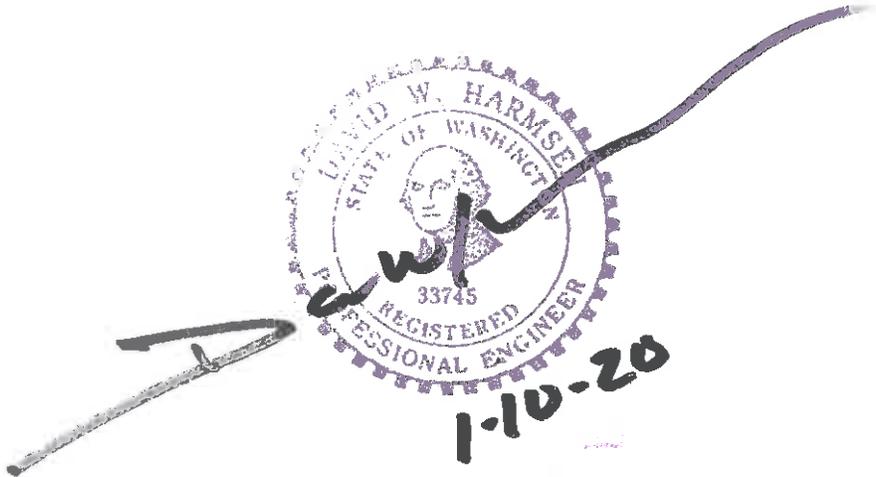




LAND SURVEYING • LAND USE PLANNING • CIVIL ENGINEERING

CONCEPTUAL STORMWATER SITE PLAN  
FOR THE  
PRELIMINARY 2 LOT SHORT PLAT OF  
SAFE HARBOR TRUST  
MONROE, WASHINGTON

January 10, 2020



EVERETT (ASPI)  
5205 S. 2<sup>nd</sup> Avenue, Ste. A  
Everett, WA 98203  
425-252-1884

MONROE  
125 East Main Street., Ste. 104  
Monroe, WA 98272  
360-794-7811

MOUNT VERNON  
603 South First Street  
Mount Vernon, WA 98273  
360-336-9199

OAK HARBOR  
840 SE 8<sup>th</sup> Avenue, Ste. 102  
Oak Harbor, WA 98277  
360-675-5973

## **PROJECT OVERVIEW**

This Stormwater Site Plan has been prepared for the Preliminary Safe Harbor Trust 2-Lot Short Plat in Monroe, Washington. The project consists of 2 lots with 2 buildings and two driveways with shared curb ramp. Currently, there is a single-family home with a driveway area that will be removed from the site. The 0.15-acre site is located at 15922 175<sup>th</sup> Drive SE, see Figure 1: Vicinity Map.

## **METHODOLOGY**

The drainage design for the project has been prepared based on the requirements of the 2012 Department of Ecology Stormwater Management Manual (DOE Manual 2014 Amendment) as adopted by the City of Monroe (MMC 15.01.025). WWHM2012 as provided by DOE has been used for determining basin runoff and for sizing of the stormwater facilities. Based on the flow charts in Figure I-2.4.1 and Figure I-2.4.2 of the DOE Manual and the site parameters, the project is subject to Minimum Requirements 1-5.

The project site parameters are:

- The project is a redevelopment with over 35% existing impervious coverage.
- The project will create more than 2,000 sf of new plus replaced impervious area.
- The project will not create 5,000 sf or more of new or replaced impervious area.
- The project will not disturb more than 7,000 sf.
- The project does not convert  $\frac{3}{4}$  acre of pasture to lawn.
- The project does not convert 2.5 acres of forest to pasture.

## **MR 1: PREPARATION OF STORMWATER SITE PLANS**

### **DRAINAGE PLAN DESCRIPTION**

Stormwater runoff from roofs will be collected and conveyed to separate downspout infiltration trenches.

### **WATER QUALITY MEASURES**

Following is a list of the proposed construction water quality BMPs. See MR 3: Water Pollution Source Control for more information. The proposed BMPs are as follows:

- BMP C103, High Visibility Fence
- BMP C105, Construction Entrance
- BMP C107, Construction Road/Parking Area Stabilization
- BMP C120, Temporary and Permanent Seeding
- BMP C121, Mulching
- BMP C123, Plastic Covering
- BMP C125, Topsoiling/Composting
- BMP C140, Dust Control
- BMP C220, Storm Inlet Protection
- Temporary Infiltration Pond

### **INFILTRATION SIZING**

Flow control will consist of roof runoff infiltration into the underlying soils using a pair of underground, infiltration trenches. As a result, there will be minimal surface runoff from the site.

### **CONVEYANCE CALCULATIONS**

It is anticipated that pipe runs will be short, and that conveyance will not be an issue.

### **STORMWATER TREATMENT BMP'S**

The roof runoff is considered clean and treatment is not required. The runoff from the new access drive site is below the threshold requiring treatment for pollution generating surfaces.

### **PROTECTION OF WETLANDS**

There are no wetlands on or adjacent to the site.

### **OPERATIONS AND MAINTENANCE**

This will be provided with the permit documents after preliminary approval.

## **EXISTING CONDITIONS SUMMARY**

### **DESCRIPTION**

The site is located at 15922 175th Drive SE in Monroe, WA. There is currently a single-family home on the 0.15 acre site. The majority of the site is lawn. The site is bounded by 175<sup>th</sup> Drive SE to the east, manufactured home sites to the north and south, and a similar size single-family residence lot to the west. Highway 522 is in close proximity to the site to the northwest.

The topography of the site lies between 52 feet and 50 feet with the low area in the northwest. See Figure 2: Existing Site Map for more information.

**SOILS DESCRIPTION**

Per the NRSC soil survey, the site is underlain with Custer fine sandy loam. See Appendix B for full soil description and map. Based on previous work in the area and general knowledge of the local area, free draining, sandy, gravelly soils will be found approximately 4' below the surface grade.

**EXISTING BASIN**

The existing basin is the full site. As 100 percent infiltration is proposed, no existing basin calculations were performed.

**OFFSITE ANALYSIS & MITIGATION**

No runoff is proposed to leave the site.

**UPSTREAM ANALYSIS**

Due to the relative flatness of the area and considering all the surrounding lots are developed with their own storm systems, no significant upstream flow is anticipated to be a factor in the site design.

**DOWNSTREAM ANALYSIS**

No runoff is proposed to leave the site.

**PROPOSED CONDITIONS SUMMARY**

The site will be sub-divided into 2 lots consisting of 2 single-family residences, and two driveways that share a curb ramp. Access will be from the existing site access location on the east side of the lots coming from 175<sup>th</sup> Drive SE. See Figure 3: Developed Conditions.

## **MR 2: CONSTRUCTION STORMWATER POLLUTION PREVENTION (SWPP)**

This SWPPP Narrative has been prepared as part of the preliminary plat and is conceptual in nature. The project proposes less than 1 acre of land disturbing activities and will not require a Department of Ecology Construction Stormwater General Permit.

The construction site has the following characteristics:

Disturbed Area:	Approximately 0.10 ac.
Soil Type:	Custer fine sandy loam (Runoff is slow and the hazard of water erosion is slight)
Average slope:	0.5-2%
Critical Areas:	None.

### **1. CONSTRUCTION STORMWATER POLLUTION PREVENTION ELEMENTS**

A Construction Stormwater Management Plan will be prepared that addresses the 13 Required Elements summarized below:

#### **Element #1: Mark Clearing Limits**

The construction plans delineate the limits of the clearing for the site. These will be located in the field prior to clearing taking place.

#### **Element #2: Establish Construction Access**

Construction access will be taken from the existing access to 175<sup>th</sup> Drive SE. The existing driveway will act as a construction access.

#### **Element #3: Control Flow Rates**

Temporary infiltration ponds will be constructed by the contractor to allow construction runoff to infiltrate.

#### **Element #4: Install Sediment Controls**

Sediment controls and their installation will be delineated on the construction documents in the future.

#### **Element #5: Stabilize Soils**

In planting areas, the exposed soils will be stabilized BMP T5.13. In paved areas the soils will be stabilized by the placement of the rock base course. Temporary stockpiles will be mulched, seeded or covered with plastic.

#### **Element #6: Protect Slopes**

The site is flat and will not require slope protection.

#### **Element #7: Protect Drain Inlets**

The storm drains along 175<sup>th</sup> Drive SE will be protected with filter inserts.

#### **Element #8: Stabilize Channels and Outlets**

No channels or outfalls are proposed.

**Element #9: Control of Pollutants**

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Good housekeeping and preventative measures will be taken to ensure that the site will be kept clean, well-organized, and free of debris.

**Element #10: Control De-Watering**

No dewatering is expected as no excavation to the water table is anticipated.

**Element #11: Maintain BMPs**

Notes for the maintenance of erosion control facilities will be included on the construction plans.

**Element #12: Manage the Project**

The project will be subject to seasonal work limitations, site inspection and monitoring as required by the City of Monroe. Erosion control monitoring and supervision will be managed by the contractor.

**Element #13: Protect Low Impact Development**

This will be addressed on the final construction documents after preliminary short plat approval.

**MR 3: WATER POLLUTION SOURCE CONTROL****PERMANENT SOURCE CONTROL BMPs**

Being a residential development source control will consist of maintained garbage facilities, maintenance of the storm drain system, and pavement sweeping.

**MR 4: PRESERVATION OF NATURAL DRAINAGE**

Infiltration of the storm water runoff from the developed site is proposed. This matches the existing conditions where there is essentially no surface discharge from the site. As such there is no downstream drainage that will be impacted by the discharge of surface water from the proposed development. By allowing the runoff to continue to infiltrate, the natural drainage will be preserved.

## **MR 5: ON-SITE STORMWATER MANAGEMENT**

The project proposes infiltration of roof runoff, meeting the requirements of MR 5. WWHM 2012 modeling parameters and results are shown in Appendix A. The project includes the construction of two single family residences (956 sf each) and a combined driveway (1,271 sf). The total new plus replaced impervious surface is 3,500 sf. The following is a conceptual evaluation of the proposed onsite stormwater management BMPs for the site:

### **Lawn and Landscaped Areas**

BMP T5.13 Post Construction Soil Quality and Depth will be implemented on disturbed and landscaped areas.

### **Roof Areas**

#### **BMP T5.10A Downspout Full Infiltration Systems**

As the site is a previously developed, there is no option to use full dispersion, so downspout full infiltration systems are the preferred method of stormwater management for roof areas. Conceptual sizing is shown below.

Per Table 3.3 of the Drainage Manual, medium sand requires 30 lf of 2' wide infiltration trench per 1,000 sf of roof area. With two roof areas of 956 sf, the required length of each infiltration trench is about 30 feet with a width of 2 feet, but we are proposing wider trenches with dimensions of 15 feet by 4 feet. Each trench location was chosen to be in the backside of the lots where there is the most open area. With full infiltration, the roof area has not been included in the developed basin WWHM2012 calculations.

### **Other Hard Surfaces**

As previously mentioned, full dispersion is not feasible due to the existing developed conditions of the site and surroundings. The remaining hard surface comprises of the shared driveway and a small area of frontage work. Overall, this accounts for 1,588 sf of hard surface, with the existing driveway being 864 sf; a difference of 724 sf, which is below the threshold for requiring treatment. With a relatively small increase in paved area and considering the proposal for full infiltration of roof areas, no further BMPs are proposed to mitigate flow from the driveway and sidewalk area. A summary of calculated flow frequency increases are included below.

Flow(cfs)	Predeveloped	Mitigated	Increase
2 Year =	0.0050	0.0307	0.0257
5 Year =	0.0077	0.0472	0.0395
10 Year =	0.0098	0.0602	0.0504
25 Year =	0.0128	0.0791	0.0663
50 Year =	0.0153	0.0952	0.0799
100 Year =	0.0180	0.1130	0.0950

As shown above, the flow frequency increase over the 100 year period is less than 0.10 cfs which is below the threshold for requiring flow control.

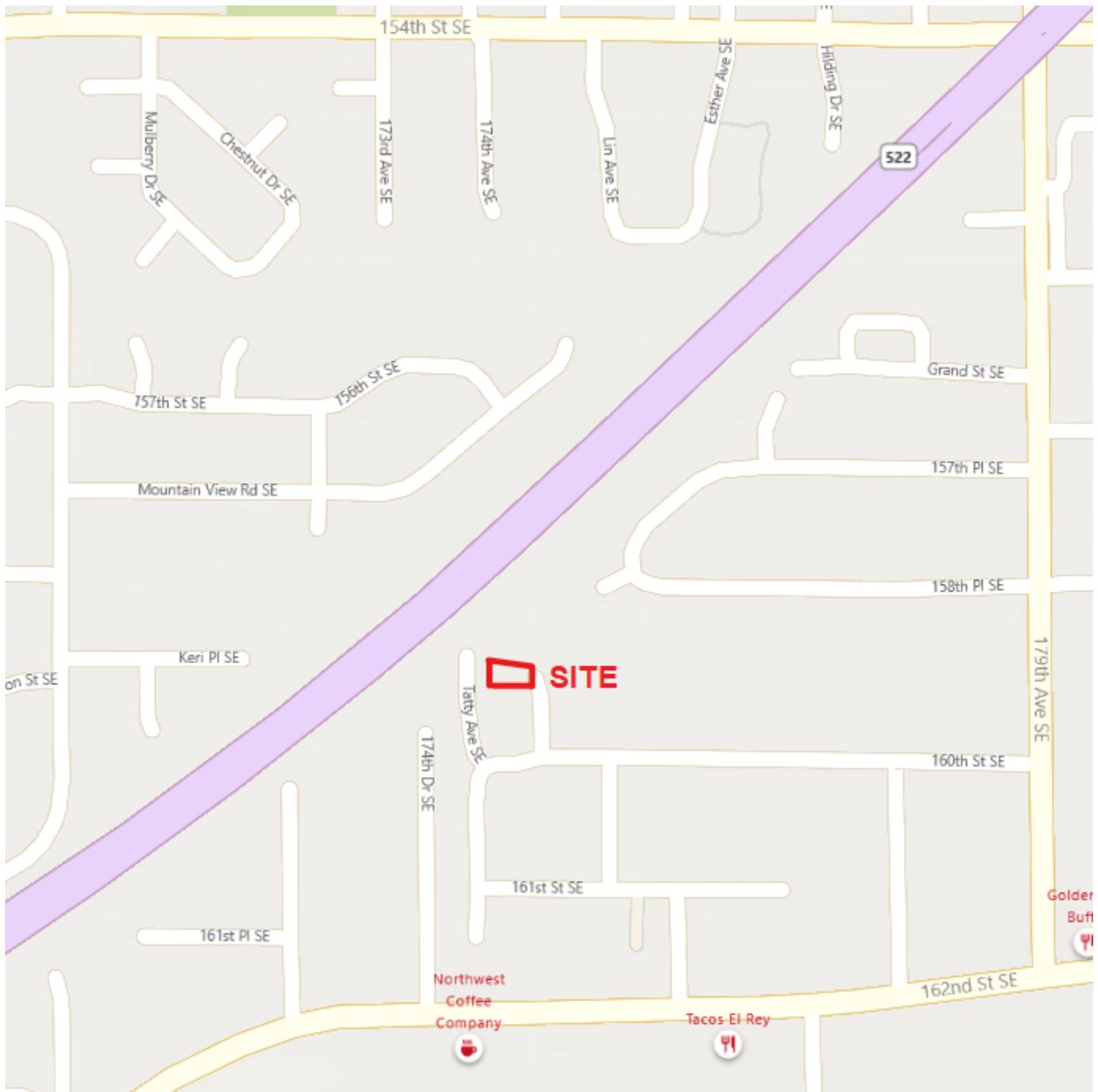


FIGURE 1: VICINITY MAP



FIGURE 2: EXISTING CONDITIONS

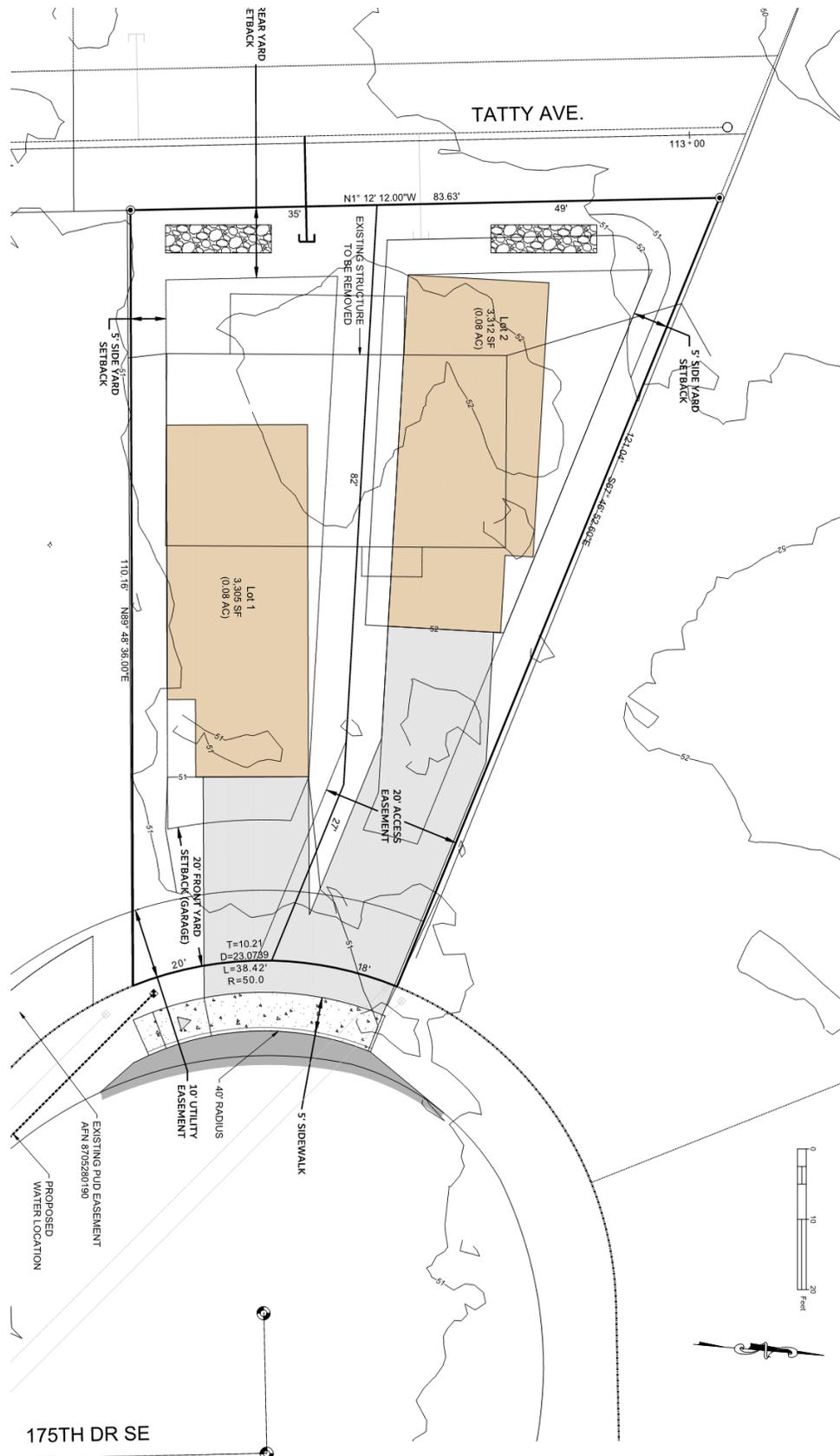


FIGURE 3: DEVELOPED SITE

## **APPENDIX A: REPORT**

**WWHM2012  
PROJECT REPORT**

**Project Name:** 19-318  
**Site Name:**  
**Site Address:**  
**City :**  
**Report Date:** 1/2/2020  
**Gage :** Everett  
**Data Start :** 1948/10/01  
**Data End :** 2009/09/30  
**Precip Scale:** 1.20  
**Version Date:** 2018/10/10  
**Version :** 4.2.16

**Low Flow Threshold for POC 1 :** 50 Percent of the 2 Year

**High Flow Threshold for POC 1:** 50 year

**PREDEVELOPED LAND USE**

**Name :** Basin 1  
**Bypass:** No

**GroundWater:** No

<b><u>Pervious Land Use</u></b>	<b><u>acre</u></b>
C, Forest, Flat	.162

<b>Pervious Total</b>	<b>0.162</b>
-----------------------	--------------

<b><u>Impervious Land Use</u></b>	<b><u>acre</u></b>
-----------------------------------	--------------------

<b>Impervious Total</b>	<b>0</b>
-------------------------	----------

<b>Basin Total</b>	<b>0.162</b>
--------------------	--------------

<b>Element Flows To:</b>		
Surface	Interflow	Groundwater

**MITIGATED LAND USE**

**Name :** Basin 1  
**Bypass:** No

**GroundWater:** No

<u>Pervious Land Use</u>	<u>acre</u>
C, Lawn, Flat	.081
<b>Pervious Total</b>	<b>0.081</b>
<u>Impervious Land Use</u>	<u>acre</u>
DRIVEWAYS FLAT	0.032
SIDEWALKS FLAT	0.005
<b>Impervious Total</b>	<b>0.037</b>
<b>Basin Total</b>	<b>0.118</b>

Element Flows To:  
 Surface                      Interflow                      Groundwater

**ANALYSIS RESULTS**

**Stream Protection Duration**

Predeveloped Landuse Totals for POC #1  
 Total Pervious Area:0.162  
 Total Impervious Area:0

Mitigated Landuse Totals for POC #1  
 Total Pervious Area:0.081  
 Total Impervious Area:0.037

**Flow Frequency Return Periods for Predeveloped. POC #1**

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0.00504
5 year	0.007732
10 year	0.009807
25 year	0.012777
50 year	0.015251
100 year	0.017956

**Flow Frequency Return Periods for Mitigated. POC #1**

<u>Return Period</u>	<u>Flow(cfs)</u>
2 year	0.030743
5 year	0.047196
10 year	0.060172
25 year	0.079112
50 year	0.095184
100 year	0.113036

**Stream Protection Duration****Annual Peaks for Predeveloped and Mitigated. POC #1**

<b>Year</b>	<b>Predeveloped</b>	<b>Mitigated</b>
1949	0.005	0.041
1950	0.005	0.045
1951	0.005	0.025
1952	0.004	0.029
1953	0.003	0.040
1954	0.016	0.061
1955	0.006	0.042
1956	0.006	0.015
1957	0.007	0.037
1958	0.005	0.097
1959	0.005	0.026
1960	0.005	0.034
1961	0.009	0.134
1962	0.004	0.030
1963	0.007	0.053
1964	0.005	0.022
1965	0.004	0.017
1966	0.003	0.022
1967	0.005	0.042
1968	0.006	0.032
1969	0.015	0.092
1970	0.004	0.022
1971	0.006	0.039
1972	0.004	0.053
1973	0.004	0.038
1974	0.009	0.049
1975	0.004	0.040
1976	0.004	0.022
1977	0.003	0.019
1978	0.004	0.015
1979	0.010	0.052
1980	0.005	0.023
1981	0.004	0.022
1982	0.005	0.020
1983	0.008	0.039
1984	0.005	0.030
1985	0.006	0.034
1986	0.014	0.050
1987	0.007	0.038
1988	0.003	0.027
1989	0.004	0.034
1990	0.005	0.022
1991	0.005	0.019
1992	0.004	0.031
1993	0.003	0.021
1994	0.003	0.019
1995	0.005	0.020
1996	0.008	0.032
1997	0.017	0.053
1998	0.003	0.047
1999	0.004	0.016
2000	0.003	0.061

2001	0.001	0.015
2002	0.005	0.014
2003	0.004	0.018
2004	0.006	0.057
2005	0.004	0.024
2006	0.011	0.040
2007	0.009	0.037
2008	0.012	0.027
2009	0.004	0.024

**Stream Protection Duration**

**Ranked Annual Peaks for Predeveloped and Mitigated. POC #1**

<b>Rank</b>	<b>Predeveloped</b>	<b>Mitigated</b>
1	0.0167	0.1339
2	0.0165	0.0967
3	0.0154	0.0920
4	0.0141	0.0610
5	0.0124	0.0608
6	0.0112	0.0565
7	0.0101	0.0532
8	0.0090	0.0530
9	0.0088	0.0527
10	0.0086	0.0523
11	0.0084	0.0503
12	0.0082	0.0494
13	0.0073	0.0467
14	0.0071	0.0454
15	0.0067	0.0421
16	0.0065	0.0420
17	0.0063	0.0408
18	0.0060	0.0403
19	0.0060	0.0400
20	0.0057	0.0396
21	0.0057	0.0391
22	0.0052	0.0387
23	0.0052	0.0381
24	0.0051	0.0380
25	0.0051	0.0369
26	0.0051	0.0365
27	0.0050	0.0344
28	0.0049	0.0343
29	0.0049	0.0337
30	0.0048	0.0322
31	0.0048	0.0316
32	0.0047	0.0305
33	0.0047	0.0300
34	0.0047	0.0298
35	0.0046	0.0293
36	0.0046	0.0274
37	0.0044	0.0270
38	0.0044	0.0264
39	0.0042	0.0248
40	0.0042	0.0244
41	0.0040	0.0238
42	0.0040	0.0231
43	0.0038	0.0222

SAFE HARBOR 2-LOT SHORT PLAT

44	0.0037	0.0220
45	0.0037	0.0217
46	0.0036	0.0217
47	0.0036	0.0216
48	0.0036	0.0215
49	0.0036	0.0211
50	0.0036	0.0195
51	0.0035	0.0195
52	0.0035	0.0191
53	0.0035	0.0190
54	0.0034	0.0188
55	0.0031	0.0183
56	0.0031	0.0173
57	0.0031	0.0156
58	0.0030	0.0154
59	0.0030	0.0154
60	0.0026	0.0146
61	0.0012	0.0139

**Stream Protection Duration**

**POC #1**

**The Facility FAILED**

**Facility FAILED duration standard for 1+ flows.**

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0025	19590	63033	321	Fail
0.0026	16996	58413	343	Fail
0.0028	14666	54135	369	Fail
0.0029	12733	50221	394	Fail
0.0030	10928	46777	428	Fail
0.0032	9443	43505	460	Fail
0.0033	8168	40510	495	Fail
0.0034	7075	37751	533	Fail
0.0035	6130	35313	576	Fail
0.0037	5311	32939	620	Fail
0.0038	4656	30778	661	Fail
0.0039	4066	28789	708	Fail
0.0041	3548	26907	758	Fail
0.0042	3136	25196	803	Fail
0.0043	2759	23656	857	Fail
0.0044	2447	22202	907	Fail
0.0046	2145	20828	971	Fail
0.0047	1892	19494	1030	Fail
0.0048	1657	18287	1103	Fail
0.0050	1508	17126	1135	Fail
0.0051	1370	16097	1174	Fail
0.0052	1250	15079	1206	Fail
0.0053	1154	14127	1224	Fail
0.0055	1069	13308	1244	Fail
0.0056	1009	12530	1241	Fail
0.0057	950	11764	1238	Fail
0.0059	888	11052	1244	Fail
0.0060	825	10391	1259	Fail
0.0061	777	9788	1259	Fail
0.0062	733	9231	1259	Fail

## SAFE HARBOR 2-LOT SHORT PLAT

PAGE 18 OF 20

0.0064	686	8703	1268	Fail
0.0065	648	8194	1264	Fail
0.0066	622	7743	1244	Fail
0.0068	602	7345	1220	Fail
0.0069	583	6977	1196	Fail
0.0070	561	6571	1171	Fail
0.0071	538	6226	1157	Fail
0.0073	506	5886	1163	Fail
0.0074	487	5555	1140	Fail
0.0075	473	5283	1116	Fail
0.0077	457	5054	1105	Fail
0.0078	440	4778	1085	Fail
0.0079	424	4541	1070	Fail
0.0080	409	4340	1061	Fail
0.0082	394	4107	1042	Fail
0.0083	380	3923	1032	Fail
0.0084	368	3745	1017	Fail
0.0086	353	3576	1013	Fail
0.0087	341	3407	999	Fail
0.0088	333	3249	975	Fail
0.0089	322	3129	971	Fail
0.0091	313	2984	953	Fail
0.0092	302	2862	947	Fail
0.0093	293	2755	940	Fail
0.0095	284	2642	930	Fail
0.0096	276	2539	919	Fail
0.0097	265	2458	927	Fail
0.0098	257	2372	922	Fail
0.0100	241	2284	947	Fail
0.0101	234	2194	937	Fail
0.0102	226	2112	934	Fail
0.0104	212	2032	958	Fail
0.0105	205	1956	954	Fail
0.0106	195	1870	958	Fail
0.0108	187	1805	965	Fail
0.0109	177	1738	981	Fail
0.0110	166	1673	1007	Fail
0.0111	160	1618	1011	Fail
0.0113	151	1557	1031	Fail
0.0114	146	1510	1034	Fail
0.0115	135	1468	1087	Fail
0.0117	128	1432	1118	Fail
0.0118	121	1398	1155	Fail
0.0119	111	1359	1224	Fail
0.0120	100	1316	1316	Fail
0.0122	86	1280	1488	Fail
0.0123	75	1236	1648	Fail
0.0124	63	1203	1909	Fail
0.0126	59	1164	1972	Fail
0.0127	56	1140	2035	Fail
0.0128	50	1103	2206	Fail
0.0129	42	1077	2564	Fail
0.0131	40	1055	2637	Fail
0.0132	37	1026	2772	Fail
0.0133	36	1005	2791	Fail
0.0135	30	975	3250	Fail
0.0136	28	958	3421	Fail

SAFE HARBOR 2-LOT SHORT PLAT

0.0137	26	944	3630	Fail
0.0138	20	922	4610	Fail
0.0140	16	892	5575	Fail
0.0141	13	876	6738	Fail
0.0142	8	847	10587	Fail
0.0144	6	825	13750	Fail
0.0145	5	811	16220	Fail
0.0146	4	788	19700	Fail
0.0147	4	769	19225	Fail
0.0149	3	750	25000	Fail
0.0150	3	735	24500	Fail
0.0151	3	719	23966	Fail
0.0153	3	705	23500	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 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	Quality Percent	Used for Comment	Total Volume	Volume	Infiltration	Cumulative	Percent	Water
		Treatment?	Needs	Through	Volume	Volume	Volume	
			Treatment	Facility	(ac-ft.)	Infiltration	Infiltrated	
			(ac-ft)	(ac-ft)		Credit		
Total Volume Infiltrated			0.00	0.00	0.00		0.00	0.00
0%		No Treat.						
Compliance with LID Standard 8								
Duration Analysis Result = Failed								

**Perlnd and Implnd Changes**

No changes have been made.

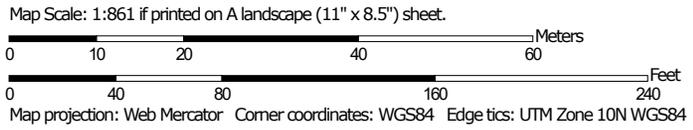
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## **APPENDIX B: SOIL DATA**

Soil Map—Snohomish County Area, Washington



Soil Map may not be valid at this scale.



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

### Water Features



Streams and Canals

### Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

### Background



Aerial Photography

## MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Snohomish County Area, Washington

Survey Area Data: Version 21, Sep 16, 2019

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

Date(s) aerial images were photographed: Sep 26, 2018—Oct 16, 2018

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
13	Custer fine sandy loam	2.5	65.7%
55	Puget silty clay loam	1.0	25.3%
66	Sultan silt loam	0.3	9.0%
<b>Totals for Area of Interest</b>		<b>3.9</b>	<b>100.0%</b>

## Snohomish County Area, Washington

### 13—Custer fine sandy loam

#### Map Unit Setting

*National map unit symbol:* 2hy0

*Elevation:* 0 to 150 feet

*Mean annual precipitation:* 32 to 50 inches

*Mean annual air temperature:* 48 to 50 degrees F

*Frost-free period:* 150 to 200 days

*Farmland classification:* Prime farmland if irrigated and drained

#### Map Unit Composition

*Custer, undrained, and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Custer, Undrained

##### Setting

*Landform:* Outwash plains

*Parent material:* Glacial outwash

##### Typical profile

*H1 - 0 to 9 inches:* fine sandy loam

*H2 - 9 to 35 inches:* sand

*H3 - 35 to 60 inches:* sand

##### Properties and qualities

*Slope:* 0 to 2 percent

*Depth to restrictive feature:* 20 to 40 inches to strongly contrasting textural stratification

*Natural drainage class:* Poorly drained

*Capacity of the most limiting layer to transmit water (Ksat):*

Moderately high (0.20 to 0.57 in/hr)

*Depth to water table:* About 0 to 12 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Low (about 3.1 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 5w

*Hydrologic Soil Group:* C/D

*Forage suitability group:* Wet Soils (G002XN102WA)

*Hydric soil rating:* Yes

### **Minor Components**

#### **Custer, drained**

*Percent of map unit:* 5 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

#### **Indianola**

*Percent of map unit:* 5 percent

*Hydric soil rating:* No

#### **Norma, undrained**

*Percent of map unit:* 5 percent

*Landform:* Depressions

*Hydric soil rating:* Yes

## **Data Source Information**

Soil Survey Area: Snohomish County Area, Washington

Survey Area Data: Version 21, Sep 16, 2019