for any stormwater runoff not infiltrated on-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. The proposed stormwater conveyance system will collect and convey runoff from the driveway and parking to CB D4-06593. Building runoff will be collected and conveyed to CB D4-06625. Both catch basins are located in the alley to the north of the project, both 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 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

VICINITY MAP
NOT TO SCALE

Update the Storm Report and design per the 2019 Ecology Manual (adopted in July 2022). Report is subject to more comments following update. [Storm Report, Pg 3]

Stormwater design for the project is in accordance with the 2012 Washington State Department of Ecology Stormwater Management Manual for Western Washington (SWMMWW) as amended in December 2014 (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 and Critical Area Report 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 elevations of approximately 48.9 feet. Site slopes are generally between approximately 2- to 7-percent.

The subject property is currently undeveloped and vacant. Land cover is primarily scrub grass and dirt. The project site is bordered to the west, north and east by parking lots, alleyways and urban commercial development (single-story retail and warehouse structures). 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 (clean 2- to 4-inch rock).

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 NRCS Data Soil Map and Soil Map Unit Data.

A Geotechnical Engineering Report was created by Icicle Creek Engineers (dated May 26, 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 Keimig/Castaneda Property 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 east 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 III, Section 3.3.6, 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, "Due to the relatively shallow groundwater table and the relatively shallow depth to low-permeability soil, we expect that disposal of stormwater by infiltration may be infeasible…"

Figure 3.1: Boring and Sample Locations

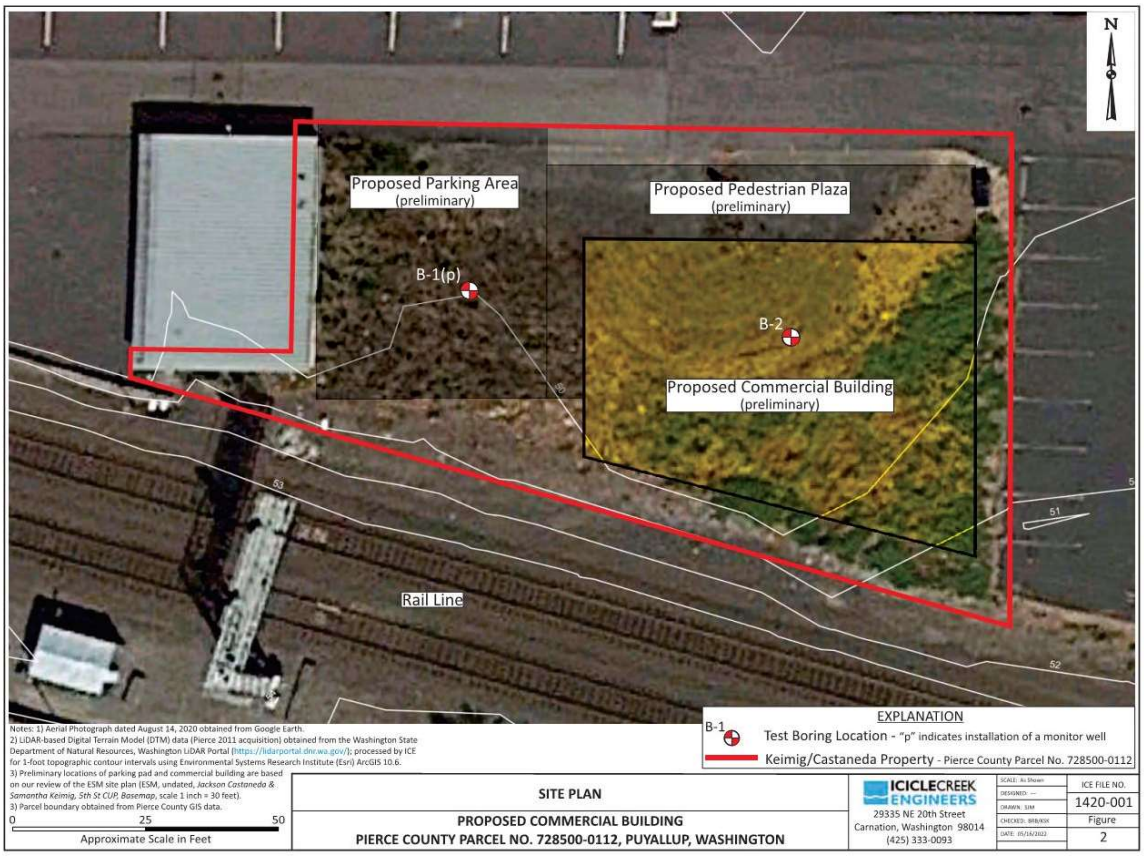


Table 3.1: Short and Long-Term Infiltration Rates

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 within or 100 feet from the site. In the developed condition, domestic water and sewer will be provided by Covington Water District and Soos Creek Sewer District, respectively

5. FUEL TANKS

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

6. FLOOD PLAIN ANALYSIS

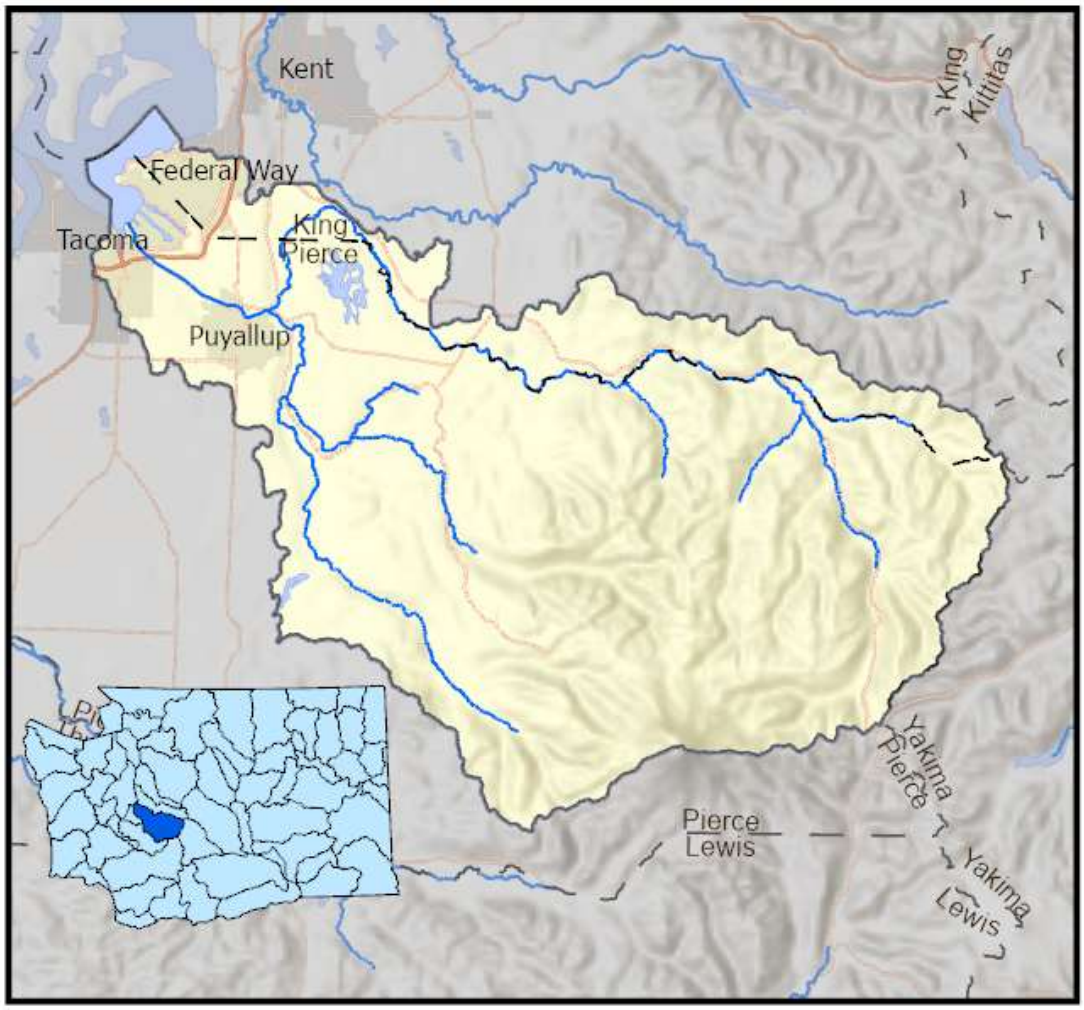
According to Federal Emergency Management Program Flood Insurance Rate Map 53053C10333E, effective 2017-03-07, the project lies within Zone X and is not screened, "Area of Minimal Zone Hazard". A FirmETTE has been created for this project and is presented as Appendix 'D'.

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 item was located regarding the Puyallup-White Watershed:

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

Tributary Runon

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

Downstream Analysis

The project site contains two Drainage Basins, herein delineated as the "West Basin" and the "East Basin". See Appendix 'F' for the downstream flow path for each Basin. Stormwater runoff from the project site that doesn't infiltrate into the underlying soils will exit the property to the north and enter the alley, where the West Basin drains into CB D-4-06593, enters Pipe D1-08661 and flows approximately 130 feet west within a 12-inch PVC pipe to CB D4-06591. The East Basin drains into CB D4-06625, flows approximately 158 feet east within a -inch pipe to D4-06626.

Tables 7.1 and 7.2 provide the downstream flow paths for the West and East Basins, respectively.

Table 7.1: Downstream Flow Path – West Drainage Basin

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 – East Drainage Basin

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 Creek 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

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:

- Aquifer Recharge Area
- Volcanic / Lahar Hazard
- Seismic Hazard

9. PERFORMANCE GOALS AND STANDARDS

Hydrology Model

The approved hydrology model used for this project is the 2021 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 2012 (amended in 2014) 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:

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

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. Design criteria for treatment facilities are assigned to achieve the applicable performance goal (e.g., 80% TSS removal) at the water quality design flow rate . At a minimum, 91% of the total runoff volume, as estimated by an approved continuous runoff model, must pass through the treatment facility(ies) at or below the approved hydraulic loading rate for the facility(ies).

Conveyance

The 2012 (amended in 2014) Stormwater Management Manual for Western Washington 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 CONROL 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 drainage basins (East Basin and West Basin) are analyzed separately. 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. The West Basin and East Basin 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 “A/B. Forest, Flat” in accordance with the Manual.

Table 10.1: Pre-Developed Land Use & Area

Basin ID	C, Forest, Flat sf (ac)	C, Lawn, Flat** sf (ac)	Rooftops, Flat sf (ac)	Roads, Flat sf (ac)	Total sf (ac)
West Basin: Pre-Developed (P.O.C. #1)	1,676 (0.039)	-	-	-	1,676 (0.039)
East Basin: Pre-Developed (P.O.C. #2)	8,324 (0.191)	-	-	-	8,324 (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 basin areas are maintained to the maximum extent practicable. However, due to land cover and site constraints, the West Basin area increased from 1,676 square feet to 3,008 square feet, an increase of 1,332 square feet (0.031 acre). The East Basin decreased by the same amount to 6,992 square feet (0.161 acre.)

It is proposed that the building roof runoff (East Basin) be collected and piped to CB D4-06625 within the alley north of the project site. The Pedestrian Plaza will sheet flow into the alley and into the same catch basin. Runoff from the parking lot and driveway (West Basin) will sheet flow into the alley and into CB D4-06593.

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

Table 10.2: Post-Developed Land Use and Areas

Basin ID	C, Pasture, Flat* sf (ac)	Parking, Flat sf (ac)	Rooftops, Flat sf (ac)	Roads, Flat sf (ac)	Sidewalks, Flat sf (ac)	Total sf (ac)
West Basin (P.O.C. #1)	1,052 (0.024)	1,956 (0.045)	-	-	-	3,008 (0.069)
East Basin (P.O.C. #2)	2,268 (0.052)	-	3,150 (0.073)	1,358 (0.031)	216 (0.005)	6,992 (0.161)
TOTAL:	3,320 (0.076)	1,956 (0.045)	3,150 (0.073)	1,358 (0.031)	216 (0.005)	**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-, 5-, 10-, 25-, 50- and 100-Year storm recurrence events) for both the West Basin and East Basin.

Table 10.3: Pre- and Post-Developed Flows

STORM RECURRENCE EVENT	PRE-DEVELOPED PEAK FLOWS - WEST BASIN (P.O.C. #1) (CFS)	DEVELOPED PEAK FLOWS - WEST BASIN (P.O.C.#1) (CFS)	PRE-DEVELOPED PEAK FLOWS - EAST BASIN (P.O.C. #2) (CFS)	DEVELOPED PEAK FLOWS - EAST BASIN (POC #2) (CFS)
2-Year	0.0008	0.0160	0.0040	0.0388
5-Year	0.0013	0.0215	0.0063	0.0521
10-Year	0.0015	0.0255	0.0075	0.0617
25-Year	0.0018	0.0310	0.0087	0.0749
50-Year	0.0019	0.0354	0.0094	0.0855
100-Year	0.0021	0.0400	0.0101	0.0968

The increase in peak flow during the 100-Year Storm Recurrence Event is 0.0379 cfs and 0.0867 cfs for the West and East Basins, respectively.

Document how the project meets COP Design Standard requirements that permits direct discharge to the Puyallup River found in Section 204.2 (2). Contact me if you have trouble finding the 2012 Storm Comp Plan Direct Discharge Basin Map. [Storm Report, Pg 12]

Flow Control System

Flow control is not required for this project as:

- The project indirectly discharges to the Puyallup River (a Flow-Control Exempt Surface Water from 1/2 mile downstream of confluence with Kellog Creek) through a conveyance system comprised entirely of manmade conveyance elements.
- The project does not propose 10,000 square feet or more in a single Threshold Discharge Area.

- The project does not convert 3/4 acres or more of vegetation to lawn or landscape or convert 2.5 acres or more of native vegetation to pasture in a Threshold Discharge Area, and from which there is a surface discharge in a natural or manmade conveyance system from the site.
- The project does not, through a combination of effective hard surfaces and converted vegetation areas, cause a 0.10 cubic feet per second increase in the 100-year flow frequency from a threshold discharge area as estimated using the Western Washington Hydrology Model or other approved model and one hour time steps (or a 0.15 cfs increase using 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

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(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.
- **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.

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 event are 0.0400 cfs (West Basin) and 0.0968 cfs (East Basin). These peak flows are for the entire basin to be conservative in the conveyance capacity calculations. The smallest diameter/slopes pipe is a 6-inch pipe laid at 0.50%. Calculations indicate that this pipe can convey 0.462 cfs at a depth of 0.47-feet (5.64-inches).

Flow Control and Water Quality calculations were performed using WWHM, a hydrological modeling program approved by the Washinton State Department of Ecology. The pipe capacity was analyzed using Hydraflow Express contained within Autocad Civil 3D. All stormwater calculations are presented in Appendix 'B'.

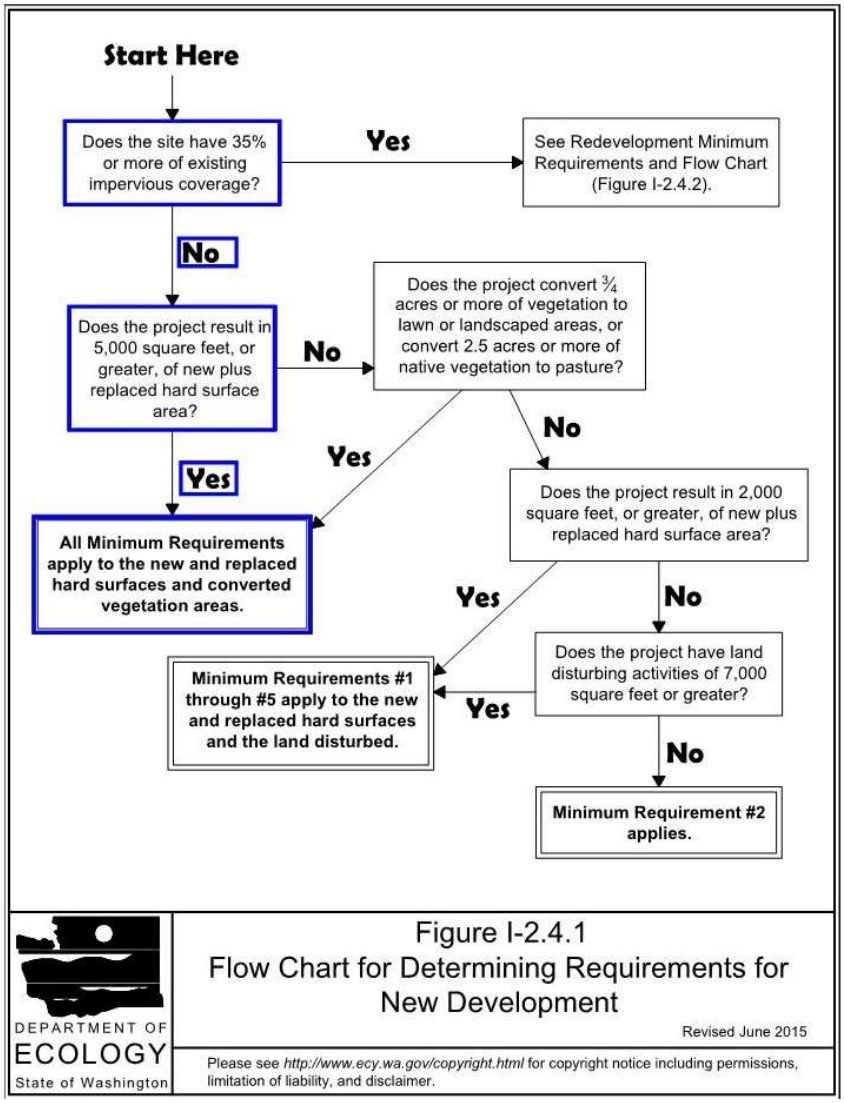
Flow Control BMPs / Low Impact Development BMPs

Due to site constraints (space limitations), 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. See Minimum Requirement #5 in Section 11 for detailed discussion.

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.

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 discussed in the Construction SWPPP. Operational and structural controls include, but are not limited to:

- Formation of a Pollution Prevention Team
- Good Housekeeping
- Spill Prevention and Cleanup
- Employee Training
- Inspections
- Record Keeping
- 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 [Irrigation] (S411)
- BMPs for Maintenance and Repair of Vehicles and Equipment (S414)
- BMPs for Maintenance of Stormwater Drainage and Treatment Systems (S417)
- BMPs for Painting / Finishing / Coating of Vehicles / Boats / Buildings / Equipment (S420)
- BMPs for Parking and Storage of Vehicles and Equipment (S421)
- BMPs for Roof / Building Drains at Manufacturing and Commercial Buildings (S424)
- BMPs for Spills of Oil and Hazardous Substances (S426)
- BMPs for Storage of Liquid, Food Waste, or Dangerous Waste Containers (S427)
- BMPs for Washing and Steam Cleaning Vehicles / Equipment / Building Structures (S431)

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

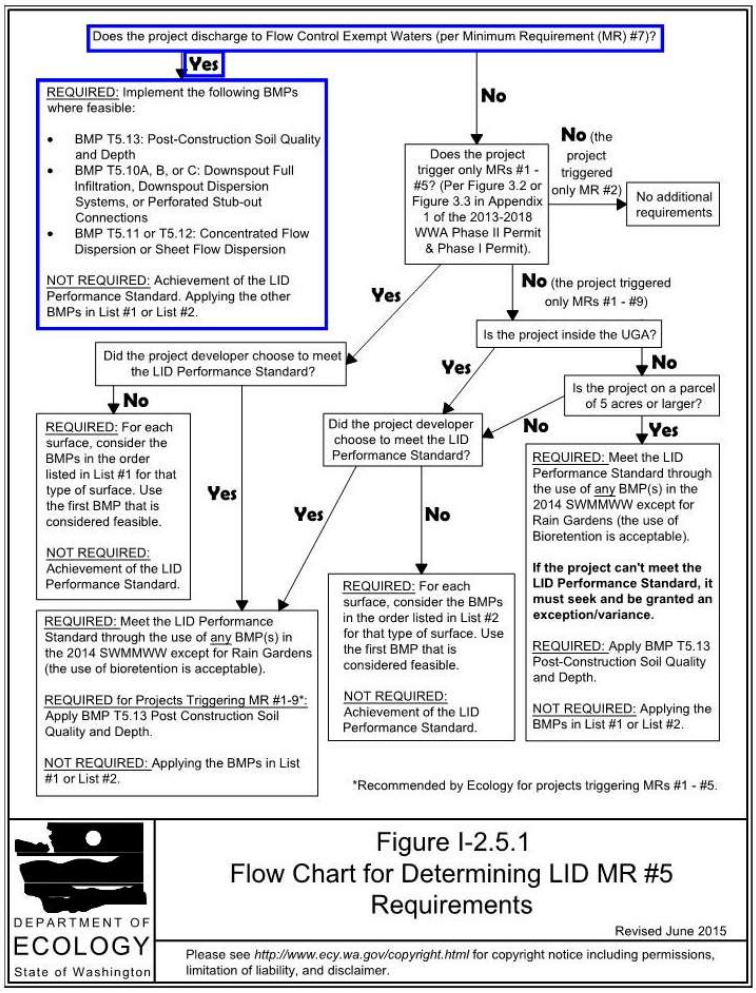
The project site maintains the natural drainage pattern of the existing site to the maximum extent practicable.

As previously stated, there are two drainage basins on the subject property. It is proposed that the discharge points to existing storm conveyance infrastructure be maintained in the as-constructed condition. the building roof runoff (East Basin) be collected and piped to CB D4-06625 within the alley north of the project site. The Pedestrian Plaza will sheet flow into the alley and into the same catch basin. Runoff from the parking lot and driveway (West Basin) will sheet flow into the alley and into CB D4-06593.

Minimum Requirement #5 - On-site Stormwater Management

Projects qualifying as flow control exempt in accordance with Minimum Requirement #7 do not have to achieve the LID performance standard, nor consider bioretention, rain gardens, permeable pavement, and full dispersion if using List #1 or List #2. However, those projects must implement BMP T5.13: Post-Construction Soil Quality and Depth; BMP T5.10A: Downspout Full Infiltration or BMP T5.10B: Downspout Dispersion Systems or BMP T5.10C: Perforated Stub-out Connections; and BMP T5.11: Concentrated Flow Dispersion or BMP T5.12: Sheet Flow Dispersion, if feasible. See Figure 11.2 (Flow Chart for Determining LID MR #5 Requirements)

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



As stated in Section 10, flow control is not required for this project as the project indirectly discharges to the Puyallup River (a Flow-Control Exempt Surface Water from 1/2 mile downstream of confluence with Kellog Creek) through a conveyance system comprised entirely of manmade conveyance elements.

Projects that trigger Minimum Requirements #1 though #9 must meet the requirements in Table 11.1.

Table 11.1: On-Site Stormwater Management Requirements for Projects Triggering Minimum Requirements #1 - #9

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

As previously stated, this project is Flow Control exempt. As such, the Low Impact Performance Standard is not applicable and the BMPs in List #2 will be considered. The first BMP that is considered feasible for each category must be implemented.

- **Lawn and Landscaped Areas**
  - BMP T5.13: Post-Construction Soil Quality and Depth.
    - **Feasible and implemented on the project for all disturbed areas that will not receive hard surfacing in the Post-Developed condition.**
- **Roofs**
  - BMP T5.30: Full Dispersion
    - **Not considered as the project is exempt from Flow Control**
  - BMP T5.10A: Downspout Full Infiltration.
    - **Not feasible as it is noted within Section 7.3.3 of the Geotech Report that "we expect that disposal of stormwater by infiltration…infeasible".**
  - BMP T7.30: Bioretention
    - **Not considered as the project is exempt from Flow Control**

In-feasibility is not fully developed. Cite in-feasibility criteria found in 2019 manual for each BMP considered. [Storm Report, Pg 17]

- BMP T5.10B: Downspout Dispersion Systems
    - **There is insufficient space for Downspout Dispersion and the associated flowpath. Thus, Downspout Dispersion is not feasible.**
- BMP T5.10C: Perforated Stub-Out Connection
    - **A Perforated Stub-Out Connection is deemed infeasible it would be placed under impervious / heavily compacted surfacing, negatively impacting the facilitation of maintenance.**

- **Other Hard Surfaces**
    - BMP T5.30: Full Dispersion
        - **Not considered as the project is exempt from Flow Control**
    - BMP T5.15: Permeable Pavements
        - **Not considered as the project is exempt from Flow Control**
    - BMP T7.30: Bioretention
        - **Not considered as the project is exempt from Flow Control**
    - BMP T5.12: Sheet Flow Dispersion or BMP T5.11: Concentrated Flow Dispersion
        - **There is insufficient space for Sheet Flow Dispersion or Concentrated Flow Dispersion with the associated flowpath.**

Minimum Requirement #6 – Runoff Treatment

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

- TDAs that have a total of 5,000 square feet or more of pollution-generating hard surface (PGHS). **This project creates less than 5,000 square feet of PGHS in a single TDA, thus Runoff Treatment is not Required.**
- TDAs that have a total of 3/4 of an acre or more of pollution-generating pervious surfaces (PGPS) – not including permeable pavements, and from which there will be a surface discharge in a natural or man-made conveyance system from the site. **Not applicable as the entire project site is 10,000 square feet (0.23 acre).**

Minimum Requirement #7 – Flow Control

As stated in Section 10, flow control is not required for this project as the project indirectly discharges to the Puyallup River (a Flow-Control Exempt Surface Water from 1/2 mile downstream of confluence with Kellog Creek) through a conveyance system comprised entirely of manmade conveyance elements.

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:

- *Geotechnical Engineering Report (Draft)*, Icicle Creek Engineers, Dated May 16, 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:	

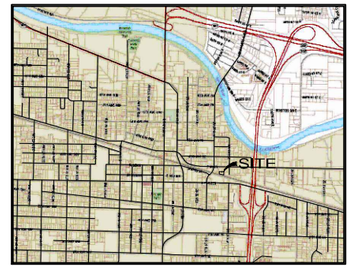
EX-01

1 OF 1 SHEETS

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

SITE DATA

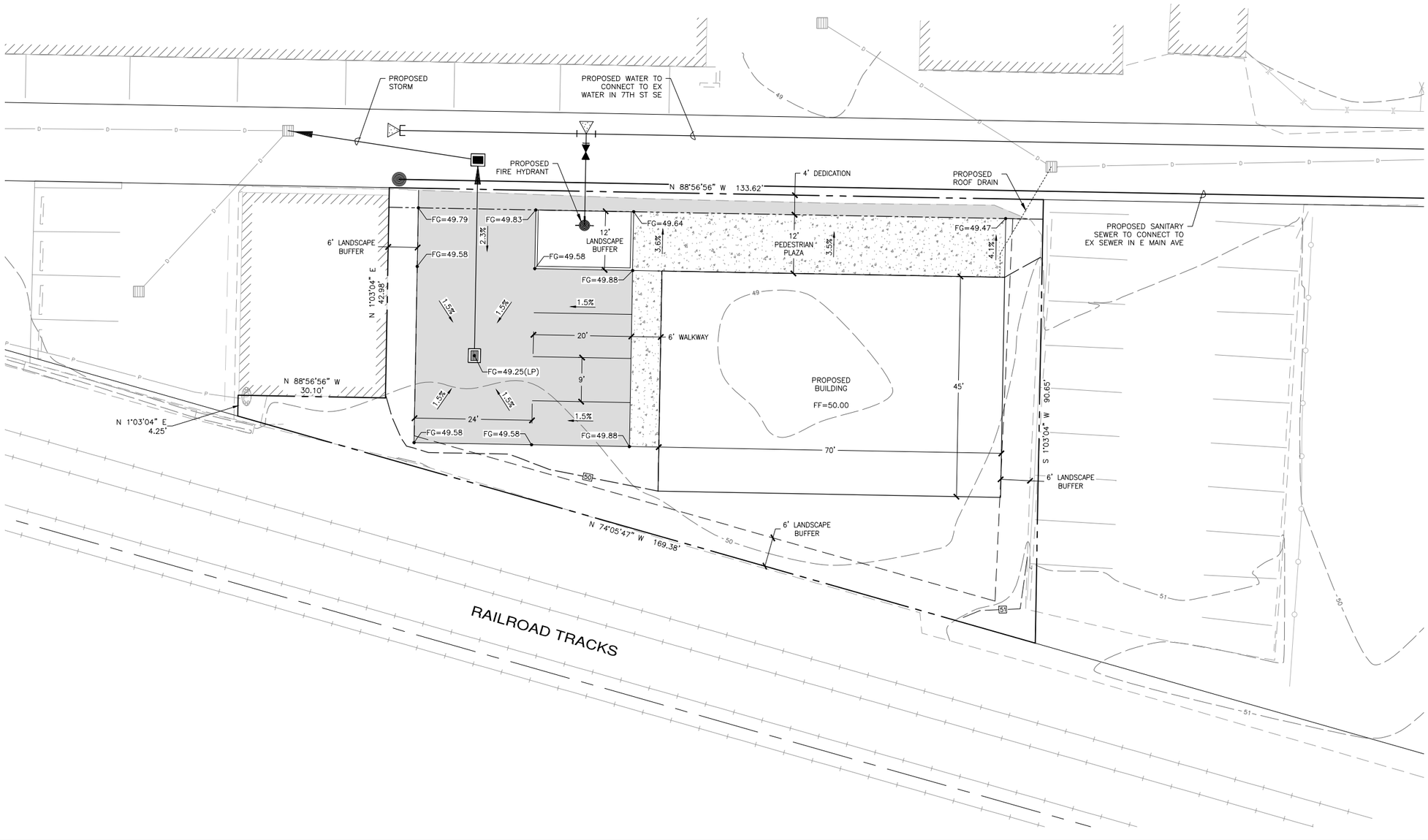
SITE ADDRESS:	111 5TH ST SE PUYALLUP WA, 98372
PARCEL NUMBER:	7285000112
SITE AREA GROSS:	10,000 SF = 0.23 AC
ZONING:	GENERAL COMMERCIAL



VICINITY MAP
NOT TO SCALE

n

SCALE: 1" = 10'
10 5 0 10 20
CONTOUR INTERVAL = 1'



File: \\esm9\ENGR\ESM-JOBS\2218\001\021\plotesk\Developed Conditions Map.dwg
Plotted: 10/21/2022 3:26 PM
Plotted By: Michael Norton

REVISIONS		
NO.	DESCRIPTION/DATE	BY

CONSULTING ENGINEERS LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
www.esmcivil.com
FEDERAL WAY (253) 838-6113
EVERETT (425) 337-3800
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:	10/20/2022
DATE OF PRINT:	

DEV-01

1 OF 1 SHEETS

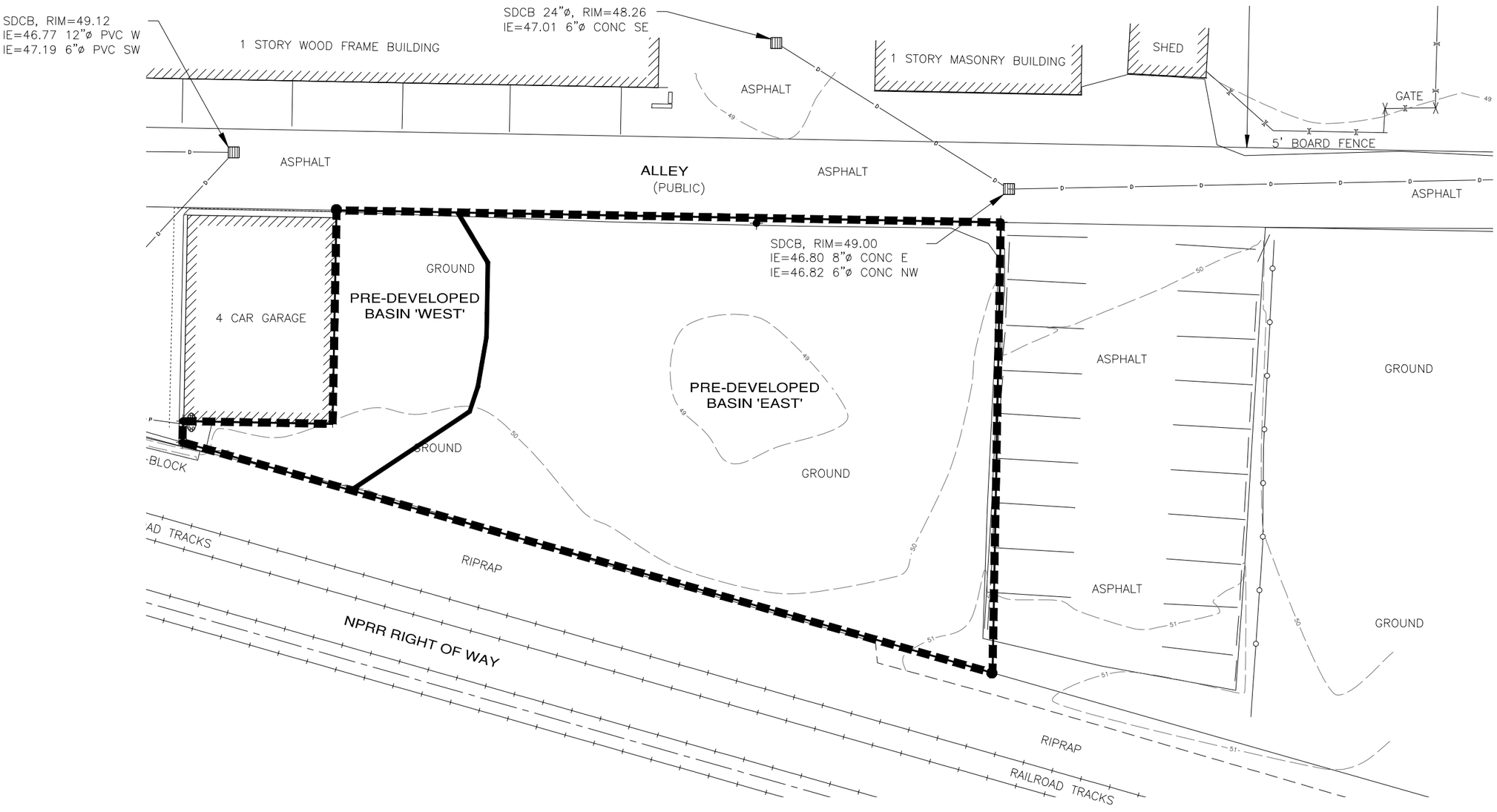
A PORTION OF THE SW 1/4 OF SECTION 27, T. 20 N., R. 4 E., W.M.

PRE-DEVELOPED AREAS		
SUB-BASIN	AREA (AC)	MODELED AS
WEST BASIN (P.O.C. 1)	0.039	C, FOREST, FLAT
EAST BASIN (P.O.C. 2)	0.191	C, FOREST, FLAT
TOTAL:	0.230	

n

SCALE : 1"=10'

20' 10' 0 20' 40'



REVISIONS

NO.	DESCRIPTION/DATE	BY

ESM CONSULTING ENGINEERS LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
FEDERAL WAY (253) 838-6113
EVERETT (425) 297-8800
www.esmcivil.com
Civil Engineering | Land Surveying | Land Planning
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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:	

P-DEV-1

1 OF 1 SHEETS

File: \\esm8\ENGR\ESM-JOBS\2218\001\021\block\Pre-Developed Basin Map.dwg
Plotted: 10/21/2022 4:22 PM
Plotted By: Michael Norton

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

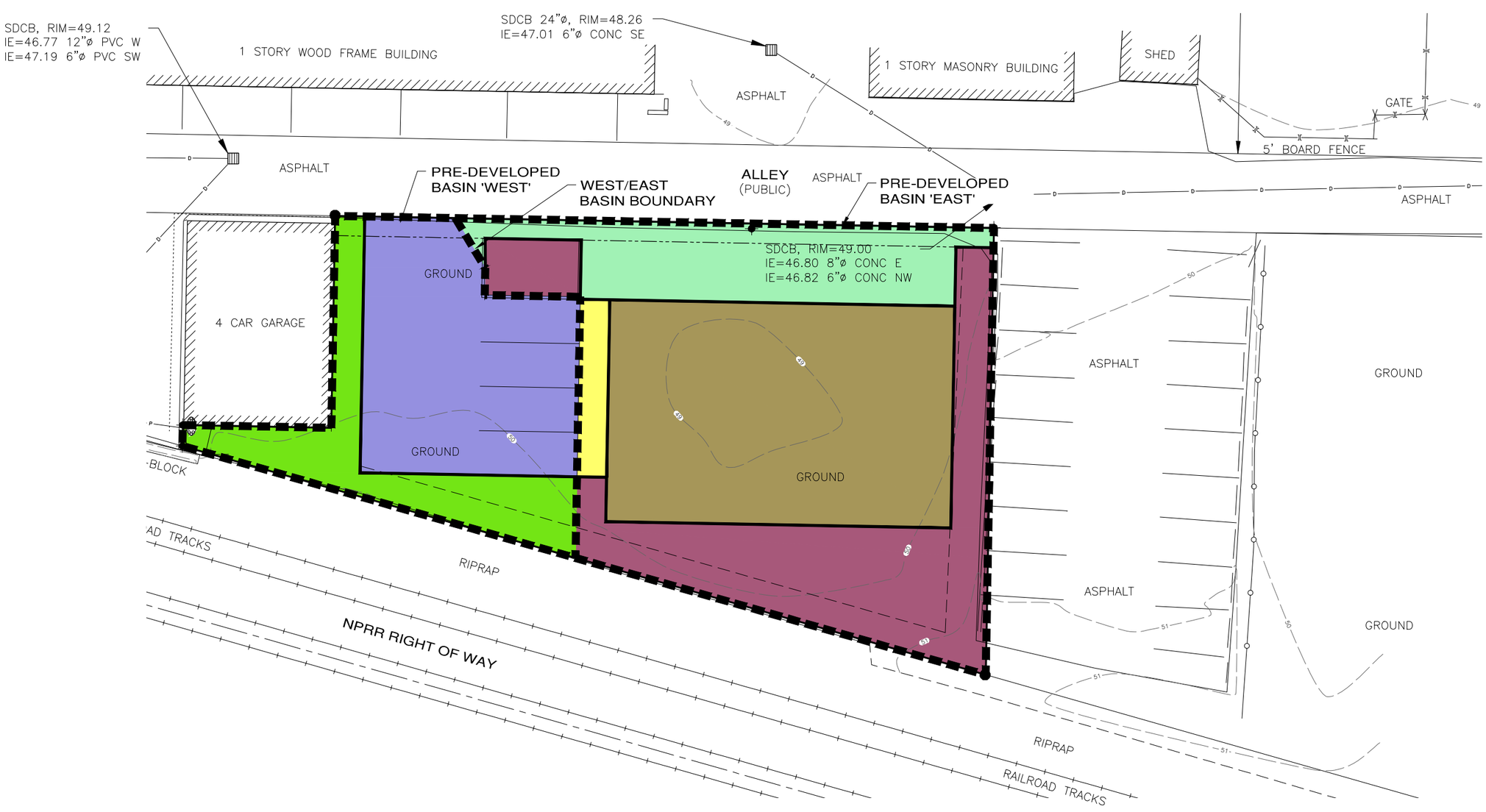
n

SCALE : 1"=10'

20' 10' 0 20' 40'

WEST BASIN			
COLOR	DESC.	AREA (AC)	MODELED AS
	LAWN/ LANDSCAPING	0.024	C, PASTURE, FLAT
	DRIVEWAY/ PARKING	0.045	PARKING, FLAT
	TOTAL:	0.069	

EAST BASIN			
COLOR	DESC.	AREA (AC)	MODELED AS
	LAWN/ LANDSCAPING	0.052	C, PASTURE, FLAT
	PLAZA	0.031	ROADS, FLAT
	BUILDING	0.073	ROOF TOPS, FLAT
	WALKS	0.005	SIIDEWALKS, FLAT
	TOTAL:	0.161	



REVISIONS		
NO.	DESCRIPTION/DATE	BY

ESM CONSULTING ENGINEERS, LLC
33301 9th Ave S, Suite 205
Federal Way, WA 98003
FEDERAL WAY (253) 838-6113
EVERETT (425) 297-8800
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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:	DEV-1
DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
DATE:	2022-10-21
DATE OF PRINT:	

DEV-1

1 OF 1 SHEETS

File: \\esm8\ENGR\ESM-JOBS\2218\001\021\block\JUNK.dwg
Plotted: 10/21/2022 5:29 PM
Plotted By: Michael Norton

APPENDIX B

Stormwater Design Calculations

5th Street Conditional Use Permit
Site Storm Calculations

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	10-10-22 5th Street Site Calculations
Site Name:	5th Street CUP
Site Address:	111 5th Street SE
City:	Puyallup
Report Date:	10/21/2022
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

West 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

East 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

West Developed

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	0.024
Pervious Total	0.024

Impervious Land Use	acre
PARKING FLAT	0.045
Impervious Total	0.045
Basin Total	0.069

Element Flows To:

Surface	Interflow	Groundwater

East Developed

Bypass:	No
GroundWater:	No

Pervious Land Use	acre
C, Pasture, Flat	0.052
Pervious Total	0.052

Impervious Land Use	acre
ROADS FLAT	0.031
ROOF TOPS FLAT	0.073
SIDEWALKS FLAT	0.005
Impervious Total	0.109
Basin Total	0.161

Element Flows To:

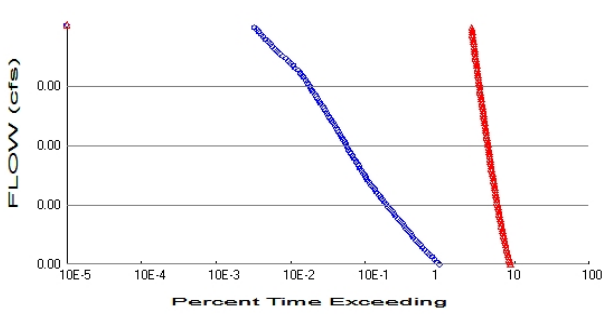
Surface	Interflow	Groundwater

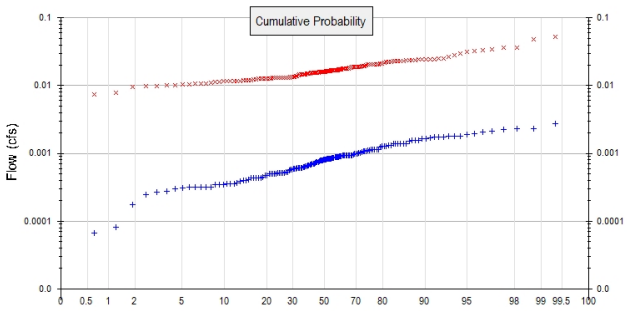
Routing Elements
Predeveloped Routing

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: 0.024
Total Impervious Area: 0.045

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	0.016041
5 year	0.021535
10 year	0.025528
25 year	0.030994
50 year	0.035381
100 year	0.040046

Increase = 0.0379 cfs
<15 cfs **(OK)**

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.001	0.019
1903	0.001	0.021
1904	0.001	0.024
1905	0.000	0.011
1906	0.000	0.012
1907	0.001	0.016
1908	0.001	0.013
1909	0.001	0.016
1910	0.001	0.015
1911	0.001	0.017

1912	0.003	0.031
1913	0.001	0.012
1914	0.000	0.052
1915	0.001	0.011
1916	0.001	0.020
1917	0.000	0.007
1918	0.001	0.016
1919	0.001	0.010
1920	0.001	0.013
1921	0.001	0.012
1922	0.001	0.018
1923	0.001	0.013
1924	0.000	0.023
1925	0.000	0.010
1926	0.001	0.019
1927	0.001	0.015
1928	0.001	0.012
1929	0.001	0.023
1930	0.001	0.024
1931	0.001	0.012
1932	0.001	0.013
1933	0.001	0.012
1934	0.002	0.021
1935	0.001	0.010
1936	0.001	0.015
1937	0.001	0.022
1938	0.001	0.011
1939	0.000	0.013
1940	0.001	0.024
1941	0.000	0.023
1942	0.001	0.018
1943	0.001	0.018
1944	0.001	0.025
1945	0.001	0.019
1946	0.001	0.015
1947	0.000	0.012
1948	0.002	0.016
1949	0.002	0.024
1950	0.000	0.014
1951	0.001	0.021
1952	0.002	0.025
1953	0.002	0.023
1954	0.001	0.013
1955	0.001	0.012
1956	0.000	0.012
1957	0.001	0.013
1958	0.002	0.017
1959	0.001	0.017
1960	0.000	0.013
1961	0.001	0.036
1962	0.001	0.015
1963	0.000	0.011
1964	0.000	0.033
1965	0.002	0.015
1966	0.000	0.013
1967	0.001	0.018
1968	0.001	0.015
1969	0.001	0.014

1970	0.001	0.016
1971	0.002	0.015
1972	0.001	0.048
1973	0.001	0.028
1974	0.001	0.021
1975	0.002	0.022
1976	0.001	0.023
1977	0.000	0.010
1978	0.002	0.017
1979	0.000	0.017
1980	0.001	0.017
1981	0.001	0.016
1982	0.000	0.013
1983	0.001	0.018
1984	0.001	0.018
1985	0.001	0.020
1986	0.001	0.011
1987	0.002	0.018
1988	0.001	0.011
1989	0.001	0.010
1990	0.001	0.013
1991	0.001	0.019
1992	0.001	0.018
1993	0.001	0.021
1994	0.002	0.015
1995	0.000	0.011
1996	0.002	0.015
1997	0.001	0.013
1998	0.001	0.016
1999	0.000	0.017
2000	0.001	0.015
2001	0.000	0.012
2002	0.001	0.023
2003	0.001	0.013
2004	0.001	0.019
2005	0.002	0.036
2006	0.001	0.017
2007	0.001	0.019
2008	0.001	0.016
2009	0.001	0.012
2010	0.001	0.015
2011	0.000	0.016
2012	0.001	0.015
2013	0.000	0.014
2014	0.000	0.014
2015	0.001	0.024
2016	0.000	0.014
2017	0.001	0.023
2018	0.002	0.015
2019	0.002	0.022
2020	0.001	0.017
2021	0.001	0.015
2022	0.000	0.024
2023	0.001	0.030
2024	0.002	0.034
2025	0.001	0.015
2026	0.001	0.017
2027	0.000	0.019

2028	0.000	0.007
2029	0.001	0.013
2030	0.002	0.024
2031	0.001	0.008
2032	0.000	0.013
2033	0.001	0.016
2034	0.000	0.013
2035	0.002	0.017
2036	0.001	0.013
2037	0.000	0.017
2038	0.001	0.017
2039	0.000	0.033
2040	0.000	0.013
2041	0.001	0.016
2042	0.002	0.019
2043	0.001	0.021
2044	0.001	0.014
2045	0.001	0.012
2046	0.001	0.013
2047	0.001	0.016
2048	0.001	0.013
2049	0.001	0.019
2050	0.001	0.015
2051	0.001	0.021
2052	0.001	0.016
2053	0.001	0.013
2054	0.001	0.027
2055	0.000	0.016
2056	0.000	0.021
2057	0.001	0.010
2058	0.001	0.019
2059	0.001	0.024

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0027	0.0518
2	0.0023	0.0485
3	0.0023	0.0364
4	0.0022	0.0359
5	0.0021	0.0340
6	0.0021	0.0334
7	0.0020	0.0328
8	0.0019	0.0312
9	0.0018	0.0298
10	0.0018	0.0281
11	0.0018	0.0268
12	0.0018	0.0251
13	0.0017	0.0251
14	0.0017	0.0245
15	0.0017	0.0244
16	0.0017	0.0244
17	0.0016	0.0242
18	0.0016	0.0241
19	0.0016	0.0239
20	0.0015	0.0237
21	0.0015	0.0236
22	0.0014	0.0234

23	0.0014	0.0231
24	0.0014	0.0231
25	0.0014	0.0230
26	0.0014	0.0230
27	0.0014	0.0230
28	0.0013	0.0226
29	0.0013	0.0225
30	0.0013	0.0222
31	0.0013	0.0218
32	0.0013	0.0211
33	0.0012	0.0209
34	0.0012	0.0208
35	0.0011	0.0207
36	0.0011	0.0207
37	0.0011	0.0207
38	0.0011	0.0206
39	0.0011	0.0205
40	0.0011	0.0204
41	0.0011	0.0199
42	0.0011	0.0195
43	0.0011	0.0194
44	0.0011	0.0192
45	0.0010	0.0191
46	0.0010	0.0190
47	0.0010	0.0190
48	0.0010	0.0190
49	0.0010	0.0188
50	0.0010	0.0187
51	0.0009	0.0187
52	0.0009	0.0182
53	0.0009	0.0181
54	0.0009	0.0180
55	0.0009	0.0180
56	0.0009	0.0180
57	0.0009	0.0178
58	0.0009	0.0176
59	0.0009	0.0176
60	0.0009	0.0173
61	0.0009	0.0173
62	0.0009	0.0172
63	0.0009	0.0172
64	0.0009	0.0171
65	0.0009	0.0170
66	0.0009	0.0170
67	0.0009	0.0170
68	0.0008	0.0170
69	0.0008	0.0169
70	0.0008	0.0169
71	0.0008	0.0167
72	0.0008	0.0165
73	0.0008	0.0165
74	0.0008	0.0163
75	0.0008	0.0163
76	0.0008	0.0163
77	0.0008	0.0162
78	0.0008	0.0160
79	0.0008	0.0159
80	0.0008	0.0159

81	0.0008	0.0159
82	0.0008	0.0158
83	0.0008	0.0158
84	0.0008	0.0158
85	0.0008	0.0157
86	0.0008	0.0155
87	0.0007	0.0155
88	0.0007	0.0155
89	0.0007	0.0155
90	0.0007	0.0154
91	0.0007	0.0154
92	0.0007	0.0153
93	0.0007	0.0153
94	0.0007	0.0153
95	0.0007	0.0153
96	0.0007	0.0152
97	0.0007	0.0151
98	0.0007	0.0151
99	0.0006	0.0149
100	0.0006	0.0148
101	0.0006	0.0148
102	0.0006	0.0147
103	0.0006	0.0147
104	0.0006	0.0145
105	0.0006	0.0144
106	0.0006	0.0144
107	0.0006	0.0138
108	0.0006	0.0137
109	0.0006	0.0136
110	0.0006	0.0134
111	0.0006	0.0134
112	0.0006	0.0133
113	0.0006	0.0132
114	0.0005	0.0132
115	0.0005	0.0132
116	0.0005	0.0132
117	0.0005	0.0131
118	0.0005	0.0131
119	0.0005	0.0130
120	0.0005	0.0130
121	0.0005	0.0130
122	0.0005	0.0129
123	0.0005	0.0129
124	0.0005	0.0128
125	0.0005	0.0128
126	0.0005	0.0127
127	0.0005	0.0127
128	0.0005	0.0126
129	0.0004	0.0126
130	0.0004	0.0126
131	0.0004	0.0124
132	0.0004	0.0123
133	0.0004	0.0120
134	0.0004	0.0120
135	0.0004	0.0119
136	0.0004	0.0118
137	0.0004	0.0118
138	0.0004	0.0117

139	0.0004	0.0117
140	0.0004	0.0117
141	0.0004	0.0116
142	0.0003	0.0115
143	0.0003	0.0114
144	0.0003	0.0112
145	0.0003	0.0109
146	0.0003	0.0108
147	0.0003	0.0108
148	0.0003	0.0106
149	0.0003	0.0105
150	0.0003	0.0105
151	0.0003	0.0102
152	0.0003	0.0100
153	0.0003	0.0099
154	0.0002	0.0098
155	0.0002	0.0096
156	0.0001	0.0079
157	0.0001	0.0075
158	0.0000	0.0074

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0004	54243	488301	900	Fail
0.0004	50226	478883	953	Fail
0.0004	46697	469853	1006	Fail
0.0005	43301	460656	1063	Fail
0.0005	40304	452457	1122	Fail
0.0005	37556	444590	1183	Fail
0.0005	34891	436335	1250	Fail
0.0005	32603	429023	1315	Fail
0.0005	30409	421931	1387	Fail
0.0005	28260	414563	1466	Fail
0.0006	26448	407970	1542	Fail
0.0006	24842	401599	1616	Fail
0.0006	23279	395007	1696	Fail
0.0006	21944	388912	1772	Fail
0.0006	20681	383206	1852	Fail
0.0006	19407	377223	1943	Fail
0.0007	18304	371849	2031	Fail
0.0007	17263	366531	2123	Fail
0.0007	16149	361046	2235	Fail
0.0007	15158	356060	2348	Fail
0.0007	14304	351129	2454	Fail
0.0007	13446	346309	2575	Fail
0.0007	12676	341711	2695	Fail
0.0008	11967	337057	2816	Fail
0.0008	11235	332404	2958	Fail
0.0008	10582	328138	3100	Fail
0.0008	9994	323983	3241	Fail
0.0008	9374	319606	3409	Fail
0.0008	8859	315673	3563	Fail
0.0009	8349	311739	3733	Fail
0.0009	7856	307695	3916	Fail
0.0009	7468	303928	4069	Fail
0.0009	7047	300327	4261	Fail
0.0009	6609	296615	4488	Fail
0.0009	6277	293125	4669	Fail
0.0009	5989	289690	4837	Fail
0.0010	5701	285978	5016	Fail
0.0010	5446	282599	5189	Fail
0.0010	5208	279330	5363	Fail
0.0010	4943	275951	5582	Fail
0.0010	4707	272848	5796	Fail
0.0010	4519	269746	5969	Fail
0.0011	4335	266532	6148	Fail
0.0011	4159	263596	6337	Fail
0.0011	3964	260660	6575	Fail
0.0011	3766	257502	6837	Fail
0.0011	3586	254732	7103	Fail
0.0011	3421	251907	7363	Fail
0.0011	3263	248970	7630	Fail
0.0012	3135	246256	7855	Fail
0.0012	3030	243597	8039	Fail
0.0012	2928	240827	8224	Fail
0.0012	2815	238167	8460	Fail
0.0012	2685	235674	8777	Fail

Duration does need to pass as the project is flow control exempt

0.0012	2556	233015	9116	Fail
0.0013	2454	230577	9395	Fail
0.0013	2364	228140	9650	Fail
0.0013	2256	225591	n/a	Fail
0.0013	2143	223209	10415	Fail
0.0013	2043	220882	10811	Fail
0.0013	1952	218556	11196	Fail
0.0013	1862	216284	11615	Fail
0.0014	1786	214123	11988	Fail
0.0014	1690	211852	12535	Fail
0.0014	1620	209636	12940	Fail
0.0014	1564	207420	13262	Fail
0.0014	1483	205149	13833	Fail
0.0014	1410	203099	14404	Fail
0.0015	1343	201160	14978	Fail
0.0015	1270	198888	15660	Fail
0.0015	1219	196894	16152	Fail
0.0015	1166	194844	16710	Fail
0.0015	1103	192739	17474	Fail
0.0015	1057	190800	18051	Fail
0.0015	1008	188972	18747	Fail
0.0016	964	186977	19395	Fail
0.0016	920	185094	20118	Fail
0.0016	874	183321	20974	Fail
0.0016	815	181382	22255	Fail
0.0016	776	179609	23145	Fail
0.0016	738	177891	24104	Fail
0.0017	695	176063	25332	Fail
0.0017	638	174401	27335	Fail
0.0017	602	172684	28685	Fail
0.0017	555	170911	30794	Fail
0.0017	517	169194	32726	Fail
0.0017	478	167421	35025	Fail
0.0017	434	165703	38180	Fail
0.0018	394	164097	41648	Fail
0.0018	364	162490	44640	Fail
0.0018	339	160939	47474	Fail
0.0018	311	159332	51232	Fail
0.0018	297	157836	53143	Fail
0.0018	273	156174	57206	Fail
0.0019	253	154679	61137	Fail
0.0019	237	153183	64634	Fail
0.0019	223	151632	67996	Fail
0.0019	206	150191	72908	Fail
0.0019	195	148751	76282	Fail
0.0019	180	147144	81746	Fail

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

Water Quality

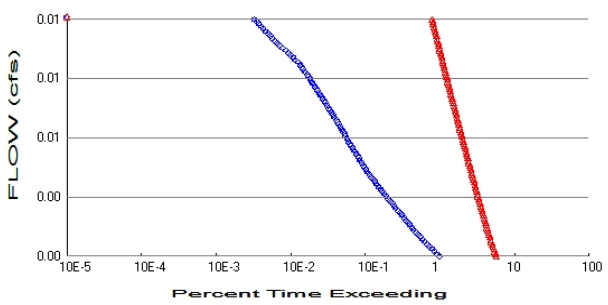
Water Quality BMP Flow and Volume for POC #1

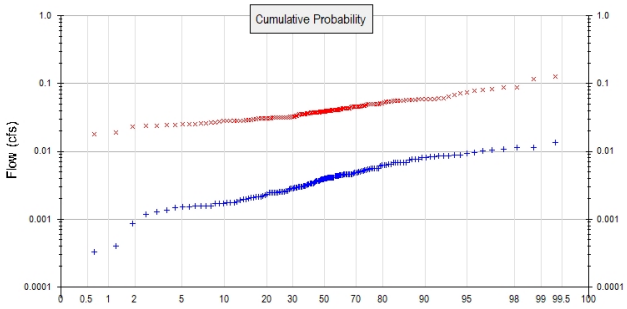
On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

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: 0.052
Total Impervious Area: 0.109

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	0.038784
5 year	0.052065
10 year	0.061717
25 year	0.074929
50 year	0.085532
100 year	0.096809

Increase = 0.0379 cfs
<15 cfs **(OK)**

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #2

Year	**Predeveloped**	**Mitigated**
1902	0.003	0.045
1903	0.002	0.050
1904	0.004	0.059
1905	0.002	0.025
1906	0.001	0.028
1907	0.006	0.040
1908	0.005	0.032
1909	0.005	0.039
1910	0.006	0.037
1911	0.004	0.042
1912	0.013	0.075

1913	0.006	0.030
1914	0.002	0.125
1915	0.003	0.026
1916	0.004	0.048
1917	0.001	0.018
1918	0.004	0.039
1919	0.003	0.024
1920	0.004	0.032
1921	0.005	0.028
1922	0.005	0.044
1923	0.004	0.030
1924	0.002	0.056
1925	0.002	0.024
1926	0.004	0.045
1927	0.003	0.037
1928	0.003	0.028
1929	0.006	0.055
1930	0.004	0.057
1931	0.004	0.028
1932	0.003	0.030
1933	0.003	0.030
1934	0.008	0.050
1935	0.004	0.025
1936	0.003	0.036
1937	0.005	0.053
1938	0.003	0.026
1939	0.000	0.033
1940	0.004	0.057
1941	0.002	0.057
1942	0.006	0.044
1943	0.003	0.043
1944	0.005	0.061
1945	0.005	0.046
1946	0.002	0.036
1947	0.002	0.028
1948	0.009	0.038
1949	0.007	0.059
1950	0.002	0.033
1951	0.003	0.051
1952	0.011	0.060
1953	0.010	0.055
1954	0.004	0.032
1955	0.003	0.029
1956	0.001	0.029
1957	0.005	0.031
1958	0.011	0.040
1959	0.007	0.040
1960	0.002	0.030
1961	0.007	0.087
1962	0.004	0.037
1963	0.002	0.028
1964	0.002	0.081
1965	0.008	0.037
1966	0.002	0.031
1967	0.003	0.043
1968	0.003	0.036
1969	0.003	0.033
1970	0.005	0.038

1971	0.008	0.037
1972	0.005	0.117
1973	0.007	0.068
1974	0.004	0.050
1975	0.009	0.054
1976	0.005	0.056
1977	0.002	0.023
1978	0.008	0.041
1979	0.002	0.041
1980	0.004	0.041
1981	0.004	0.038
1982	0.002	0.031
1983	0.007	0.043
1984	0.003	0.043
1985	0.004	0.049
1986	0.004	0.025
1987	0.008	0.043
1988	0.005	0.026
1989	0.004	0.024
1990	0.005	0.032
1991	0.004	0.046
1992	0.006	0.044
1993	0.005	0.050
1994	0.008	0.035
1995	0.002	0.027
1996	0.009	0.037
1997	0.003	0.032
1998	0.004	0.039
1999	0.000	0.041
2000	0.003	0.037
2001	0.002	0.029
2002	0.006	0.055
2003	0.005	0.032
2004	0.004	0.046
2005	0.008	0.088
2006	0.003	0.041
2007	0.003	0.047
2008	0.004	0.038
2009	0.003	0.029
2010	0.002	0.037
2011	0.002	0.039
2012	0.003	0.037
2013	0.002	0.035
2014	0.002	0.033
2015	0.003	0.058
2016	0.001	0.035
2017	0.006	0.056
2018	0.011	0.037
2019	0.011	0.054
2020	0.003	0.042
2021	0.006	0.036
2022	0.002	0.058
2023	0.005	0.072
2024	0.009	0.082
2025	0.004	0.038
2026	0.007	0.041
2027	0.002	0.046
2028	0.002	0.018

2029	0.005	0.031
2030	0.009	0.059
2031	0.003	0.019
2032	0.002	0.032
2033	0.002	0.040
2034	0.002	0.031
2035	0.010	0.041
2036	0.005	0.031
2037	0.001	0.042
2038	0.004	0.041
2039	0.000	0.079
2040	0.002	0.032
2041	0.003	0.040
2042	0.009	0.045
2043	0.005	0.050
2044	0.006	0.035
2045	0.004	0.029
2046	0.005	0.031
2047	0.004	0.038
2048	0.005	0.032
2049	0.004	0.047
2050	0.003	0.036
2051	0.004	0.051
2052	0.002	0.038
2053	0.004	0.032
2054	0.006	0.065
2055	0.002	0.039
2056	0.002	0.050
2057	0.003	0.025
2058	0.004	0.047
2059	0.007	0.059

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #2

Rank	Predeveloped	Mitigated
1	0.0134	0.1254
2	0.0113	0.1174
3	0.0113	0.0882
4	0.0109	0.0869
5	0.0105	0.0817
6	0.0102	0.0807
7	0.0096	0.0794
8	0.0093	0.0748
9	0.0088	0.0721
10	0.0088	0.0680
11	0.0087	0.0647
12	0.0086	0.0609
13	0.0085	0.0603
14	0.0084	0.0592
15	0.0083	0.0592
16	0.0082	0.0590
17	0.0081	0.0587
18	0.0077	0.0583
19	0.0076	0.0578
20	0.0076	0.0574
21	0.0074	0.0572
22	0.0068	0.0567
23	0.0068	0.0561

24	0.0068	0.0558
25	0.0068	0.0556
26	0.0068	0.0554
27	0.0067	0.0553
28	0.0064	0.0547
29	0.0064	0.0539
30	0.0062	0.0535
31	0.0062	0.0529
32	0.0062	0.0509
33	0.0061	0.0506
34	0.0056	0.0503
35	0.0056	0.0501
36	0.0056	0.0500
37	0.0056	0.0499
38	0.0055	0.0499
39	0.0054	0.0497
40	0.0054	0.0492
41	0.0053	0.0481
42	0.0052	0.0471
43	0.0052	0.0469
44	0.0052	0.0465
45	0.0050	0.0462
46	0.0050	0.0460
47	0.0049	0.0460
48	0.0049	0.0459
49	0.0049	0.0455
50	0.0047	0.0453
51	0.0046	0.0452
52	0.0046	0.0439
53	0.0046	0.0437
54	0.0046	0.0437
55	0.0046	0.0434
56	0.0046	0.0434
57	0.0045	0.0429
58	0.0045	0.0426
59	0.0045	0.0426
60	0.0045	0.0419
61	0.0045	0.0418
62	0.0044	0.0416
63	0.0044	0.0414
64	0.0043	0.0413
65	0.0043	0.0413
66	0.0043	0.0412
67	0.0043	0.0412
68	0.0041	0.0411
69	0.0041	0.0409
70	0.0041	0.0407
71	0.0041	0.0402
72	0.0041	0.0398
73	0.0041	0.0398
74	0.0041	0.0396
75	0.0040	0.0395
76	0.0040	0.0393
77	0.0040	0.0393
78	0.0040	0.0388
79	0.0040	0.0386
80	0.0039	0.0385
81	0.0039	0.0384

82	0.0039	0.0383
83	0.0039	0.0383
84	0.0038	0.0383
85	0.0037	0.0379
86	0.0037	0.0376
87	0.0037	0.0375
88	0.0037	0.0375
89	0.0036	0.0374
90	0.0036	0.0373
91	0.0034	0.0371
92	0.0034	0.0370
93	0.0034	0.0370
94	0.0033	0.0369
95	0.0033	0.0369
96	0.0033	0.0365
97	0.0033	0.0365
98	0.0033	0.0365
99	0.0032	0.0360
100	0.0031	0.0359
101	0.0031	0.0356
102	0.0030	0.0356
103	0.0030	0.0354
104	0.0030	0.0350
105	0.0030	0.0349
106	0.0030	0.0348
107	0.0030	0.0335
108	0.0029	0.0333
109	0.0029	0.0329
110	0.0029	0.0325
111	0.0028	0.0325
112	0.0028	0.0321
113	0.0028	0.0319
114	0.0026	0.0319
115	0.0026	0.0319
116	0.0025	0.0319
117	0.0025	0.0316
118	0.0025	0.0316
119	0.0025	0.0316
120	0.0025	0.0315
121	0.0025	0.0314
122	0.0025	0.0313
123	0.0025	0.0312
124	0.0024	0.0310
125	0.0024	0.0309
126	0.0023	0.0307
127	0.0023	0.0305
128	0.0022	0.0305
129	0.0021	0.0305
130	0.0021	0.0303
131	0.0021	0.0299
132	0.0021	0.0299
133	0.0021	0.0291
134	0.0020	0.0291
135	0.0020	0.0289
136	0.0019	0.0286
137	0.0019	0.0285
138	0.0018	0.0284
139	0.0017	0.0283

140	0.0017	0.0282
141	0.0017	0.0280
142	0.0017	0.0279
143	0.0017	0.0277
144	0.0017	0.0270
145	0.0016	0.0263
146	0.0016	0.0261
147	0.0016	0.0260
148	0.0015	0.0255
149	0.0015	0.0255
150	0.0015	0.0254
151	0.0015	0.0246
152	0.0013	0.0242
153	0.0013	0.0239
154	0.0012	0.0238
155	0.0009	0.0233
156	0.0004	0.0190
157	0.0003	0.0182
158	0.0002	0.0180

Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0020	54309	315396	580	Fail
0.0021	50182	307474	612	Fail
0.0022	46603	299939	643	Fail
0.0022	43345	292682	675	Fail
0.0023	40293	285590	708	Fail
0.0024	37451	278776	744	Fail
0.0025	34913	272183	779	Fail
0.0025	32564	266034	816	Fail
0.0026	30326	259884	856	Fail
0.0027	28271	253957	898	Fail
0.0028	26432	248361	939	Fail
0.0028	24797	242766	979	Fail
0.0029	23296	237336	1018	Fail
0.0030	21922	232239	1059	Fail
0.0031	20631	227253	1101	Fail
0.0031	19418	222267	1144	Fail
0.0032	18282	217669	1190	Fail
0.0033	17219	213126	1237	Fail
0.0034	16160	208639	1291	Fail
0.0034	15147	204262	1348	Fail
0.0035	14277	200052	1401	Fail
0.0036	13451	195841	1455	Fail
0.0037	12659	191742	1514	Fail
0.0037	11933	187808	1573	Fail
0.0038	11235	184041	1638	Fail
0.0039	10559	180274	1707	Fail
0.0040	9972	176728	1772	Fail
0.0040	9374	173293	1848	Fail
0.0041	8847	169692	1918	Fail
0.0042	8332	166257	1995	Fail
0.0043	7861	162933	2072	Fail
0.0043	7457	159720	2141	Fail
0.0044	7030	156562	2227	Fail
0.0045	6609	153404	2321	Fail
0.0046	6271	150357	2397	Fail
0.0046	5978	147366	2465	Fail
0.0047	5701	144429	2533	Fail
0.0048	5438	141604	2603	Fail
0.0049	5198	138834	2670	Fail
0.0049	4940	136119	2755	Fail
0.0050	4703	133460	2837	Fail
0.0051	4511	130912	2902	Fail
0.0052	4335	128308	2959	Fail
0.0052	4157	125815	3026	Fail
0.0053	3958	123322	3115	Fail
0.0054	3766	120995	3212	Fail
0.0055	3581	118613	3312	Fail
0.0055	3414	116286	3406	Fail
0.0056	3259	114181	3503	Fail
0.0057	3134	111909	3570	Fail
0.0058	3026	109749	3626	Fail
0.0058	2926	107754	3682	Fail
0.0059	2814	105704	3756	Fail
0.0060	2682	103599	3862	Fail

Duration does need to pass as the project is flow control exempt

0.0061	2555	101660	3978	Fail
0.0061	2451	99777	4070	Fail
0.0062	2358	97782	4146	Fail
0.0063	2255	95899	4252	Fail
0.0064	2140	94070	4395	Fail
0.0064	2038	92297	4528	Fail
0.0065	1952	90580	4640	Fail
0.0066	1860	88918	4780	Fail
0.0067	1778	87311	4910	Fail
0.0067	1690	85594	5064	Fail
0.0068	1619	83987	5187	Fail
0.0069	1561	82381	5277	Fail
0.0070	1482	80774	5450	Fail
0.0070	1407	79223	5630	Fail
0.0071	1338	77727	5809	Fail
0.0072	1270	76231	6002	Fail
0.0073	1217	74846	6150	Fail
0.0073	1163	73461	6316	Fail
0.0074	1103	72076	6534	Fail
0.0075	1055	70802	6711	Fail
0.0076	1005	69472	6912	Fail
0.0076	963	68143	7076	Fail
0.0077	919	66924	7282	Fail
0.0078	872	65705	7534	Fail
0.0079	814	64431	7915	Fail
0.0079	774	63212	8166	Fail
0.0080	738	62049	8407	Fail
0.0081	694	60996	8789	Fail
0.0082	636	59833	9407	Fail
0.0082	601	58835	9789	Fail
0.0083	553	57727	10438	Fail
0.0084	517	56675	10962	Fail
0.0085	478	55622	11636	Fail
0.0085	434	54597	12579	Fail
0.0086	394	53644	13615	Fail
0.0087	363	52636	14500	Fail
0.0088	339	51639	15232	Fail
0.0088	310	50692	16352	Fail
0.0089	295	49789	16877	Fail
0.0090	273	48830	17886	Fail
0.0091	252	47938	19023	Fail
0.0091	237	47052	19853	Fail
0.0092	223	46165	20701	Fail
0.0093	206	45262	21971	Fail
0.0094	194	44393	22882	Fail
0.0094	179	43578	24345	Fail

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

Water Quality

Water Quality BMP Flow and Volume for POC #2

On-line facility volume:	0 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   10-10-22 5th Street Site Calculations.wdm
MESSU       25   Pre10-10-22 5th Street Site Calculations.MES
            27   Pre10-10-22 5th Street Site Calculations.L61
            28   Pre10-10-22 5th Street Site Calculations.L62
            30   POC10-10-22 5th Street Site Calculations1.dat
            31   POC10-10-22 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        West Pre-Developed          MAX                   1    2   30    9
    2        East 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#   ***
West Pre-Developed***
PERLND  10                       0.039     COPY   501     12
PERLND  10                       0.039     COPY   501     13
East 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   10-10-22 5th Street Site Calculations.wdm
MESSU       25   Mit10-10-22 5th Street Site Calculations.MES
            27   Mit10-10-22 5th Street Site Calculations.L61
            28   Mit10-10-22 5th Street Site Calculations.L62
            30   POC10-10-22 5th Street Site Calculations1.dat
            31   POC10-10-22 5th Street Site Calculations2.dat
END FILES

OPN SEQUENCE
    INGRP               INDELT 00:15
      PERLND      13
      IMPLND      11
      IMPLND       1
      IMPLND       4
      IMPLND       8
      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        West Developed             MAX                    1    2   30    9
    2        East 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           ***
 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
  8      SIDEWALKS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

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

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

```
  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
   11         0    0    0    0    0
    1         0    0    0    0    0
    4         0    0    0    0    0
    8         0    0    0    0    0
  END IWAT-PARM1

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

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

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

END IMPLND

SCHEMATIC
<-Source->                 <--Area-->     <-Target->   MBLK   ***
<Name>   #                 <-factor->     <Name>   #   Tbl#   ***
West Developed***
PERLND  13                      0.024     COPY   501     12
PERLND  13                      0.024     COPY   501     13
IMPLND  11                      0.045     COPY   501     15
East Developed***
PERLND  13                      0.052     COPY   502     12
PERLND  13                      0.052     COPY   502     13
IMPLND   1                      0.031     COPY   502     15
IMPLND   4                      0.073     COPY   502     15
IMPLND   8                      0.005     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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Clear Creek Solutions, Inc.
6200 Capitol Blvd. Ste F
Olympia, WA. 98501
Toll Free 1(866)943-0304
Local (360)943-0304

www.clearcreeksolutions.com

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Thursday, Oct 20 2022

<Name>

Circular

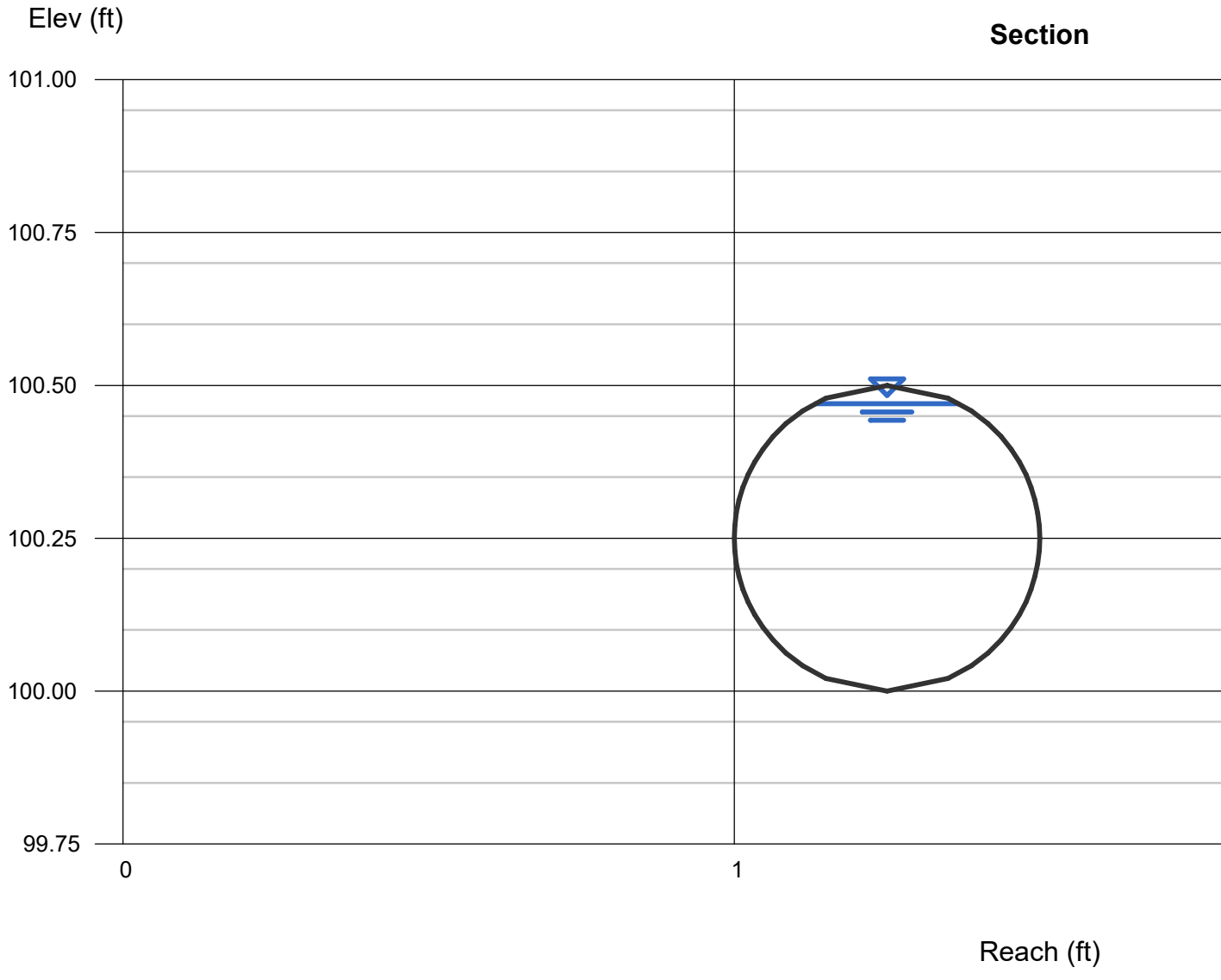
Diameter (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 0.50
N-Value	= 0.012

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



APPENDIX C

NRCS Soil Map and Soil Unit Data

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%**

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

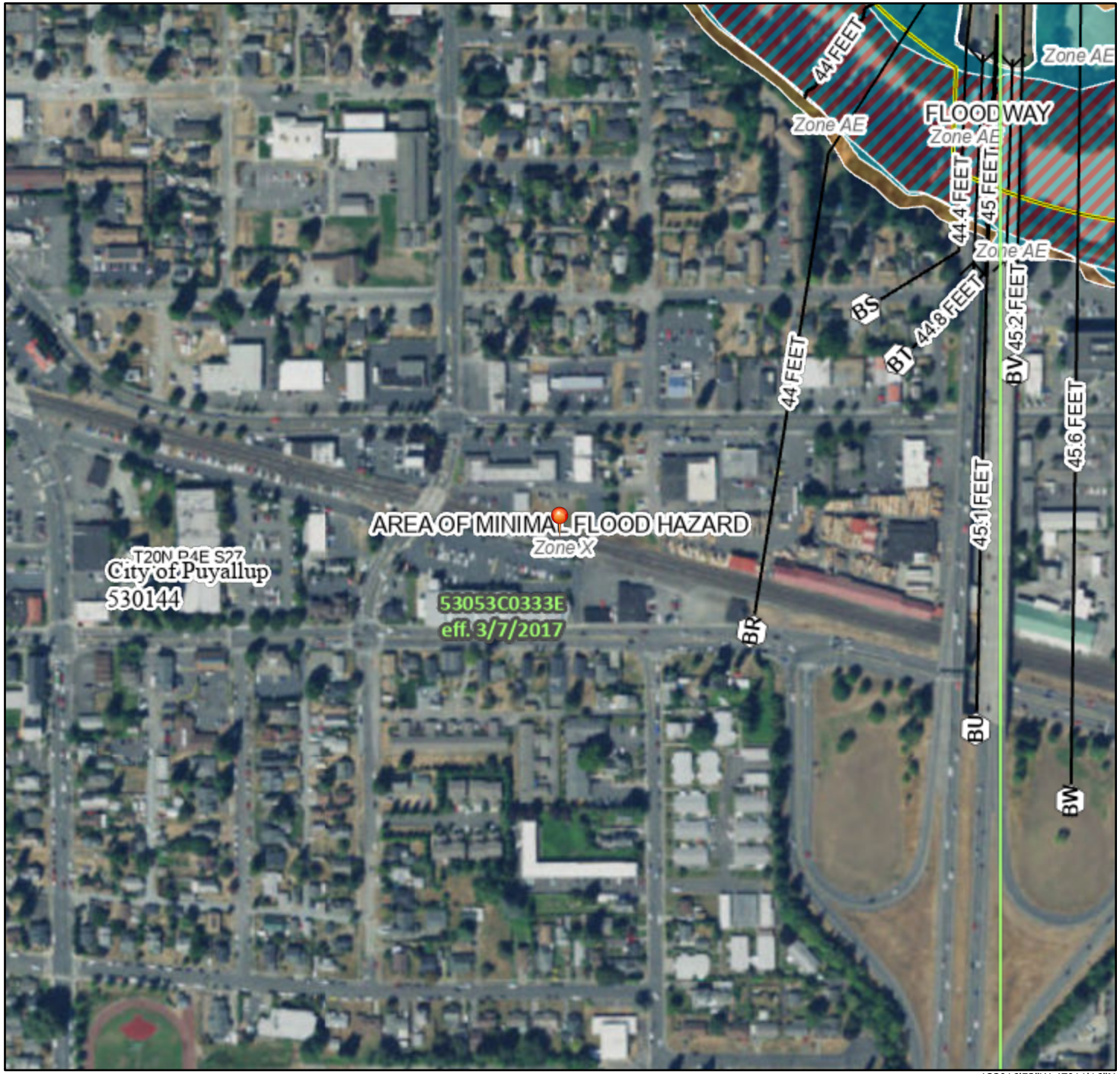
APPENDIX D

Federal Emergency Management Agency Flod 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

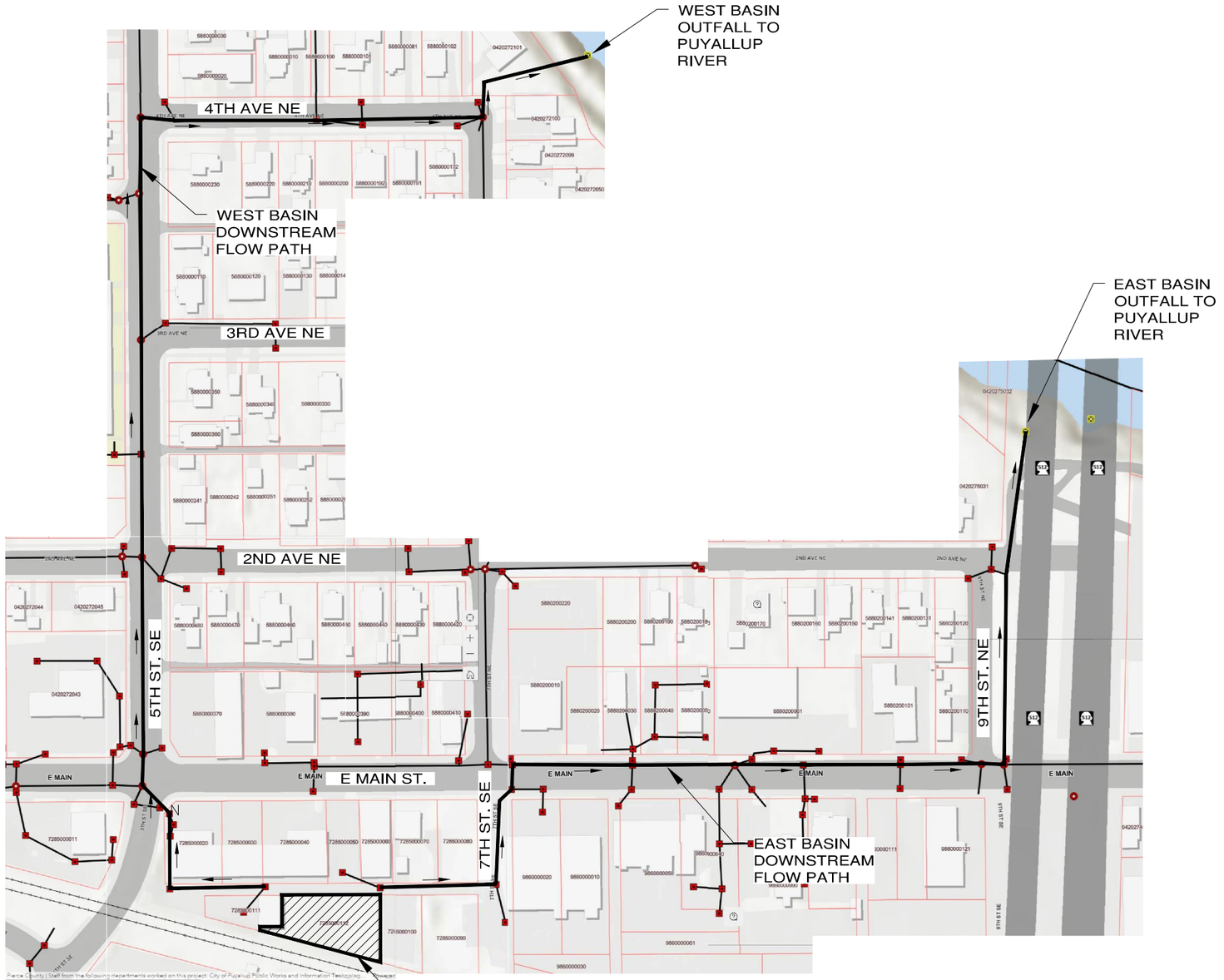
Bond Quantities, Declaration of Covenant for Privately Maintained Facilities

(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.



REVISIONS		
NO.	DESCRIPTION/DATE	BY

CONSULTING ENGINEERS LLC
33400 8th Ave S, Suite 205
Federal Way, WA 98003
www.esmcivil.com
FEDERAL WAY (253) 838-6113
EVERETT (425) 337-3500
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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: K:\ESM-JOBS\2218\001\021\StormReport\Resources\Appendices\Downstream Flow.dwg
Plotted: 10/24/2022 1:03 PM
Plotted By: Michael Norton