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Small Site Drainage Report Mundorf SFR

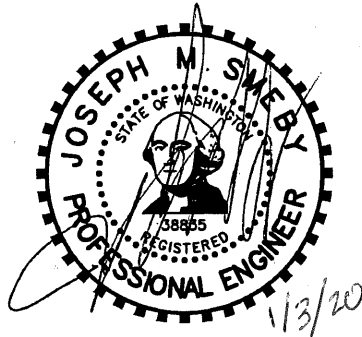
for

Owner:

Terence & Marina Mundorf
211 Wyatt Way NW B-102
Bainbridge Island, WA 98110

SITE LOCATION:

8XX 8th St
Mukilteo, WA 98275
Tax ID: 00527503900500



Prepared by:
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Job No: 19-1024
January 2020

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1. PROJECT OVERVIEW

This document is intended to provide the engineering information necessary to support the building permit application for a new single family residence (SFR) in the City of Mukilteo. The site covers 0.23 acres and is currently undeveloped. The parcel is surrounded by developed parcels in all directions. The slope of the site is moderate and averages approximately 10 percent down to the north. This development proposes to construct a new SFR and driveway. The proposed disturbance area is the entirety of the parcel. The proposed SFR will be set approximately 19 feet from the eastern property line and 39 feet from the northern property line. Access to the new SFR will be taken from the proposed driveway which will take access from the existing roadway to the north (8th St).

This project proposes to construct approximately 4,848 sf of new impervious surfaces including roof and driveway surfaces, therefore minimum requirements 1-5 apply to all of the new impervious surfaces for this project along with all the disturbed pervious surfaces. This proposal does not meet any of the land-use criteria that require specific source control for the final use and a SWPPP has been prepared to address the runoff from the site during construction. Refer to Sections 4 and 5 for a detailed discussion.

Figures 2 & 3 are provided to show the existing and developed basins and runoff conditions for this site. The runoff in the existing condition spreads over the pervious surfaces to the north and across the northern property line. In the developed conditions all of the runoff from the new roof and driveway surfaces will be dispersed on-site via splash blocks, a dispersion trench and sheet flow dispersion. See Section 7 for a detailed discussion.

Due to the size of this project only Minimum requirements 1-5 apply to the proposed drainage design as noted above. All on-site drainage improvements have been designed to meet or exceed the 2012 DOE Stormwater Management Manual.

The project location is 8XX 8th St in the City of Mukilteo, and in Section 04, Township 28N, Range 4E, Willamette Meridian. See Figure 1 - Vicinity Map.

2. EXISTING SITE CONDITIONS

The project location is 8XX 8th St, in the City of Mukilteo, and in Section 04, Township 28N, Range 4E, Willamette Meridian. See Figure 1 - Vicinity Map. The site covers approximately 0.23 acres. As previously mentioned, the site is undeveloped. A category IV wetland exists on site that will be filled per the biologist mitigation plan. The vegetation found on the existing site consists primarily of thick brush and trees.

Land use around the site is primarily single-family homes. Access to the site will be from 8th St to the north. Approximately 4,848 sf (0.11 acres) of the site will be impacted by new impervious surfaces with approximately 10,000 sf (0.23 acres) being disturbed as needed for the clearing/grubbing and restoration of the existing site.

The proposed area of disturbance drains to the north and eventually into the catch basin located north of the northeastern property corner within 8th St. This project will not affect any off-site flows from passing through the site as in the existing condition. Runoff from the proposed impervious surfaces will be dispersed on site via splash blocks, a dispersion trench and sheet flow. By not grading or compacting the majority of the pervious surfaces to remain after construction in the area of disturbance a maximum amount of site runoff from the developed project will be absorbed and naturally infiltrated into the existing on-site soils.

The USDA Web-Soil Survey was used to determine the existing soil conditions for the parcel. Refer to Appendix A. The soils are mapped as Alderwood gravelly sandy loam. The general site slopes, in the area of disturbance, are moderate and average approximately 10 percent down to the north. Based on the existing soil information and the setbacks of the proposed improvements from any of the property lines or critical areas there is little potential for erosion or sedimentation during construction, assuming the basic BMPs included in the SWPPP are installed and maintained properly. Refer to Figure 2 for an existing basin map.

3. OFF-SITE DOWNSTREAM ANALYSIS

Runoff from the proposed area of disturbance of the existing site sheet flows over pervious surfaces in a generally northern direction toward the northern property line. Runoff leaves the parcel over the northern property line and flows northeast and into the catch basin within 8th St. Runoff flows north out of the CB under 8th St and discharges into a broad swale on private property. The outfall into this swale could not be observed due to private property boundaries. However, topographic contour lines on the Snohomish County PDS Map Portal indicate that runoff is discharged into this swale in which runoff flows northeast approximately 500 feet. At this point, runoff was observed flowing into a small PVC culvert and into a CB at the top of a driveway off of Campbell Ave. Runoff flows north in this conveyance system approximately 200 feet and into the main conveyance system within Campbell Ave, at which point the downstream analysis was concluded.

In the developed condition, the landscaped portions of the site will continue to flow in the same direction as noted above. The roof and driveway runoff will be dispersed on-site and continue to flow in the same direction as noted above.

4. SWPPP NARRATIVE

The intent of this section is to provide the information necessary to support the engineering plans in order to implement a design that will; reduce, eliminate or prevent the discharge of stormwater pollutants, meet or exceed the water quality and sediment management standards for the City and State, and prevent adverse impacts to the receiving waters for this project. Note; this narrative is intended to support the SWPPP that is included with the Drainage Plans also a part of this submittal package to the City.

A. SITE GRADING/EROSION CONTROL RISK ASSESSMENT

Area proposed to be cleared/worked:	0.23 acres
Average slope for the site:	10% (Area of Disturbance Only)
Erosion Hazard of Soil	Low
Critical Areas downslope	No
Site is upstream of an ESA Stream	No

Based on the above information and the fact that the area of the site to be disturbed is moderate to steep and construction site runoff will pass through silt fencing or other perimeter filtration features prior to leaving the site, and that if site conditions warrant, additional BMP's can be implemented as corrective measures the Risk Category for this site is **Low Risk**.

B. SWPPP MINIMUM ELEMENTS

1: Preserve Vegetation and Mark Clearing Limits

The first step in the construction process is for the contractor to flag or fence the limits of clearing/disturbance prior to any other construction activity. The engineering plans locate and provide the square footages for the areas of grading, clearing, impervious surfaces and un-disturbed areas on the proposed site.

2: Establish Construction Access

The SWPPP calls for the proposed construction entrance to be installed as the second step after the staking of clearing limits. At this time winter work is expected during the wet season.

3: Control Flow Rates

This project is below the thresholds requiring flow control for the project.

4: Install Sediment Controls

This site SWPPP proposes to construct/maintain a gravel entrance, vegetative buffer, silt fencing if necessary and retention of the existing vegetation that will provide a vegetated strip between the cleared areas and any property line. The construction of these features should be completed before the clearing and grading of the site. Mulch will also be used on the exposed soil as necessary to limit erosion.

5: Stabilize Soils

The "Construction Sequence" calls for the stabilization of soils that remain unworked for certain lengths of time based on the time of year. Stabilization techniques may include but not limited to mulching, plastic sheeting or hydroseeding, notes have been added to the plan regarding protection for the stock pile area if necessary. A stockpile area has been identified on the SWPPP and is setback a minimum of 10-feet from any down slope property line.

6: Protect Slopes

All disturbed slopes on site during construction are required to be protected with mulch or other means as specified in the construction sequence. No concentrated runoff or significant amounts of sheet flow will be directed to new cut or fill slopes during construction.

7: Protect Drain Inlets

The existing catch basins will be protected from sediment during the construction process by catch basin protection inserts.

8: Stabilize Channels and Outlets

No new channels or outlets are proposed for this site.

9: Control Pollutants

No outside chemicals are expected to be necessary for the construction of this project. Concrete truck chutes, pumps, internals and hand tools shall be washed out only into formed areas awaiting installation of concrete or asphalt. Unused concrete remaining in the truck and pump shall be returned to the originating batch plant for recycling. When no formed areas are available, washwater and leftover product shall be contained in a lined container and disposed of in a manner that does not violate water quality standards. All vehicles working on and around the site would need to meet the State requirements for emissions. A drip pan or other appropriate temporary containment device shall be placed at locations where leaks or spills may occur during the fueling or maintenance of machinery.

10: Control DeWatering

DeWatering runoff shall be discharged in the northeastern portion of the property. The contractor is to monitor the outfall for excessive sedimentation and erosion.

11: Maintain BMPs

The construction supervisor will be responsible for maintaining all BMPs during construction and working with the City of Marysville to relocate or add BMPs as necessary as site conditions change.

12: Manage the Project

It will be the responsibility of the Contractor and Developer to manage this project and coordinate with the City Inspector and Engineer.

Inspection and Monitoring:

Site inspections shall be done by a person who is knowledgeable in the principles and practices of erosion and sediment control. The person must have skills to first assess the site conditions and construction activities that could impact the quality of stormwater, and second assess the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges. Whenever inspection and/or monitoring reveals that the BMPs identified in the Construction SWPPP are inadequate, due to the actual discharge of or potential to discharge a significant amount of any pollutant, appropriate BMPs or design changes shall be implemented as soon as possible.

Maintaining an Updated Construction SWPPP:

The construction SWPPP shall be retained on-site or within reasonable access to the site. The SWPPP shall be modified whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state. The SWPPP shall be modified if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site. The SWPPP shall be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within seven days following inspection.

13: Protect On-Site Stormwater Management BMPs for Runoff from Hard Surfaces

The use of on-site management BMPs for this project will allow for the installation of the splash block and dispersion trench at the end of the project during final stabilization. This will protect those areas from disturbance or compaction. In addition, the organic content of the amended soils will be tested and verified prior to final project acceptance.

5. SOURCE CONTROL

This project proposes to construct a new SFR and driveway. Chapter 2 of Volume IV of the 2012 DOE Stormwater Management Manual were reviewed for specific BMPs required for this type of land-use. None of the activities or land uses contained in any of the chapters in Volume IV applies to this project. Therefore, no site/development specific source control BMPs are required for this project.

6. PRESERVATION OF NATURAL DRAINAGE SYSTEM

The runoff from the new hard surfaces will be dispersed on-site. By not grading or compacting the majority of the pervious surfaces to remain after construction in the area of disturbance a maximum amount of site runoff from the developed project will be absorbed and infiltrated into the existing on-site soils. This will mimic the existing conditions by maintaining the existing direction and condition of flow from this site.

7. ON-SITE STORMWATER MANAGEMENT

This project is required to assess the feasibility of the on-site BMP options per List #2 of the DOE manual. List #2 is as follows:

Lawn and Landscaped Areas:

1. Post-Construction Soil Quality and Depth: Required. Any area of the site not proposed to be covered with impervious surfaces but graded or compacted will be treated to meet the criteria for DOE BMP T5.13. Soil management will be incorporated on the existing disturbed soils on the site and will be treated to meet the DOE requirements for amended soils.

Roofs:

- 1a. Full Dispersion: Not selected due to the 65:35 requirement.
- 1b. Downspout Infiltration Systems: Not feasible due to the existence of a wetland on-site indicating less than 36 inches to water table.
- 2. Bioretention: Not feasible due to site limitations and shallow water table.
- 3. Downspout Dispersion: Minimum flow paths can be attained, so downspout dispersion is feasible and is the selected BMP for this project.

Runoff from the roof surfaces shall be dispersed via splash blocks and dispersion trench, as only two feasible splash block locations with 50-foot vegetated flow paths exist. According to the 2012 DOE Stormwater Management Manual DOE SMM), a maximum of 700 sf of roof area may drain to each splash block. Therefore, approximately 1400 square feet of SFR roof area will be directed to a minimum of two splash blocks. The remaining SFR roof area (2,469 sf assuming an 18-inch roof overhang) shall be directed to a dispersion trench. According to the DOE SMM, for roof areas greater than 700 sf, a dispersion trench shall be designed with a length of 1 foot per 70 sf of contributing roof area. Therefore, the remaining 2,469 sf of roof area shall be tightlined to a 36 LF dispersion trench.

- 4. Perforated stub-out connection: Higher priority BMP selected.

Other Hard Surfaces:

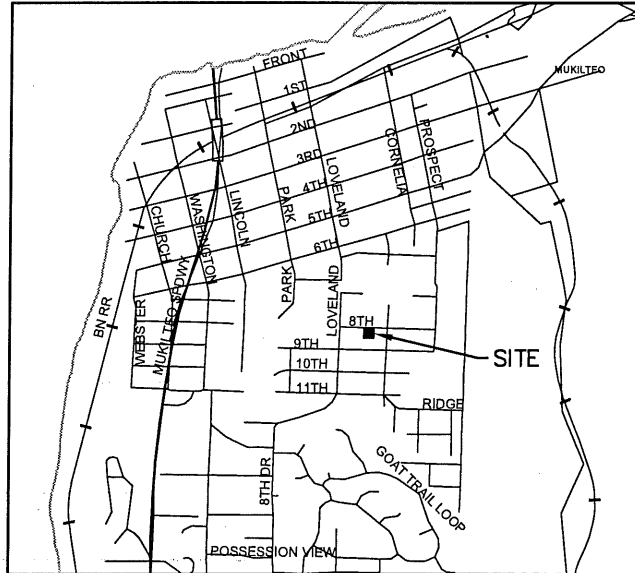
- 1. Full Dispersion: Not feasible per the geotechnical engineers recommendation.
- 2. Permeable Pavement: Not selected due to cost.
- 3. Bioretention: Not feasible (see 'Roofs').
- 4a. Sheet Flow Dispersion: Feasible and selected.

Runoff from the proposed driveway will sheet flow to the northeast, flowing through a 2-foot wide transition zone before sheet flowing with the minimum required flow paths for sheet flow dispersion. This will provide a vegetated flow path that will allow the runoff to naturally disperse, simulating pre-developed conditions.

- 4b. Concentrated Flow Dispersion: Higher priority BMP selected.

8. SUMMARY

This project proposes to construct less than 5,000 sf of new impervious surfaces including driveway and roof areas. As a result, the use and land cover for less than 5,000 sf of the site will be converted from pervious lawn to impervious surfaces. On-site stormwater management techniques have been incorporated into the design to mitigate for this land conversion. In addition, based on the proposed improvements for the site drainage design the post developed runoff from the site is expected to be slightly more than the runoff from the existing system. Therefore, the stormwater design for this project has meet or exceeded all of the applicable Minimum Requirements 1-5.



VICINITY MAP
SCALE: 1" = 2,000'

FIG. 1

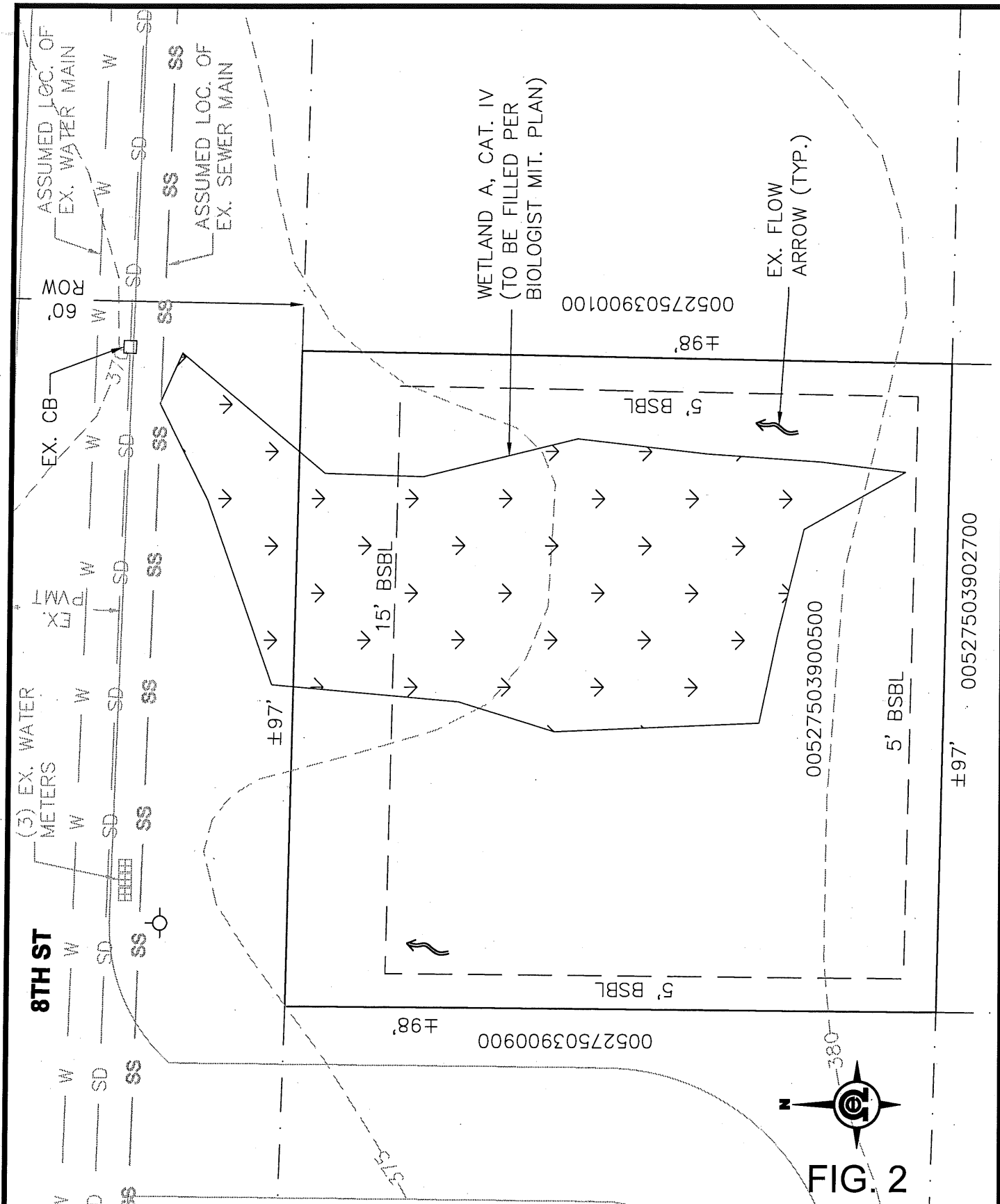


**OMEGA
ENGINEERING, INC.**

**2707 WETMORE AVE.
Everett, WA 98201
(o)425.387.3820 (f) 425.259.1958**

**VICINITY MAP
MUNDORF SFR**

DATE	JOB NO.	SCALE	SHEET
1/2/20	19-1024	1" = 2000'	1 OF 1

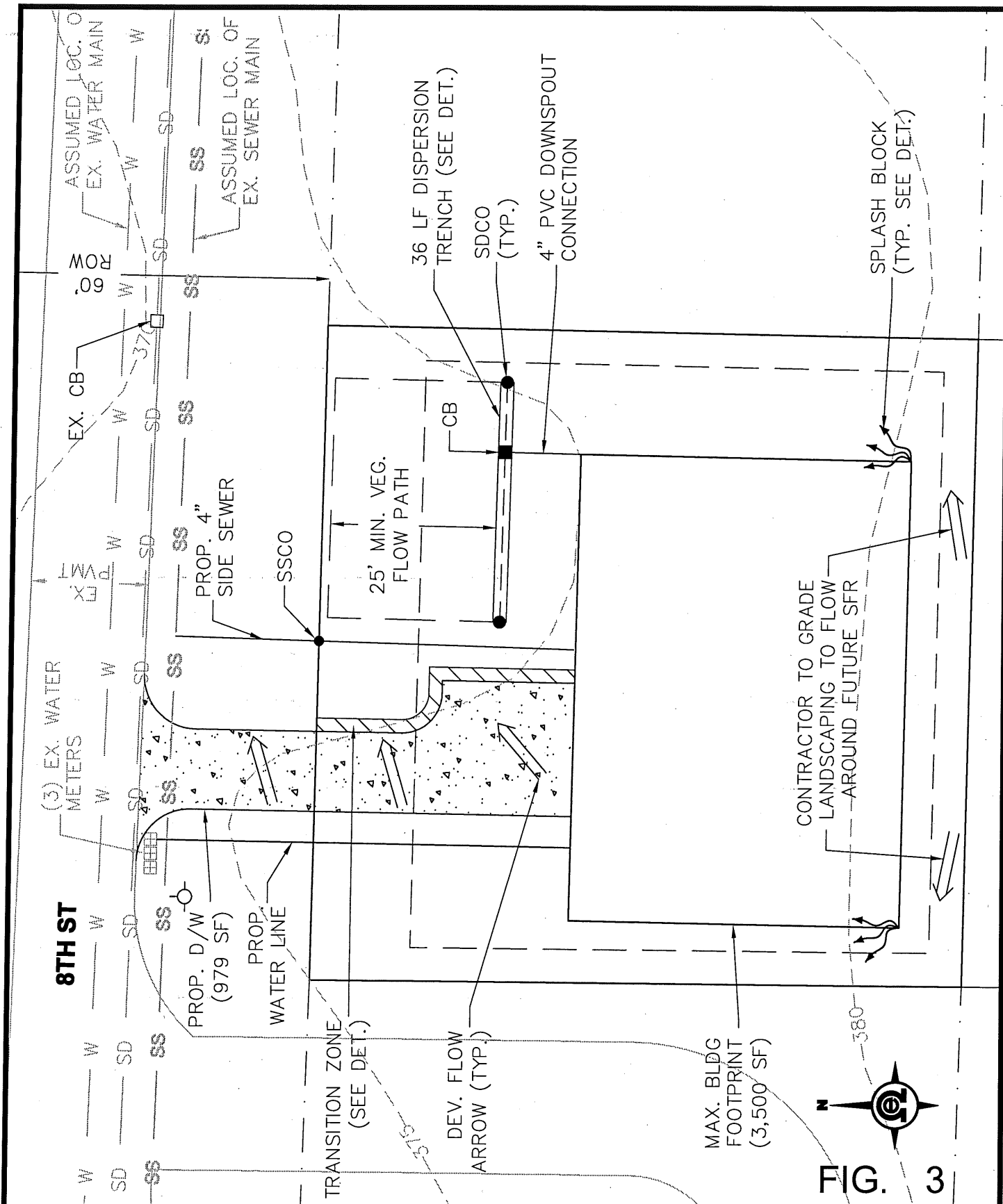


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Everett, WA 98201
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EXISTING BASIN MAP MUNDORF SFR

DATE	JOB NO.	SCALE	SHEET
1/2/20	19-1024	1" = 20'	1 OF 1



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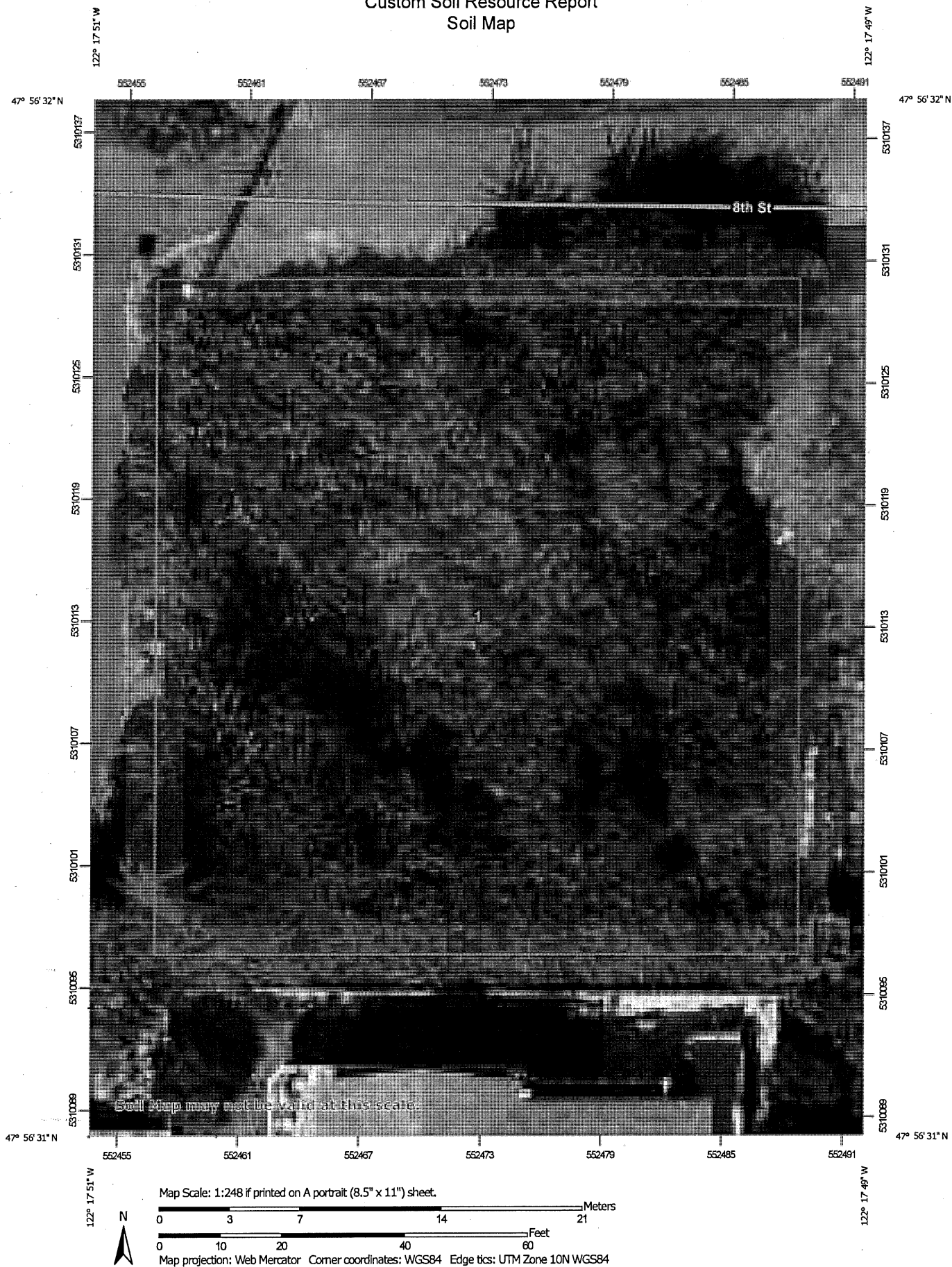
DEVELOPED BASIN MAP MUNDORF SFR

DATE	JOB NO.	SCALE	SHEET
1/2/20	19-1024	1" = 20'	1 OF 1

APPENDIX A

ADDITIONAL STUDIES, CALCS & SITE PHOTOS

Custom Soil Resource Report Soil Map



1- ALDERWOOD GRAVELLY SANDY LOAM.



Delineation / Mitigation / Restoration / Habitat Creation / Permit Assistance

9505 19th Avenue S.E.
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Everett, Washington 98208
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CRITICAL AREA STUDY & MITIGATION PLAN

FOR

MUNDORF – 8TH ST
MUKILTEO, WA

Wetland Resources, Inc. Project #16233

Prepared By
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Bainbridge Island, WA 98110

July 21, 2017

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APPENDIX B: U.S. ARMY CORPS OF ENGINEERS WETLAND DETERMINATION FORMS

APPENDIX C: CRITICAL AREAS REPORT MAP SHEETS

APPENDIX E: CITY OF MUKILTEO DRAINAGE MAPS

1.0 INTRODUCTION

Wetland Resources, Inc. completed a site investigation on May 25th & August 29th, 2016 to locate and evaluate jurisdictional wetlands and streams on and adjacent to the subject site located west of the intersection of Campbell Avenue and 8th Street in the city of Mukilteo, WA, as required by the Mukilteo Municipal Code (MMC) Section 17.52B.080(B).

The 0.23-acre subject property is further located as a portion of Section 4, Township 28N, Range 04E, W.M. The subject site is square in shape and is comprised of one tax parcel. The tax identification number for the subject site is 00527503900500. The intent of this document is to characterize all identified critical areas and buffers in the vicinity of the subject property, assess potential impacts associated with the applicant's development proposal, and provide mitigation adequate to compensate for all proposed impacts.



Figure 1: Aerial view of the subject property

1.1 SITE DESCRIPTION

Access to the subject property is from the north via 8th St. The property is undeveloped, and no buildings or foundations were found. A stormwater pipe was located onsite near the southeast corner of the subject property. This pipe is presumed to be a point discharge from the neighboring property's French drain. Surrounding property use can be described as single-family residential development.

Dominant vegetation on-site is a combination of native shrubs and small trees including Sitka willow and Nootka rose as well as a number of invasive species. A large portion of the property has been invaded with Himalayan blackberry and field bindweed, which has created a dense thicket across the site. Topography of the subject property is generally sloped with a north-northeast aspect and undulations throughout. On-site soils are mapped as Alderwood gravelly sandy loam, 0 to 8 percent slopes. Soils found during the investigation are similar to the above mapped series, and a detailed description is provided in Section 2.0 of this report.

One wetland (Wetland A) was found within the boundary of the investigation area. The on-site wetland is a linear sloped feature located on the eastern half of the subject property. Wetland A is 3,432 square feet in size, and is fed by a point discharge from the neighboring property to the south, as well as surface water run-off from surrounding properties. Stormwater moves through Wetland A and discharges into a catch basin immediately down slope, located on the southern side of 8th St. Based on the City of Mukilteo Drainage Maps (Appendix E), this catch basin discharges into a stormwater conveyance line and is detained in a series of subsequent catch basins and drainage facilities further down gradient, before eventually outflowing into the Puget Sound. Wetland A appears to be isolated from other critical areas. No additional wetlands or streams were found on or immediately adjacent to the subject property.

The City of Mukilteo provides regulatory guidance on wetland classification within the City's jurisdiction, *Wetlands shall be classified as Category I, II, III or IV using the 2014 Washington State Department of Ecology's Wetland Rating System for Western Washington, Publication No. 04-06-025, or as amended hereafter. Identification of wetlands and delineation of their boundaries pursuant to this chapter shall be done in accordance with the approved federal wetland delineation manual and applicable regional supplements. All areas within the city meeting the wetland designation criteria in that procedure are hereby designated critical areas and are subject to the provisions of this chapter.* Pursuant to MMC 17.52B.090, Wetland A is classified as a Category IV wetland, with a habitat score of 4. All Category IV wetlands in the City of Mukilteo receive standard 40-foot protective buffers.

1.2 PROJECT DESCRIPTION

Terry Mundorf, hereafter referred to as the applicant, is proposing the future development of the property for the construction of a single-family residence and associated infrastructure. Nearly ninety-six percent of the property is encumbered by the subject wetland and associated buffer, save for narrow strip of non-buffer area (437 square feet) along the western property boundary. As such, the on-site wetland and buffer restrict the applicant's economic use of the subject property. As a means of providing a developable lot for a new home to be built at a size

commensurate to the existing neighborhood residences, the applicant is proposing to fill the on-site wetland and provide compensatory mitigation through off-site wetland creation in a high-value watershed. Lot development will result in permanent impacts to 3,432 square feet (0.079 acres) of Category IV wetland (City of Mukilteo and DOE rating).

As compensatory mitigation for filling the low quality Category IV wetland on the subject site, the applicant is proposing to utilize the City of Mukilteo Critical Areas Mitigation Program (CAMP) and provide wetland creation at the CAMP identified Mitigation Site M2: Japanese Gulch/Brewery Creek Headwater Wetlands. The selection of Mitigation Site M2 is appropriate for the proposed project as both the impacted wetland and Site M2 in which wetland creation and buffer enhancement is proposed, are within the same drainage sub basin.

The applicant is proposing to create a total of 5,162 square feet of wetland (1.5:1 creation to fill ratio) at Mitigation Site M2, as mitigation for the 3,432 square feet (0.079 acres) of permanent on-site wetland fill. Additionally, as compensatory mitigation for the loss of 6,609 square feet of regulated buffer area, the applicant is proposing to enhance a total of 6,649 square feet of buffer at Mitigation Site M2 with an assemblage of native trees and shrubs (1:1 enhancement to impact ratio). This buffer area currently has low structural diversity and is dominated by Himalayan blackberry, an invasive species. The enhancement of the degraded buffer area, and establishment of a structurally diverse assemblage of native plants, will improve the attenuation of floodflow, biofiltration function, and the quality of wildlife habitat provided within the Mitigation Site M2.

Site M2: Japanese Gulch/Brewery Creek Headwater Wetlands, is identified in CAMP as a potential mitigation site ideal for wetland creation, wetland enhancement, and buffer enhancement. Additionally, there is opportunity for the removal of a paved roadway, as well as invasive species eradication in upland areas. The applicant is proposing wetland creation contiguous with the feature identified as Wetland 2 described in the CAMP document.

***Wetland 2** is a palustrine open water/forested wetland less than 0.5 acre in size, located in a depression in the northeast portion of the property. The majority of the wetland is located off of the property, with approximately 0.01 acre of wetland located on the property. The wetland generally occurs within an oblong depression and hydrology is likely supplied by a combination of direct precipitation and groundwater. Dominant vegetation in the wetland includes red alder and salmonberry.*

The 5,162 square feet of wetland creation represents a 1.5:1 creation to impact ratio as required for permanent impacts to Category IV wetlands by the City of Mukilteo (MMC 17B.52B.100(B)(2) Table 2) and the Washington State Department of Ecology. Utilizing the CAMP program for mitigation is consistent with the document, *Selecting Wetland Mitigation Sites Using a Watershed Approach* (DOE Publication #09-06-032), and will ensure that the biological and physical functions provided by the proposed wetland creation will remain within a high value sub-basin, contained in the larger City of Mukilteo watershed. With the use of the CAMP the applicant will be filling a low quality, largely isolated wetland on the subject site, while improving the size and function of Wetland 2, a dynamic high value feature that comprises a portion of the headwaters of Japanese Gulch & Brewery Creek. The proposed mitigation will

result in long-term improvements to the overall level of critical areas functions and values within the larger City of Mukilteo watershed.

Mitigation Site M2 has not yet been utilized for any compensatory mitigation work in the City of Mukilteo. In an effort to ensure the success of the proposed and future mitigation, a full site assessment was performed to identify all the areas of potential mitigation opportunities (**See Attached Figure**, Conceptual Mitigation Plan - Mundorf - 8th St).

Table 4. Summary of Mitigation Opportunities

Action	Area
Wetland Creation	~14,849 square feet
Buffer Enhancement	~40,075 square feet
Buffer Enhancement, Conifer Under-plantings	~2.7 acres

In an effort to provide continued access to Japanese Gulch and its broader connections to the 76th Street Trailhead (immediately west of the Mitigation Site M2), the City of Mukilteo will require the replacement of any trail connections to be constructed through boardwalks to minimize disturbance of the existing trail network. Final trail configuration is subject to change, and the applicant will work with the City and the consulting biologist on exact boardwalk location prior to construction, and implementation of the mitigation planting plan.

It is recommended that future applicants coordinate with the consulting biologist of the previous mitigation phases in order to maintain consistency and mitigation function throughout the process. This will allow for a more complete strategy for implementing future mitigation at the M2 site, and would help facilitate future applicants who wish to use CAMP.

Table 1. Summary of Proposed Actions

Action	Impact Area	Compensatory Mitigation	Mitigation to Impact Ratio
Wetland Impact	3,432 square feet of wetland fill	5,162 square feet of Wetland Creation	1.5:1
Buffer Impact	6,609 square feet of buffer loss	6,649 square feet of Buffer Enhancement	1:1

1.3 WETLAND CLASSIFICATION

1.3.1 Cowardin System Classification

According to the Cowardin System, as described in Classification of Wetlands and Deepwater Habitats of the United States, Cowardin, et al. 1979, the classification for the on-site wetland is as follows:

Wetland A: Palustrine, Forested, Broad-leaved Deciduous, Saturated

1.3.2 City of Mukilteo Classifications

As required by MMC 17.52B.090, the subject wetlands were classified using the *Washington State Department of Ecology (DOE) Wetland Rating System for Western Washington: 2014 Update*. Wetlands were also classified according to the U.S. Fish and Wildlife Service (USFWS) *Classifications of Wetlands and Deepwater Habitats of the United States*, also known as the Cowardin Classification System.

Wetland A - Category IV: Wetland A received a total score of 14 on the DOE *Wetland Rating Form for Western Washington 2014 Update*, with a score for habitat functions of 4. In Mukilteo, wetlands that receive scores between 9 and 15 points are classified as Category IV wetlands. Category IV wetlands in Mukilteo receive standard buffers of 40 feet.

2.0 WETLAND DETERMINATION

2.1 REVIEW OF EXISTING INFORMATION

Prior to conducting the site investigation, public resource information was reviewed to gather background information on the subject property and the surrounding area in regards to wetlands, streams, and other critical areas. These sources included the USFWS National Wetlands Inventory (NWI), USDA-NRCS Web Soil Survey, Mukilteo Streams Wetlands and Watersheds map, WDFW Priority Habitat and Species (PHS) Interactive Map, WDFW SalmonScape mapping tool, and DNR Forest Practices Application Mapping tool (FPAMT).

Literature Review Findings

- NWI does not display any wetland features on or in the immediate vicinity of the subject site. The closest wetlands depicted are approximately 0.4 miles northwest of the subject site, within the Japanese gulch recreation area.
- NRCS maps soils in the vicinity of the subject site Alderwood gravelly sandy loam, 0 to 8 percent slopes. Inclusions of McKenna and Norma soils, both on the Hydric Soils list, occur as minor components within Alderwood gravelly sandy loam.
- The Mukilteo Streams Wetlands and Watershed map does not show any features on or adjacent to the subject site. The closest mapped feature is Brewery Creek with is located approximately 0.23 miles to the west.

- WDFW PHS does not display any sensitive areas on or near the subject site. The closest features depicted are the wetland identified by NWI and Brewery Creek located in the same location shown on the Mukilteo Stream Wetland and Watershed map.
- WDFW SalmonScape does not display any critical areas on or near the subject site. The closest mapped feature is depicted in the same location as the Mukilteo Stream Wetland and Watershed map and PHS.
- DNR FPAMT does not display any streams on or adjacent to the subject site. It does depict the same stream and in the same location as listed in SalmonScape, PHS, and the Mukilteo Stream Wetland and Watershed map.

2.2 WETLAND DETERMINATION METHODOLOGY

Wetland Resources' staff conducted site visits on May 25th and August 29th, 2016 to locate wetlands and streams occurring within and near the project site. Wetland conditions were evaluated using routine methodology described in the *Corps of Engineers Wetlands Delineation Manual (Final Report; January 1987)*, except where superseded by the *2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0, referred to as 2010 Regional Supplement)*. Our findings are consistent with both manuals.

The following criteria descriptions were used in the boundary determination:

- 1.) Examination of the site for hydrophytic vegetation (species present and percent cover);
- 2.) Examination of the site for hydric soils;
- 3.) Determining the presence of wetland hydrology

2.2.1 Hydrophytic Vegetation Criteria

The manuals define hydrophytic vegetation as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present. One of the most common indicators for hydrophytic vegetation is when more than 50 percent of a plant community consists of species rated "Facultative" and wetter on lists of plant species that occur in wetlands.

2.2.2 Soils Criteria and Mapped Description

The manuals define hydric soils as those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Field indicators are used for determining whether a given soil meets the definition for hydric soils.

According to NRCS Web Soil Survey, the soil map unit Alderwood gravelly sandy loam is predicted to occur on the subject property.

Alderwood gravelly sandy loam: is described as a moderately well drained soil on till plains. It is moderately deep over a hardpan. This soil formed in glacial till. Typically, the surface layer is very dark grayish brown gravelly sandy loam about 7 inches thick. The upper part of the subsoil is dark yellowish brown and dark brown very gravelly sandy loam about 23 inches thick. Included in this unit are small areas of Everett, Indianola, and Kitsap soils on terraces and uplands. Permeability of this soil is moderately rapid above the hardpan and very slow through it. Available water capacity is low. Soils sampled on site appear similar to the description for Alderwood gravelly sandy loam.

2.2.3 Hydrology Criteria

Wetland hydrology encompasses all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface for a sufficient duration during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an overriding influence on characteristics of vegetation and soils due to anaerobic and chemically reducing conditions, respectively.

Additionally, areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days ≥ 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas inundated or saturated between 5 and 12.5 percent of the growing season in most years may or may not be wetlands. Areas saturated to the surface for less than 5 percent of the growing season are non-wetlands. Field indicators are used for determining whether wetland hydrology parameters are met.

2.3 BOUNDARY DETERMINATION FINDINGS

2.3.1 Wetland A

HGM Class: Slope

Ecology Rating: Category IV

City of Mukilteo standard buffer width: 40 feet



Wetland A is a sloped feature located on the eastern side of the subject site. Dominant vegetation within the wetland includes Sitka willow (*Salix sitchensis*), Himalayan blackberry (*Rubus armeniacus*), Nootka rose (*Rosa nutkana*), and creeping buttercup (*Ranunculus repens*). Soils within the wetland are generally very dark grayish brown (10YR 3/2) sandy clay loam with dark yellowish brown (10YR 4/6) redoximorphic features. Soils sampled in the northern portion of the wetland contain a sublayer of dark gray (10YR 4/1) sandy loam with strong brown (7.5YR 5/8) redoximorphic features. These soil characteristics are consistent with the Redox Dark Surface (F6) and Depleted Below Dark Surface (F7) hydric soil indicators listed in the 2010 Regional Supplement. Soils were saturated at 10 inches below the surface following a long period without rainfall, during our August 2016 site visit (A total of 0.40 inches of precipitation total for the month of August). Additionally, the geomorphic position and sparsely vegetated areas within the interior of the wetland meet secondary indicators for wetland hydrology.

The dominant species rate “facultative” or wetter, indicating that a hydrophytic vegetative community is present in the areas mapped as wetland.

Field observations indicate that the area mapped as wetland is flooded, ponded, or saturated long enough during the growing season to develop anaerobic conditions in the upper part of the soils. Therefore, the vegetation, soil, and hydrologic criteria are all met for the on-site wetland.

2.3.2 City of Mukilteo CAMP Wetland 2

HGM Class: Depression

Ecology Rating: Category II

City of Mukilteo standard buffer width: 165 feet



Wetland 2 is a depressional feature located on the eastern side of the Mitigation Site M2: Japanese Gulch/Brewery Creek Headwater Wetlands, and continues off-site to the north. Dominant vegetation within the wetland includes red alder (*Alnus rubra*; FAC), Western red cedar (*Thuja plicata*; FAC), salmonberry (*Rubus spectabilis*; FAC), Sitka willow (*Salix sitchensis*, FACW), Pacific willow (*Salix lucida*, FACW), creeping buttercup (*Ranunculus repens*), and Himalayan blackberry (*Rubus armeniacus*; FAC). Wetland soils from 0 to 6 inches below the surface generally have a Munsell color of black (10YR 2/2) and a sandy clay loam texture. From 6 to 11 inches below the surface, soils have a color of very dark gray (10YR 3/1) and a sandy loam texture, with dark yellowish brown (10YR 4/6) redoximorphic features present on coated sand grains. From 11 to 16 inches below the surface, soils have a color of dark grayish brown (10YR 4/2) and a sandy loam texture, with dark yellowish brown (10YR 4/6) redoximorphic features present on coated sand grains. A restrictive cobble layer was present at 16 inches. These soil characteristics are consistent with the Redox Dark Surface (F6) and Depleted Below Dark Surface (F7) hydric soil indicators listed in the 2010 Regional Supplement. Soils were saturated at the surface, during our October 2016 site visit.

The dominant species rate “facultative” or wetter, indicating that a hydrophytic vegetative community is present in the areas mapped as wetland.

Field observations indicate that the area mapped as wetland is flooded, ponded, or saturated long enough during the growing season to develop anaerobic conditions in the upper part of the soils. Therefore, the vegetation, soil, and hydrologic criteria are all met for the on-site wetland.

2.3.3 Non-wetland Area

Dominant upland vegetation within the proposed development site is represented by various fruit trees (*Prunus* & *Malus spp.*) western sword fern (*Polystichum munitum*; FACU), trailing blackberry (*Rubus ursinus*; FACU), and Himalayan blackberry (*Rubus armeniacus*, FACU). Based on the observed dominant species, the majority of the vegetation species do not rate “facultative” or wetter, indicating that it is not a hydrophytic community.

Typical soils from 0 to 10 inches below the surface of the subject site have a Munsell color of very dark grayish brown (10YR 3/2), with a texture of gravely sandy loam. Soils from 10 to at least 16 inches are predominantly dark brown (10YR 3/3), with a texture of sandy loam. No redoximorphic features were observed in any of the non-wetland areas. This soil profile does not meet the criteria for any hydric soil indicators.

Soils were dry at the time of our August 2016 site investigation. Soils sampled in the area mapped as non-wetland do not appear to be flooded, ponded, or saturated long enough during the growing season to develop anaerobic conditions in the upper part, and therefore do not appear to meet wetland hydrology criteria.

The dominant vegetative community is not hydrophytic, hydric soils are absent in these areas, and direct hydrologic indicators are lacking. Therefore, it appears that areas present on the subject site do not meet criteria for wetlands.

2.4 WILDLIFE

The proposed development site provides low to moderate habitat functions. Although a portion of the property contains non-mature forest, the majority of the property including those forested areas is dominated by invasive species (Himalayan blackberry). Due to the low structural and plant diversity on the subject site overall wildlife use is limited. Additionally, stochastic high velocity flow events exhibited by slope wetland systems, do not provide appropriate access to food and water for terrestrial wildlife, and persistent instream habitat for fish species. Therefore, the onsite wildlife habitat is limited to small mammal and avian species. No mammalian species were detected during our on-site investigations in 2016, although several species, including gray squirrels (*Sciurus spp.*) and raccoon (*Procyon lotor*), are expected to occur within the area. Avian activity was not strongly detected. However, given the habitat available nearby, it is expected that the following avian species use the area: American Crow (*Corvus brachyrhynchos*), American Robin (*Turdus migratorius*), Steller’s Jay (*Cyanocitta stelleri*), Black-capped Chickadee (*Parus atricapilla*), Dark-eyed Junco (*Junco hyemalis*), northern flicker (*Colaptes auratus*), and Song Sparrow (*Melospiza melodia*). These lists are not meant to be all-inclusive and may omit species that currently utilize or could utilize the site.

3.0 WETLAND FUNCTIONS AND VALUES ASSESSMENT

Pursuant to requirements set forth in MMC 17.52B.140 critical areas reports shall assess the impacts of any alteration proposed for a critical area or buffer. The following assessment is intended to compare the current and post-development functions and values provided by Wetland A in the vicinity of the project area.

3.1 METHODOLOGY

The methodology for this functions and values assessment is based on professional opinion developed through past field analyses and interpretation. This assessment pertains specifically to the on-site wetland system, but is typical for assessments of similar systems common to Western Washington.

3.2 FUNCTIONAL COMPONENTS

Wetlands in Western Washington perform a variety of ecosystem functions. Included among the most important functions provided by wetlands are stormwater control, water quality improvement, fish and wildlife habitat, aesthetic value, recreational opportunities and education. The most commonly assessed functions and their descriptions are listed below.

3.3 VALUE ASSESSMENT

3.3.1 Wetland A

Hydrologic Function

Wetland A is a slope wetland. In general, wetlands in depressional areas with limited outlets store greater amounts of water than wetlands with unrestricted flow outlets. This wetland collects and temporarily stores precipitation as well as runoff from the surrounding area during storm events. However, the wetland's sloped nature reduces the potential residence time of water within the wetland. Due to its geomorphic position on a slope, this wetland provides a low to moderate value for this function.

Water Quality

This wetland provides some water quality benefits as water moves through the system. Since this wetland is on a slope, the residence time in this wetland is fairly low. Small ponded areas within slope wetlands allow sediments to drop out of suspension, thereby increasing water quality. Vegetation also allows this wetland to perform a bio-filtration function. This area contains dense cover of persistent forest and with a scrub-shrub layer present. Residence time and vegetation allow this wetland to provide a moderate value for this function, however its position on a slope greater than 2 percent limits the wetland's potential to perform a high water quality function.

Wildlife Habitat

Wetland A is quite small and as such has limited potential to provide a significant wildlife habitat function. The wetland has low structural complexity and is composed of forested vegetation. There is low species diversity and large amounts of invasive species that restrict wildlife use. Additionally, there is only one hydroperiod across the site, with no areas for significant live

storage of water. Due to the dense assemblage of invasives and low species diversity, the vegetation within the wetland provides limited resources such as food, water, thermal cover and hiding cover in close proximity, which wildlife species need to thrive. Roads and residential development surrounding the subject property on all sides disturb the continuity of the corridor. The disturbed nature of the corridor and isolation of the wetland limits its ability to provide valuable wildlife habitat. Therefore, based on the evidence on-site this wetland provides a low value for this function.

3.3.2 City of Mukilteo CAMP Wetland 2

Hydrologic Function

Wetland 2 is located in a topographic depression and is surrounded by gentle slopes. Wetland 2 is forested with a dense shrub and herbaceous layer in its understory. Wetland 2 does not have a visible outlet from the subject property, and due to its size and large volume of permanent flooded area visible in aerial photography, it is expected there is no outlet. In general, wetlands with no outlets store more amounts of water than depressional wetlands with restricted or unrestricted outlets. This wetland collects and temporarily stores precipitation as well as runoff from the surrounding area during storm events. Additionally, Wetland A has good cover of rigid plants that could reduce the velocity of surface flows during these events. The geomorphic position of Wetland A is such that it can provide high water storage capacity in its depressional areas. Based on its geomorphic position, and ability to attenuate surface water flows, Wetland A provides a high value for this function.

Water Quality

This wetland provides some water quality benefits as water moves through the system. Since this wetland is a depression with no outlet, the residence time is high. Depressional wetlands improve water quality by allowing sediment to settle out of the sequestered stormwater due to the reduction in flow velocity. This sediment is often ionically bonded to pollutants such as phosphorous. However, less than a quarter of the wetland is seasonally flooded. Seasonally flooded depressional areas provide the aforementioned functions most effectively because of their ability to contribute live storage. The presence of dense, uncut, herbaceous vegetation allows this wetland to perform an increased bio-filtration function. However, the wetland's location in a low-density rural area, and its small distribution of seasonally flooded areas, limits its ability to provide a high value for water quality. Subsequently, these conditions allow the wetland to provide a moderate value of Water Quality function.

Wildlife Habitat

Wetland A has good potential to perform a wildlife habitat function. The wetland has high structural complexity and is composed of forested and scrub-shrub vegetation. There is high species diversity, and multiple hydroperiods. The vegetation within the wetland provides resources such as food, water, thermal cover and hiding cover in close proximity, which wildlife species need to thrive. Roads and residential development surrounding the subject property is low, therefore the continuity of the corridor is maintained. Therefore, based on these conditions this wetland provides a high value for this function.

3.4 POST-DEVELOPMENT FUNCTIONS AND VALUES

In order to accommodate a proposed development of the property suitable for a single-family residence and associated infrastructure on site, the applicant is proposing to fill the on-site wetland. Wetland A is a 3,432 square foot (0.079 acres) Category IV wetland located on the eastern side of the subject property, and is currently providing a low level of ecosystem functions and values. The on-site wetland and buffer are isolated from other critical areas, and are significantly impacted by invasive species including Himalayan blackberry and field bindweed. Well-established invasive species limits the quantity, density, and structural diversity of the native plant assemblage within the on-site wetland and buffer. Consequently, wetland functions and values including the attenuation of floodflow, biofiltration function, and the quality of wildlife habitat provided are significantly degraded.

As compensatory mitigation for filling the low quality Category IV wetland on the subject site, the applicant is proposing to provide 5,162 square feet (0.12 acres) of wetland creation at the Mukilteo CAMP Mitigation Site M2. Additionally, the applicant is proposing to enhance a total of 6,649 square feet of buffer adjacent to the created wetland. This buffer area currently has low structural diversity and is dominated by Himalayan blackberry, an invasive species. The enhancement of the degraded buffer area, and establishment of a structurally diverse assemblage of native plants, will improve the attenuation of floodflow, biofiltration function, and the quality of wildlife habitat provided within the Mitigation Site M2. Utilizing the CAMP for mitigation will ensure that the biological and physical functions provided by the proposed wetland creation and buffer enhancement will occur within a sub-basin that has been identified as having a high ecological value. With the use of the CAMP the applicant will be filling a low quality largely isolated wetland on the subject site, while improving the size and function of Wetland 2, a dynamic high value feature that comprises a portion of the headwaters of Japanese Gulch & Brewery Creek. The proposed mitigation will result in long-term improvements to the overall level of critical areas functions and values within the larger City of Mukilteo watershed.

4.0 WETLAND MITIGATION PLAN

As compensatory mitigation for filling the low quality Category IV wetland on the subject site, the applicant is proposing to utilize the City of Mukilteo CAMP and provide wetland creation and buffer enhancement at the CAMP identified Mitigation Site M2: Japanese Gulch/Brewery Creek Headwater Wetlands.

4.1 WETLAND CREATION

The applicant is proposing 5,162 square feet of wetland creation area. The creation area will be restored with the following trees and shrubs.

Common Name	Latin Name	Size	Spacing	Quantity
Western red cedar	<i>Thuja plicata</i>	2 gal	10'	26
Sitka spruce	<i>Picea sitchensis</i>	2 gal	10'	26
Red osier dogwood	<i>Cornus sericea</i>	2 gal	5'	31
Black twinberry	<i>Lonicera involucrata</i>	2 gal	5'	31
Vine Maple	<i>Acer circinatum</i>	2 gal	5'	31
Salmonberry	<i>Rubus spectabilis</i>	2 gal	5'	31
Sitka Willow	<i>Salix sitchensis</i>	2 gal	5'	31
Total Plantings				207

4.2 BUFFER ENHANCEMENT

The applicant is proposing to enhance a total of 6,649 square feet of buffer adjacent to the created wetland, with the following trees and shrubs.

Common Name	Latin Name	Size	Spacing	Quantity
Douglas fir	<i>Pseudotsuga menziesii</i>	1 gallon	10'	22
Big leaf maple	<i>Acer macrophyllum</i>	1 gallon	10'	22
Western hemlock	<i>Tsuga heterophylla</i>	1 gallon	10'	22
Beaked Hazelnut	<i>Corylus cornuta</i>	1 gallon	5'	38
Red elderberry	<i>Sambucus racemosa</i>	1 gallon	5'	38
Salmonberry	<i>Rubus spectabilis</i>	1 gallon	5'	38
Osoberry	<i>Oemleria cerasiformis</i>	1 gallon	5'	38
Snowberry	<i>Symphoricarpos albus</i>	1 gallon	5'	38
Thimbleberry	<i>Rubus parviflorus</i>	1 gallon	5'	38
Baldhip rose	<i>Rosa gymnocarpa</i>	1 gallon	5'	38
Total Plantings				332

4.3 GRASS SEEDING

Any disturbed soil in buffers shall be seeded to the recommended grass seed mixture below, or similar approved mixture. The City shall approve any change in species or concentration. Fertilizer shall only be used if absolutely necessary due to potential runoff into adjacent waters. If deemed absolutely necessary by the consulting biologist and/or the City, an appropriate fertilizer will be recommended for the particular situation.

4.3.1 Wetland Seed Mix

Common Name	Latin Name	% Composition
Tall manna grass	<i>Glyceria elata</i>	20
Slough sedge	<i>Carex obnupta</i>	20
Dagger-leaved rush	<i>Juncus ensifolius</i>	20
Slender rush	<i>Juncus tenuis</i>	20
Small-flowered bulrush	<i>Scirpus microcarpus</i>	20

4.3.2 Buffer Mix:

Common Name	Latin Name	lbs/1,000 s.f.
Tall fescue	<i>Festuca arundinacea</i>	0.4
Colonial bentgrass	<i>Agrostis tenuis</i>	0.4
Annual ryegrass	<i>Lolium multiflorum</i>	0.5
Red clover	<i>Trifolium repens</i>	0.2

This mitigation plan is consistent with the *Mitigation Plan Requirements* as outlined in MMC 17.52B.140. The proposed wetland creation and buffer enhancement within the CAMP Mitigation Site M2, is expected to provide a significant increase in biological functions and values as compared to those currently provided by Wetland A located on the subject property.

4.4 PERFORMANCE SURETY

Performance Surety. All wetland mitigation and buffer enhancement shall be completed prior to final plat approval and/or building occupancy depending on the type of application. However, when improvements cannot be completed prior to final acceptance due to weather conditions, which may negatively affect the success of the project, a performance surety may be used. The surety shall equal one hundred fifty percent of the cost of the mitigation project, and the required improvements shall be installed in a satisfactory manner within six months or less.

Buffer Enhancement Projects: The amount of the maintenance surety shall be equal to fifteen percent of the costs of the enhancement project and the term of the surety shall reflect that of the monitoring program.

Quantity of 1 gallon plants (\$12/ea., installed)	538
Estimated Cost of Plant Materials and Labor	\$6,456
Estimated Cost of Monitoring (\$1800/yr.)	\$9000
Estimated Cost of Maintenance (\$1000/yr.)	\$5,000
Total Estimated Project Cost	\$20,456

4.5 PROJECT NOTES

Pre-Construction Meeting

Mitigation projects are typically more complex to install than is described in plans. Careful

monitoring by a wetland biologist for all portions of this project is strongly recommended. Construction timing and sequencing is important to the success of this type of project. There shall be a pre-construction meeting on the project site between the Permittee, the consulting wetland biologist, equipment operator(s), and a City representative. The objective will be to verify the location of proposed planting.

Inspections

A wetland biologist shall be contracted to periodically inspect the mitigation installation described in this plan. Minor adjustments to the original design may be necessary prior to and during construction due to unusual or hidden site conditions. A City representative and/or the consulting biologist will make these decisions during construction.

Planting Notes

Plant in the early spring or late fall and obtain all plants from a reputable nursery. Care and handling of all plant materials is extremely important to the overall success of the project. The origin of all plant materials specified in this plan shall be native plants, nursery grown in the Puget Sound region of Washington. Some limited species substitution may be allowed, only with the agreement of the landscape designer, wetland biologist, and/or The City

Handling

Plants shall be handled so as to avoid all damage, including breaking, bruising, root damage, sunburn, drying, freezing or other injury. Plants must be covered during transport. Plants shall not be bound with wire or rope in a manner that could damage branches. Protect plant roots with shade and wet soil in the time period between delivery and installation. Do not lift container stock by trunks, stems, or tops. Do not remove from containers until ready to plant. Water all plants as necessary to keep moisture levels appropriate to the species horticultural requirements. Plants shall not be allowed to dry out. All plants shall be watered thoroughly immediately upon installation. Soak all containerized plants thoroughly prior to installation. Bare root plants are subject to the following special requirements, and shall not be used unless planted between November 1 and March 1, and only with the permission of the landscape designer, wetland biologist, and City staff. Bare root plants must have enough fibrous root to insure plant survival. Roots must be covered at all times with mud and/or wet straw, moss, or other suitable packing material until time of installation. Plants whose roots have dried out from exposure will not be accepted at installation inspection.

Storage

Plants stored by the Permittee for longer than one month prior to planting shall be planted in nursery rows, and treated in a manner suitable to that species horticultural requirement. Plants must be re-inspected by the wetland biologist and/or landscape designer prior to installation.

Damaged plants

Damaged, dried out, or otherwise mishandled plants will be rejected at installation inspection. All rejected plants shall be immediately removed from the site.

Plant Names

Plant names shall comply with those generally accepted in the native plant nursery trade. Any

question regarding plant species or variety shall be referred to the landscape designer, wetland biologist, or City staff. All plant materials shall be true to species and variety and legibly tagged.

Quality and condition

Plants shall be normal in pattern of growth, healthy, well-branched, vigorous, with well-developed root systems, and free of pests and diseases. Damaged, diseased, pest-infested, scraped, bruised, dried out, burned, broken, or defective plants will be rejected. Plants with pruning wounds over 1" in diameter will be rejected.

Roots

All plants shall be balled and burlapped or containerized, unless explicitly authorized by the landscape designer and/or wetland biologist. Rootbound plants or B&B plants with damaged, cracked, or loose rootballs (major damage) will be rejected. Immediately before installation, plants with minor root damage (some broken and / or twisted roots) must be root-pruned. Matted or circling roots of containerized plantings must be pruned or straightened and the sides of the root ball must be roughened from top to bottom to a depth of approximately half an inch in two to four places. Bare root plantings of woody material are allowed only with permission from the landscape designer, wetland biologist and/or City staff.

Sizes

Plant sizes shall be the size indicated in the plant schedule in approved plans. Larger stock may be acceptable provided that it has not been cut back to the size specified, and that the root ball is proportionate to the size of the plant. Smaller stock may be acceptable, and preferable under some circumstances, based on site-specific conditions. Measurements, caliper, branching, and balling and burlapping shall conform to the American Standard of Nursery Stock by the American Association of Nurserymen (latest edition).

Form

Evergreen trees shall have single trunks and symmetrical, well-developed form. Deciduous trees shall be single trunked unless specified as multi-stem in the plant schedule. Shrubs shall have multiple stems and be well-branched.

Timing of Planting

Unless otherwise approved by City staff, all planting shall occur between November 1 and March 1. Overall, the earlier plants go into the ground during the dormant period, the more time they have to adapt to the site and extend their root systems before the water demands of spring and summer.

Weeding

Existing and exotic vegetation in the mitigation areas will be hand weeded from around all newly installed plants at the time of installation and on a routine basis throughout the monitoring period. No chemical control of vegetation on any portion of the site is allowed without the written permission of City staff.

Site conditions

The contractor shall immediately notify the landscape designer and/or wetland biologist of drainage or soil conditions likely to be detrimental to the growth or survival of plants. Planting

operations shall not be conducted under the following conditions: freezing weather, when the ground is frozen, excessively wet weather, excessively windy weather, or in excessive heat.

Planting Pits

Planting pits shall be circular or square with vertical sides, and shall be 6" deeper and 12" larger in diameter than the root ball of the plant. Break up the sides of the pit in compacted soils. Set plants upright in pits. Burlap shall be removed from the planting pit. Backfill shall be worked back into holes such that air pockets are removed without adversely compacting down soils.

Fertilizer

Slow release fertilizer may be used if pre-approved by The City. Fertilizers shall be applied only at the base of plantings underneath the required covering of mulch (that does not make contact with stems of the plants). No soil amendment or fertilizers will be placed in planting holes.

Water

Plants shall be watered midway through backfilling, and again upon completion of backfilling. For spring plantings (if approved), a rim of earth shall be mounded around the base of the tree or shrub no closer than the drip line, or no less than 30" in diameter, except on steep slopes or in hollows. Plants shall be watered a second time within 24-48 hours after installation. The earthen rim / dam should be leveled prior to the second growing season.

Staking

Most shrubs and many trees DO NOT require any staking. If the plant can stand alone without staking in a moderate wind, do not use a stake. If the plant needs support, then strapping or webbing should be used as low as possible on the trunk to loosely brace the tree with two stakes. Do not brace the tree tightly or too high on the trunk. If the tree is unable to sway, it will further lose the ability to support itself. Do not use wire in a rubber hose for strapping as it exerts too much pressure on the bark. As soon as supporting the plant becomes unnecessary, remove the stakes. All stakes must be removed within two (2) years of installation.

Plant Location

Three foot by 2-inch by 1/4-inch lath stakes or suitable flagging material shall be placed next to or on each planting to assist in locating the plants while removing the competing non-native vegetation and to assist in locating the plants during the monitoring period.

Arrangement and Spacing

The plants shall be arranged in a pattern with the appropriate numbers, sizes, species, and distribution that are required in accordance with the approved plans. The actual placement of individual plants shall mimic natural, asymmetric vegetation patterns found on similar undisturbed sites in the area. Spacing of the plantings may be adjusted to maintain existing vegetation with the agreement of the landscape designer, wetland biologist, and/or City staff.

Inspection(s)

A wetland biologist shall be present on site to inspect the plants prior to planting. Minor adjustments to the original design may be required prior to and during construction.

Mulch

All landscaped areas denuded of vegetation and soil surface surrounding all planting pit areas shall receive no less than 2 to 4 inches of organic compost or certified weed free straw after planting. Compost or certified weed free straw shall be kept well away (at least 2 inches) from the trunks and stems of woody plants.

5.0 PROJECT MONITORING PROGRAM

5.1 REQUIREMENTS FOR MONITORING PROJECT

1. Initial compliance/as-built report
2. Semi-annual site inspection (twice per year spring and summer) for five years
3. Annual reports including final report (one report submitted in the summer of each monitored year)

Purpose for Monitoring

The purpose for monitoring this mitigation project shall be to evaluate its success. Success will be determined if monitoring shows at the end of five years that the definitions of success stated below are being met. The property owner shall grant access to the mitigation area for inspection and maintenance to the contracted landscape and/or wetland specialist and The City during the period of the bond or until the project is evaluated as successful.

Monitoring

Monitoring shall be conducted for five years in accordance with the approved Mitigation Plan. The monitoring period will begin once the City receives written notification confirming the mitigation plan has been implemented and City staff inspects the site and issues approval of the installation.

Vegetation Monitoring

Representative photopoints shall be selected, and permanently marked in the field with rebar, PVC, or other marking device. Photos must be taken from the original locations during each monitoring year to establish a record of plant growth throughout the monitoring period. The exact location of permanent photopoints must be depicted in the as-built report (attached map), and Year 0 photographs shall be included in the as-built letter to document baseline conditions.

Vegetation sampling shall be conducted as a qualitative assessment, for the purpose of establishing approximate invasive cover and approximate areal coverage. Total invasive cover will be determined as follows: the contracted biologist will walk the entirety of the mitigation planting area and record approximate invasive species coverage. Total observed invasive species cover divided by the total area of the mitigation site yields approximate invasive cover. The findings will be presented in the annual report.

Total areal coverage will be determined as follows: the contracted biologist will walk the entirety of the mitigation planting area and record approximate areal coverage. Total areal coverage

divided by the total area of the mitigation site yields approximate areal coverage. The findings will be presented in the annual report.

Each monitoring report will establish an approximate percent coverage of invasive species and areal coverage, which will serve as the basis for maintenance recommendations (invasive species removal and re-planting). Maintenance shall occur following any monitoring report documenting an increase in invasive species cover, even if cover is reported below ten percent.

5.2 MONITORING REPORTS

Report Contents

Monitoring shall occur in the spring of each monitoring year. Reports shall be submitted by August 1st of each year during the monitoring period. As applicable, monitoring reports must include descriptions / data for:

1. Site plan and vicinity map
2. Description of project, including date of installation, current year of monitoring, restatement of mitigation / restoration goals, and performance standards
3. Plant survival and areal coverage (qualitative assessment)
4. Assessment of nuisance / exotic biota and recommendations for management
5. Receipts for any structural repair or replacement
6. Color photographs taken from permanent photo-points that shall be depicted on the monitoring report map.

5.3 PROJECT SUCCESS AND COMPLIANCE

5.3.1 Criteria for Success

Upon completion of the proposed mitigation project, an inspection by a qualified biologist will be made to document mitigation installation. A compliance letter (as-built) will be supplied to The City for review, within 30 days after the completion of planting. City review and acceptance of successful mitigation installation is required prior to commencement of the 5-year monitoring period.

A landscape professional or wetland biologist will perform condition monitoring of the plantings annually in the spring. A written report describing the monitoring results will be submitted to The City after each site inspection of each monitored year. Final inspection will occur five years after completion of this project. The contracted consultant will prepare a final report describing success or failure of the project.

5.3.2 City of Mukilteo Contact

Certain actions within the wetland and buffer mitigation areas may require inspection or approval by City staff. Requests for inspection/approval shall be coordinated with the City. The City shall grant access to the mitigation areas for inspection and maintenance to the contracted wetland specialist the monitoring period, or until the project is evaluated as successful.

5.3.3 Definition of Success

The mitigation project goal will be deemed successful when objectives are met, as evidenced through the observation of set performance standards.

5.3.4 Objectives

Objective 1: To establish a diverse, native plant community in the wetland buffer that will persist and create an appropriate vegetative matrix.

Objective 2: To have significant native vegetative cover throughout the restoration area.

Objective 3: To remove existing invasive species and limit the establishment and spread of those species in the buffer.

5.3.5 Performance standards

Year 1 Monitoring

Performance Standard: 100 percent survival of planted species
No greater than 20 percent coverage of invasive species

Year 3 Monitoring

Performance Standard: 80 percent survival of planted species
No greater than 20 percent coverage of invasive species
New growth shall be observable and documented

Year 5 Monitoring

Performance Standard: 80 percent survival of planted species
No greater than 10 percent coverage of invasive species
New growth shall be observable and documented

5.4 MAINTENANCE

This mitigation project will require periodic maintenance to replace mortality of the planted trees and shrubs. Maintenance is also necessary to control invasive, non-native plant species and competing grasses. The planting areas will be maintained in the spring of each year for the five-year monitoring period. Maintenance will include hand removal of competing grasses and non-native vegetation from a 2-foot diameter ring surrounding a given plant. Removal of invasive species shall be done by hand to decrease the likelihood of damage occurring to the plantings. All blackberry, reed canarygrass, and other aggressive invasive species sprouting anywhere within the mitigation site shall be removed during each maintenance period. Herbicide use is prohibited.

When necessary, mulch shall be replaced around each plant. Each plant shall receive a 2-foot diameter ring of mulch to a height of 3 to 4 inches above the existing soil surface. A 4-inch diameter ring around the base of each plant shall be kept free of mulch. Wood chips or composted mulch is acceptable.

Following each monitoring site visit, recommendations will be made for the replacement of plant mortality and other general maintenance. If necessary, re-planting shall occur in the fall, and a brief memo shall be included in the annual monitoring report, and submitted to City staff indicating that re-planting has successfully occurred.

5.4.1 Contingency Plan

If, during any of the inspections, more than 20 percent of the plants are severely stressed, or it appears more than 20 percent may not survive, additional plantings of the same species or, if necessary, alternative species may be added to the planting area. If this situation persists into the next inspection, a meeting with a representative for the City, the consulting wetland biologist and the property owner will be scheduled to decide upon contingency plans. Elements of the contingency plan may include, but will not be limited to more aggressive weed control, plant mortality replacement, species substitution, fertilization, and/or soil amendments.

6.0 USE OF THIS REPORT

This Critical Area Study is supplied Terry Mundorf, as a means of determining on-site wetlands conditions and providing appropriate mitigation for on-site wetland and buffer impacts, as required by City of Mukilteo during the permitting process. This report is based largely on readily observable conditions and, to a lesser extent, on readily ascertainable conditions. No attempt has been made to determine hidden or concealed conditions. The laws applicable to wetlands are subject to varying interpretations and may be changed at any time by the courts or legislative bodies. This report is intended to provide information deemed relevant in the applicant's attempt to comply with the laws now in effect.

The work for this report has conformed to the standard of care employed by wetland ecologists. No other representation or warranty is made concerning the work or this report, and any implied representation or warranty is disclaimed.

Wetland Resources, Inc.



Jeff Mallahan
Associate Ecologist

7.0 REFERENCES

- Cowardin, et al., 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior. FWS/OBS-79/31. December 1979.
- Environmental Laboratory. 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1. Environmental Laboratory, Department of the Army, Corps Waterways Experiment Station, Vicksburg, MS.
- Granger, T., T. Hruby, A. McMillan, D. Peters, J. Rubey, D. Sheldon, S. Stanley, E. Stockdale. April 2005. Wetlands in Washington State – Volume 2: Guidance for Protecting and Managing Wetlands. Washington State Department of Ecology. Publication #05-06-008. Olympia, WA.
- Hruby, T. 2014. *Washington State Wetland Rating System for Western Washington: 2014 Update*. Washington State Dept. of Ecology Publication No. 14-06-029. Olympia, WA.
- Lichvar, R.W. 2013. The National Wetland Plant List: 2013 wetland ratings. Phytoneuron 2013-49: 1–241. Published July 17, 2013. ISSN 2153 733X
- Mukilteo Municipal Code, Chapter 17.52. Wetland Regulations.
- Munsell Color. 2012. Munsell Soil Color Book. Munsell Color, Grand Rapids, MI.
- NRCS. 2014. Web Soil Survey. United States Department of Agriculture. <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>.
- Soil Conservation Service. 1973. Soil Survey of Snohomish County Area Washington. November 1973.
- Snohomish, County of. 2016. SnoScape Interactive Mapping Tool. <http://gis.snoco.org/maps/snoscape/>
- US Army COE. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0). Vicksburg, MS
- USFWS. 2016. National Wetlands Inventory (NWI) Online Mapper. <http://www.fws.gov/wetlands/Data/Mapper.html>.
- Washington State Department of Ecology. Using the Wetland Rating System in Compensatory Mitigation. Publication #08-06-009. March 2008.
- WDFW. 2016a. Priority Habitat and Species (PHS) Interactive Map. <http://apps.wdfw.wa.gov/phsontheweb/>

WDFW. 2016b. SalmonScape Online Mapping Application.
<http://apps.wdfw.wa.gov/salmonscape/map.html>.

APPENDIX A:
WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Mundorf - 8th St. City/County: Mukilteo Sampling Date: 8/29/16
 Applicant/Owner: Terry Mundorf State: WA Sampling Point: S1
 Investigator(s): J. Mallahan & M. Kamowski Section, Township, Range: SEC 28, TWP 28, RGE 4
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): ~5%
 Subregion (LRR): LRR-A Lat: 47.942224 N Long: -122.29731 W Datum: WGS84
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-FT)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. <u>Salix sitchensis</u>	<u>75</u>	<u>Y</u>	<u>FACW</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC species _____ x 3 = <u>0</u> FACU species _____ x 4 = <u>0</u> UPL species _____ x 5 = <u>0</u> Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____
<u>75</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: 15-FT)				
1. <u>Rosa nutkana</u>	<u>75</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Rubus armeniacus</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>95</u> = Total Cover				
Herb Stratum (Plot size: 5-FT)				
1. <u>Ranunculus repens</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>5</u> = Total Cover				
Woody Vine Stratum (Plot size: 5-FT)				
1. <u>Rubus armeniacus</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
<u>15</u> = Total Cover				
% Bare Ground in Herb Stratum <u>95</u>				
Remarks:				

SOIL

Sampling Point: S1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features		Type ¹	Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%				
0-7	10YR 3/2	100					SaCilO	
7-16+	2.5YR 5/2	90	10YR 5/6	10	CS	M	SaCilO	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- | | |
|---|--|
| <input type="checkbox"/> Histosol (A1) | <input type="checkbox"/> Sandy Redox (S5) |
| <input type="checkbox"/> Histic Epipedon (A2) | <input type="checkbox"/> Stripped Matrix (S6) |
| <input type="checkbox"/> Black Histic (A3) | <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) |
| <input type="checkbox"/> Hydrogen Sulfide (A4) | <input type="checkbox"/> Loamy Gleyed Matrix (F2) |
| <input checked="" type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Matrix (F3) |
| <input type="checkbox"/> Thick Dark Surface (A12) | <input type="checkbox"/> Redox Dark Surface (F6) |
| <input type="checkbox"/> Sandy Mucky Mineral (S1) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4) | <input type="checkbox"/> Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- | | |
|--|--|
| <input type="checkbox"/> Surface Water (A1) | <input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) |
| <input type="checkbox"/> High Water Table (A2) | <input type="checkbox"/> Salt Crust (B11) |
| <input type="checkbox"/> Saturation (A3) | <input type="checkbox"/> Aquatic Invertebrates (B13) |
| <input type="checkbox"/> Water Marks (B1) | <input type="checkbox"/> Hydrogen Sulfide Odor (C1) |
| <input type="checkbox"/> Sediment Deposits (B2) | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) | <input type="checkbox"/> Presence of Reduced Iron (C4) |
| <input type="checkbox"/> Algal Mat or Crust (B4) | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) |
| <input type="checkbox"/> Iron Deposits (B5) | <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) |
| <input type="checkbox"/> Surface Soil Cracks (B6) | <input type="checkbox"/> Other (Explain in Remarks) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | |
| <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- ☒ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
☒ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☒ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☐ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (**LRR A**)
☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____
 Water Table Present? Yes ☐ No ☒ Depth (inches): _____
 Saturation Present? Yes ☒ No ☐ Depth (inches): 14
 (includes capillary fringe)

Wetland Hydrology Present? Yes ☒ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Sampling site located in a sparsely vegetated area, with obvious drainage patterns present.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Mundorf - 8th St. City/County: Mukilteo Sampling Date: 8/29/16
 Applicant/Owner: Terry Mundorf State: WA Sampling Point: S2
 Investigator(s): J. Mallahan & M. Kamowski Section, Township, Range: SEC 28, TWP 28, RGE 4
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): ~3%
 Subregion (LRR): LRR-A Lat: 47.942276 N Long: -122.297442 W Datum: WGS84
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
 Are Vegetation ☐, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks:	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30-FT)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. <u>Salix sitchensis</u>	<u>25</u>	<u>Y</u>	<u>FACW</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC species _____ x 3 = <u>0</u> FACU species _____ x 4 = <u>0</u> UPL species _____ x 5 = <u>0</u> Column Totals: <u>0</u> (A) <u>0</u> (B) Prevalence Index = B/A = _____
<u>25</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: 15-FT)				
1. <u>Rubus armeniacus</u>	<u>75</u>	<u>Y</u>	<u>FAC</u>	
2. <u>Rosa nutkana</u>	<u>10</u>	<u>N</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Wetland Non-Vascular Plants ¹ <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>85</u> = Total Cover				
Herb Stratum (Plot size: 5-FT)				
1. <u>Convolvulus arvensis</u>	<u>5</u>	<u>Y</u>	<u>NI</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>5</u> = Total Cover				
Woody Vine Stratum (Plot size: 5-FT)				
1. <u>Rubus armeniacus</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
<u>15</u> = Total Cover				
% Bare Ground in Herb Stratum <u>95</u>				
Remarks:				

SOIL

Sampling Point: S2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features			Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹			
0-10	10YR 3/2	100					SaLo	
10-16+	10YR 3/3	100					GrSaLo	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) <input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Sandy Gleyed Matrix (S4)	Indicators for Problematic Hydric Soils³: <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Depleted Dark Surface (F7) <input type="checkbox"/> Redox Depressions (F8) <input type="checkbox"/> 2 cm Muck (A10) <input type="checkbox"/> Red Parent Material (TF2) <input type="checkbox"/> Very Shallow Dark Surface (TF12) <input type="checkbox"/> Other (Explain in Remarks)
--	---

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
--	---

Remarks:

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one required; check all that apply)			Secondary Indicators (2 or more required)		
<input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Salt Crust (B11) <input type="checkbox"/> Aquatic Invertebrates (B13) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A) <input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Raised Ant Mounds (D6) (LRR A) <input type="checkbox"/> Frost-Heave Hummocks (D7)			

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
---	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B:
DEPARTMENT OF ECOLOGY WETLAND RATING FORMS

Wetland name or number A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Mundorf Date of site visit: 8/29/16
Rated by MK & JM Trained by Ecology? ☒ Yes ☐ No Date of training 3/15
HGM Class used for rating SLOPE Wetland has multiple HGM classes? ☐ Y ☒ N

NOTE: Form is not complete without the figures requested (*figures can be combined*).
Source of base aerial photo/map ESRI World Imagery

OVERALL WETLAND CATEGORY IV (based on functions ☒ or special characteristics ☐)

1. Category of wetland based on FUNCTIONS

- ☐ Category I – Total score = 23 - 27
☐ Category II – Total score = 20 - 22
☐ Category III – Total score = 16 - 19
☒ Category IV – Total score = 9 - 15

FUNCTION	Improving Water Quality			Hydrologic			Habitat			
Circle the appropriate ratings										
Site Potential	H	M	<input type="checkbox"/> L	H	M	<input type="checkbox"/> L	H	M	<input type="checkbox"/> L	
Landscape Potential	H	<input checked="" type="checkbox"/> M	L	H	<input checked="" type="checkbox"/> M	L	H	M	<input type="checkbox"/> L	
Value	H	<input checked="" type="checkbox"/> M	L	H	<input checked="" type="checkbox"/> M	L	H	<input checked="" type="checkbox"/> M	L	
Score Based on Ratings	5			5			4			TOTAL
										14

Score for each function based on three ratings
(order of ratings is not important)

9 = H,H,H
8 = H,H,M
7 = H,H,L
7 = H,M,M
6 = H,M,L
6 = M,M,M
5 = H,L,L
5 = M,M,L
4 = M,L,L
3 = L,L,L

2. Category based on SPECIAL CHARACTERISTICS of wetland

CHARACTERISTIC	CATEGORY
Estuarine	I II
Wetland of High Conservation Value	I
Bog	I
Mature Forest	I
Old Growth Forest	I
Coastal Lagoon	I II
Interdunal	I II III IV
None of the above	<input checked="" type="checkbox"/>

Wetland name or number A

Maps and figures required to answer questions correctly for Western Washington

Depressional Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	D 1.3, H 1.1, H 1.4	
Hydroperiods	D 1.4, H 1.2	
Location of outlet (<i>can be added to map of hydroperiods</i>)	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	D 2.2, D 5.2	
Map of the contributing basin	D 4.3, D 5.3	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	D 3.1, D 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	D 3.3	

Riverine Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Ponded depressions	R 1.1	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream (<i>can be added to another figure</i>)	R 4.1	
Map of the contributing basin	R 2.2, R 2.3, R 5.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	R 3.1	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	R 3.2, R 3.3	

Lake Fringe Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	L 1.1, L 4.1, H 1.1, H 1.4	
Plant cover of trees, shrubs, and herbaceous plants	L 1.2	
Boundary of area within 150 ft of the wetland (<i>can be added to another figure</i>)	L 2.2	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	L 3.1, L 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	L 3.3	

Slope Wetlands

Map of:	To answer questions:	Figure #
Cowardin plant classes	H 1.1, H 1.4	
Hydroperiods	H 1.2	
Plant cover of dense trees, shrubs, and herbaceous plants	S 1.3	
Plant cover of dense, rigid trees, shrubs, and herbaceous plants (<i>can be added to figure above</i>)	S 4.1	
Boundary of 150 ft buffer (<i>can be added to another figure</i>)	S 2.1, S 5.1	
1 km Polygon: Area that extends 1 km from entire wetland edge - including polygons for accessible habitat and undisturbed habitat	H 2.1, H 2.2, H 2.3	
Screen capture of map of 303(d) listed waters in basin (from Ecology website)	S 3.1, S 3.2	
Screen capture of list of TMDLs for WRIA in which unit is found (from web)	S 3.3	

HGM Classification of Wetlands in Western Washington

For questions 1-7, the criteria described must apply to the entire unit being rated.

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, identify which hydrologic criteria in questions 1-7 apply, and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides except during floods?

NO – go to 2

YES – the wetland class is **Tidal Fringe** – go to 1.1

- 1.1 Is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

NO – **Saltwater Tidal Fringe (Estuarine)**

YES – **Freshwater Tidal Fringe**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is an **Estuarine** wetland and is not scored. This method **cannot** be used to score functions for estuarine wetlands.*

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.

NO – go to 3

YES – The wetland class is **Flats**

*If your wetland can be classified as a Flats wetland, use the form for **Depressional** wetlands.*

3. Does the entire wetland unit **meet all** of the following criteria?

The vegetated part of the wetland is on the shores of a body of permanent open water (without any plants on the surface at any time of the year) at least 20 ac (8 ha) in size;
At least 30% of the open water area is deeper than 6.6 ft (2 m).

NO – go to 4

YES – The wetland class is **Lake Fringe** (Lacustrine Fringe)

4. Does the entire wetland unit **meet all** of the following criteria?

- ✓ The wetland is on a slope (*slope can be very gradual*),
- ✓ The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks,
- ✓ The water leaves the wetland **without being impounded**.

NO – go to 5

YES – The wetland class is **Slope**

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 ft diameter and less than 1 ft deep).

5. Does the entire wetland unit **meet all** of the following criteria?

- ___ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river,
- ___ The overbank flooding occurs at least once every 2 years.

Wetland name or number A

NO – go to 6

YES – The wetland class is **Riverine**

NOTE: The Riverine unit can contain depressions that are filled with water when the river is not flooding

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time during the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

NO – go to 7

YES – The wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no overbank flooding? The unit does not pond surface water more than a few inches. The unit seems to be maintained by high groundwater in the area. The wetland may be ditched, but has no obvious natural outlet.

NO – go to 8

YES – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a Depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within the wetland unit being scored.

NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the HGM class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM classes within the wetland unit being rated	HGM class to use in rating
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake Fringe	Lake Fringe
Depressional + Riverine along stream within boundary of depression	Depressional
Depressional + Lake Fringe	Depressional
Riverine + Lake Fringe	Riverine
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE

*If you are still unable to determine which of the above criteria apply to your wetland, or if you have **more than 2 HGM classes** within a wetland boundary, classify the wetland as Depressional for the rating.*

Wetland name or number A

SLOPE WETLANDS

Water Quality Functions - Indicators that the site functions to improve water quality

S 1.0. Does the site have the potential to improve water quality?		
S 1.1. Characteristics of the average slope of the wetland: (<i>a 1% slope has a 1 ft vertical drop in elevation for every 100 ft of horizontal distance</i>) <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Slope is 1% or less <input type="checkbox"/> Slope is > 1%-2% <input checked="" type="checkbox"/> Slope is > 2%-5% <input type="checkbox"/> Slope is greater than 5% </div> <div> points = 3 points = 2 points = 1 points = 0 </div> </div>		1
S 1.2. The soil <u>2</u> in below the surface (or duff layer) is true clay or true organic (use NRCS definitions): Yes = 3 No = 0		0
S 1.3. Characteristics of the plants in the wetland that trap sediments and pollutants: Choose the points appropriate for the description that best fits the plants in the wetland. <i>Dense means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 in.</i> <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Dense, uncut, herbaceous plants > 90% of the wetland area <input checked="" type="checkbox"/> Dense, uncut, herbaceous plants > ½ of area <input type="checkbox"/> Dense, woody, plants > ½ of area <input type="checkbox"/> Dense, uncut, herbaceous plants > ¼ of area <input type="checkbox"/> Does not meet any of the criteria above for plants </div> <div> points = 6 points = 3 points = 2 points = 1 points = 0 </div> </div>		3
Total for S 1 Add the points in the boxes above		4

Rating of Site Potential If score is: 12 = H 6-11 = M ☒ 0-5 = L

Record the rating on the first page

S 2.0. Does the landscape have the potential to support the water quality function of the site?	
S 2.1. Is > 10% of the area within 150 ft on the uphill side of the wetland in land uses that generate pollutants? <div style="text-align: right;">Yes = 1 No = 0</div>	1
S 2.2. Are there other sources of pollutants coming into the wetland that are not listed in question S 2.1? Other sources _____ Yes = 1 No = 0	0
Total for S 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ☒ 1-2 = M 0 = L

Record the rating on the first page

S 3.0. Is the water quality improvement provided by the site valuable to society?	
S 3.1. Does the wetland discharge directly (i.e., within 1 mi) to a stream, river, lake, or marine water that is on the 303(d) list? <div style="text-align: right;">Yes = 1 No = 0</div>	0
S 3.2. Is the wetland in a basin or sub-basin where water quality is an issue? <i>At least one aquatic resource in the basin is on the 303(d) list.</i> <div style="text-align: right;">Yes = 1 No = 0</div>	1
S 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality? <i>Answer YES if there is a TMDL for the basin in which unit is found.</i> <div style="text-align: right;">Yes = 2 No = 0</div>	0
Total for S 3 Add the points in the boxes above	1

Rating of Value If score is: 2-4 = H ☒ 1 = M 0 = L

Record the rating on the first page

--

Wetland name or number A

SLOPE WETLANDS

Hydrologic Functions - Indicators that the site functions to reduce flooding and stream erosion

S 4.0. Does the site have the potential to reduce flooding and stream erosion?

S 4.1. Characteristics of plants that reduce the velocity of surface flows during storms: Choose the points appropriate for the description that best fits conditions in the wetland. *Stems of plants should be thick enough (usually $> \frac{1}{8}$ in), or dense enough, to remain erect during surface flows.*

- ☐ Dense, uncut, **rigid** plants cover $> 90\%$ of the area of the wetland
☒ All other conditions

points = 1
points = 0

0

Rating of Site Potential If score is: 1 = M 0 = L

Record the rating on the first page

S 5.0. Does the landscape have the potential to support the hydrologic functions of the site?

S 5.1. Is more than 25% of the area within 150 ft upslope of wetland in land uses or cover that generate excess surface runoff?

Yes = 1 No = 0

1

Rating of Landscape Potential If score is: 1 = M 0 = L

Record the rating on the first page

S 6.0. Are the hydrologic functions provided by the site valuable to society?

S 6.1. Distance to the nearest areas downstream that have flooding problems:

- ☐ The sub-basin immediately down-gradient of site has flooding problems that result in damage to human or natural resources (e.g., houses or salmon redds) points = 2
☒ Surface flooding problems are in a sub-basin farther down-gradient points = 1
☐ No flooding problems anywhere downstream points = 0

1

S 6.2. Has the site been identified as important for flood storage or flood conveyance in a regional flood control plan?

Yes = 2 No = 0

0

Total for S 6

Add the points in the boxes above

1

Rating of Value If score is: 2-4 = H 1 = M 0 = L

Record the rating on the first page

NOTES and FIELD OBSERVATIONS:

Wetland name or number A

These questions apply to wetlands of all HGM classes.

HABITAT FUNCTIONS - Indicators that site functions to provide important habitat

H 1.0. Does the site have the potential to provide habitat?

H 1.1. Structure of plant community: *Indicators are Cowardin classes and strata within the Forested class. Check the Cowardin plant classes in the wetland. Up to 10 patches may be combined for each class to meet the threshold of ¼ ac or more than 10% of the unit if it is smaller than 2.5 ac. Add the number of structures checked.*

- | | | |
|--|----------------------------------|----------|
| <input type="checkbox"/> Aquatic bed | 4 structures or more: points = 4 | 1 |
| <input type="checkbox"/> Emergent | 3 structures: points = 2 | |
| <input type="checkbox"/> Scrub-shrub (areas where shrubs have > 30% cover) | 2 structures: points = 1 | |
| <input checked="" type="checkbox"/> Forested (areas where trees have > 30% cover) | 1 structure: points = 0 | |
| <i>If the unit has a Forested class, check if:</i> | | |
| <input checked="" type="checkbox"/> The Forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the Forested polygon | | |

H 1.2. Hydroperiods

Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ ac to count (*see text for descriptions of hydroperiods*).

- | | | |
|--|-------------------------------------|----------|
| <input type="checkbox"/> Permanently flooded or inundated | 4 or more types present: points = 3 | 0 |
| <input type="checkbox"/> Seasonally flooded or inundated | 3 types present: points = 2 | |
| <input type="checkbox"/> Occasionally flooded or inundated | 2 types present: points = 1 | |
| <input checked="" type="checkbox"/> Saturated only | 1 type present: points = 0 | |
| | | |
| <input type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland | | |
| <input type="checkbox"/> Lake Fringe wetland | 2 points | |
| <input type="checkbox"/> Freshwater tidal wetland | 2 points | |

H 1.3. Richness of plant species

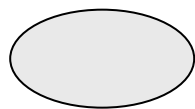
Count the number of plant species in the wetland that cover at least 10 ft².

Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle

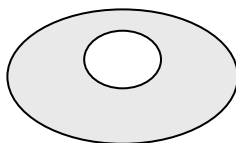
- | | | |
|---|------------|----------|
| If you counted: > 19 species | points = 2 | 1 |
| <input type="checkbox"/> 5 - 19 species | points = 1 | |
| < 5 species | points = 0 | |

H 1.4. Interspersion of habitats

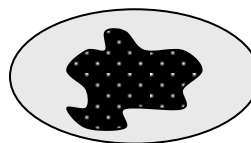
Decide from the diagrams below whether interspersions among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always high.*



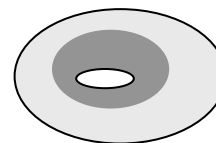
None = 0 points



Low = 1 point

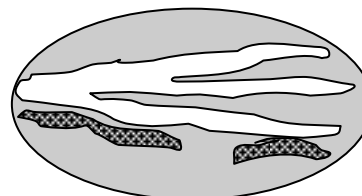
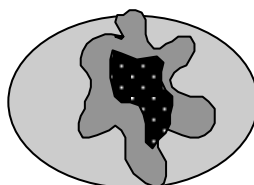
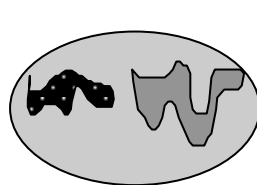


Moderate = 2 points



0

All three diagrams in this row are **HIGH** = 3points



Wetland name or number A

<p>H 1.5. Special habitat features:</p> <p>Check the habitat features that are present in the wetland. <i>The number of checks is the number of points.</i></p> <p><input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long).</p> <p><input checked="" type="checkbox"/> Standing snags (dbh > 4 in) within the wetland</p> <p><input type="checkbox"/> Undercut banks are present for at least 6.6 ft (2 m) and/or overhanging plants extends at least 3.3 ft (1 m) over a stream (or ditch) in, or contiguous with the wetland, for at least 33 ft (10 m)</p> <p><input type="checkbox"/> Stable steep banks of fine material that might be used by beaver or muskrat for denning (> 30 degree slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet weathered where wood is exposed</i>)</p> <p><input type="checkbox"/> At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>)</p> <p><input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in every stratum of plants (<i>see H 1.1 for list of strata</i>)</p>		2
Total for H 1	Add the points in the boxes above	4

Rating of Site Potential If score is: 15-18 = H 7-14 = M ☒ 0-6 = L

Record the rating on the first page

H 2.0. Does the landscape have the potential to support the habitat functions of the site?		
<p>H 2.1. Accessible habitat (include <i>only habitat that directly abuts wetland unit</i>).</p> <p>Calculate: % undisturbed habitat <u>0</u> + [(% moderate and low intensity land uses)/2] <u>0</u> = <u>0</u> %</p> <p>If total accessible habitat is:</p> <p><input type="checkbox"/> > 1/3 (33.3%) of 1 km Polygon points = 3</p> <p><input type="checkbox"/> 20-33% of 1 km Polygon points = 2</p> <p><input type="checkbox"/> 10-19% of 1 km Polygon points = 1</p> <p><input checked="" type="checkbox"/> < 10% of 1 km Polygon points = 0</p>		0
<p>H 2.2. Undisturbed habitat in 1 km Polygon around the wetland.</p> <p>Calculate: % undisturbed habitat <u>5</u> + [(% moderate and low intensity land uses)/2] <u>14</u> = <u>19</u> %</p> <p><input type="checkbox"/> Undisturbed habitat > 50% of Polygon points = 3</p> <p><input type="checkbox"/> Undisturbed habitat 10-50% and in 1-3 patches points = 2</p> <p><input checked="" type="checkbox"/> Undisturbed habitat 10-50% and > 3 patches points = 1</p> <p><input type="checkbox"/> Undisturbed habitat < 10% of 1 km Polygon points = 0</p>		1
<p>H 2.3. Land use intensity in 1 km Polygon: If</p> <p><input checked="" type="checkbox"/> > 50% of 1 km Polygon is high intensity land use points = (- 2)</p> <p><input type="checkbox"/> ≤ 50% of 1 km Polygon is high intensity points = 0</p>		-2
Total for H 2	Add the points in the boxes above	-1

Rating of Landscape Potential If score is: 4-6 = H 1-3 = M ☒ < 1 = L

Record the rating on the first page

H 3.0. Is the habitat provided by the site valuable to society?		
<p>H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? <i>Choose only the highest score that applies to the wetland being rated.</i></p> <p>Site meets ANY of the following criteria: points = 2</p> <p><input type="checkbox"/> It has 3 or more priority habitats within 100 m (see next page)</p> <p><input type="checkbox"/> It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists)</p> <p><input type="checkbox"/> It is mapped as a location for an individual WDFW priority species</p> <p><input type="checkbox"/> It is a Wetland of High Conservation Value as determined by the Department of Natural Resources</p> <p><input type="checkbox"/> It has been categorized as an important habitat site in a local or regional comprehensive plan, in a Shoreline Master Plan, or in a watershed plan</p> <p><input checked="" type="checkbox"/> Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1</p> <p><input type="checkbox"/> Site does not meet any of the criteria above points = 0</p>		2

Rating of Value If score is: 2 = H ☒ 1 = M 0 = L

Record the rating on the first page

WDFW Priority Habitats

Priority habitats listed by WDFW (see complete descriptions of WDFW priority habitats, and the counties in which they can be found, in: Washington Department of Fish and Wildlife. 2008. Priority Habitat and Species List. Olympia, Washington. 177 pp. <http://wdfw.wa.gov/publications/00165/wdfw00165.pdf> or access the list from here: <http://wdfw.wa.gov/conservation/phs/list/>)

Count how many of the following priority habitats are within 330 ft (100 m) of the wetland unit: **NOTE:** *This question is independent of the land use between the wetland unit and the priority habitat.*

- ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 1 ac (0.4 ha).
- ☐ **Biodiversity Areas and Corridors:** Areas of habitat that are relatively important to various species of native fish and wildlife (*full descriptions in WDFW PHS report*).
- ☐ **Herbaceous Balds:** Variable size patches of grass and forbs on shallow soils over bedrock.
- ☒ **Old-growth/Mature forests:** Old-growth west of Cascade crest – Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) > 32 in (81 cm) dbh or > 200 years of age. Mature forests – Stands with average diameters exceeding 21 in (53 cm) dbh; crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth; 80-200 years old west of the Cascade crest.
- ☐ **Oregon White Oak:** Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is important (*full descriptions in WDFW PHS report p. 158 – see web link above*).
- ☐ **Riparian:** The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other.
- ☐ **Westside Prairies:** Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (*full descriptions in WDFW PHS report p. 161 – see web link above*).
- ☐ **Instream:** The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources.
- ☐ **Nearshore:** Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coast Nearshore, and Puget Sound Nearshore. (*full descriptions of habitats and the definition of relatively undisturbed are in WDFW report – see web link on previous page*).
- ☐ **Caves:** A naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human.
- ☐ **Cliffs:** Greater than 25 ft (7.6 m) high and occurring below 5000 ft elevation.
- ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.5 - 6.5 ft (0.15 - 2.0 m), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs.
- ☒ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 20 in (51 cm) in western Washington and are > 6.5 ft (2 m) in height. Priority logs are > 12 in (30 cm) in diameter at the largest end, and > 20 ft (6 m) long.

Note: All vegetated wetlands are by definition a priority habitat but are not included in this list because they are addressed elsewhere.

Wetland name or number A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type	Category
<i>Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.</i>	
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt Yes – Go to SC 1.1 No = Not an estuarine wetland	
SC 1.1. Is the wetland within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? Yes = Category I No - Go to SC 1.2	Cat. I
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. (If non-native species are <i>Spartina</i> , see page 25) <input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. Yes = Category I No = Category II	Cat. I Cat. II
SC 2.0. Wetlands of High Conservation Value (WHCV) SC 2.1. Has the WA Department of Natural Resources updated their website to include the list of Wetlands of High Conservation Value? Yes – Go to SC 2.2 No – Go to SC 2.3 SC 2.2. Is the wetland listed on the WDNR database as a Wetland of High Conservation Value? Yes = Category I No = Not a WHCV SC 2.3. Is the wetland in a Section/Township/Range that contains a Natural Heritage wetland? http://www1.dnr.wa.gov/nhp/refdesk/datasearch/wnhpwetlands.pdf Yes – Contact WNHP/WDNR and go to SC 2.4 No = Not a WHCV SC 2.4. Has WDNR identified the wetland within the S/T/R as a Wetland of High Conservation Value and listed it on their website? Yes = Category I No = Not a WHCV	Cat. I
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? <i>Use the key below. If you answer YES you will still need to rate the wetland based on its functions.</i> SC 3.1. Does an area within the wetland unit have organic soil horizons, either peats or mucks, that compose 16 in or more of the first 32 in of the soil profile? Yes – Go to SC 3.3 No – Go to SC 3.2 SC 3.2. Does an area within the wetland unit have organic soils, either peats or mucks, that are less than 16 in deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on top of a lake or pond? Yes – Go to SC 3.3 No = Is not a bog SC 3.3. Does an area with peats or mucks have more than 70% cover of mosses at ground level, AND at least a 30% cover of plant species listed in Table 4? Yes = Is a Category I bog No – Go to SC 3.4 NOTE: If you are uncertain about the extent of mosses in the understory, you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16 in deep. If the pH is less than 5.0 and the plant species in Table 4 are present, the wetland is a bog. SC 3.4. Is an area with peats or mucks forested (> 30% cover) with Sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Engelmann spruce, or western white pine, AND any of the species (or combination of species) listed in Table 4 provide more than 30% of the cover under the canopy? Yes = Is a Category I bog No = Is not a bog	Cat. I

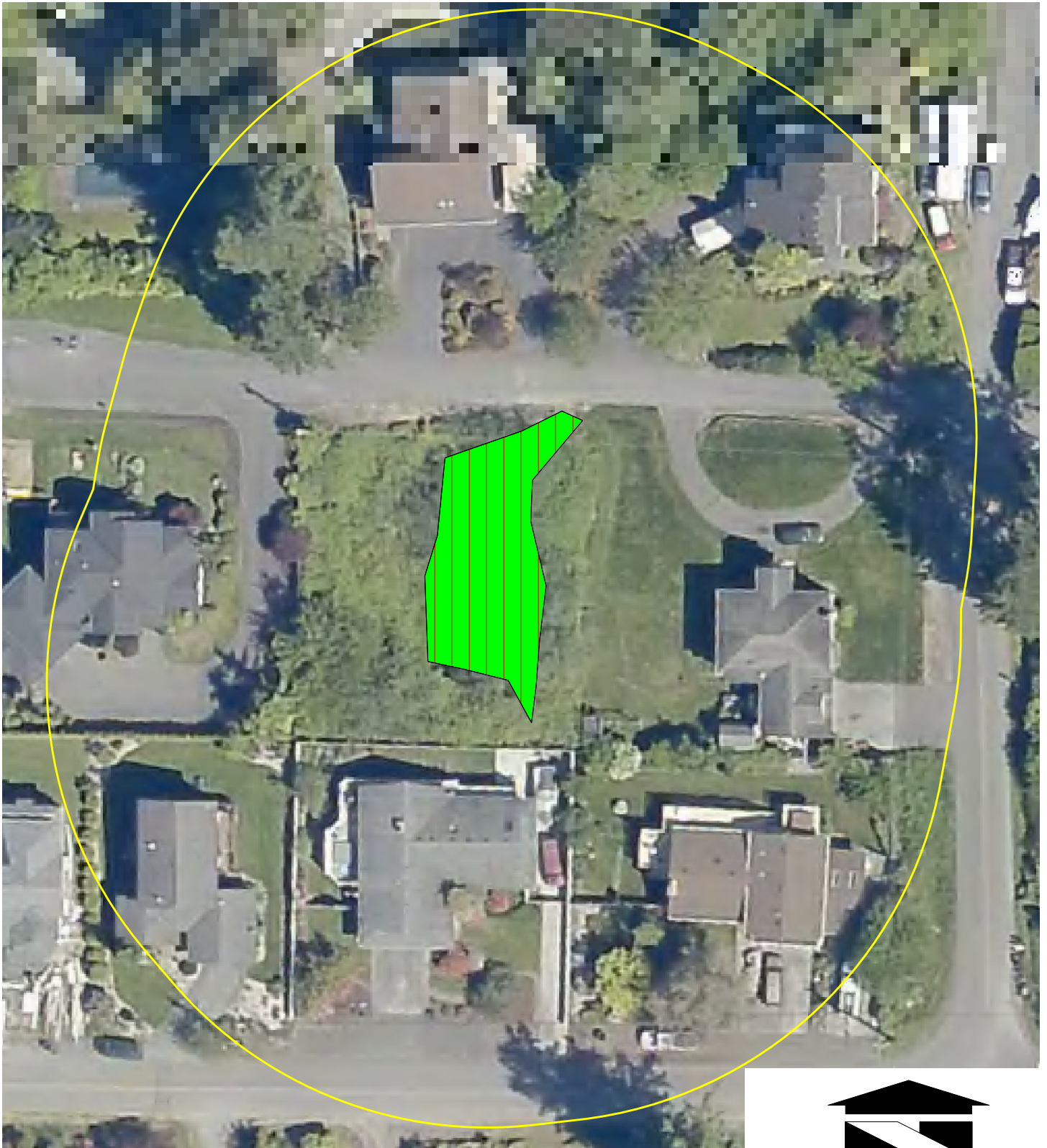
Wetland name or number A

<p>SC 4.0. Forested Wetlands</p> <p>Does the wetland have at least <u>1 contiguous acre</u> of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? <i>If you answer YES you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests (west of Cascade crest): Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/ac (20 trees/ha) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 in (81 cm) or more.</p> <p><input type="checkbox"/> Mature forests (west of the Cascade Crest): Stands where the largest trees are 80- 200 years old OR the species that make up the canopy have an average diameter (dbh) exceeding 21 in (53 cm).</p> <p style="text-align: right;">Yes = Category I No = Not a forested wetland for this section</p>	<p>Cat. I</p>
<p>SC 5.0. Wetlands in Coastal Lagoons</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p><input type="checkbox"/> The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains ponded water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>)</p> <p style="text-align: right;">Yes – Go to SC 5.1 No = Not a wetland in a coastal lagoon</p> <p>SC 5.1. Does the wetland meet all of the following three conditions?</p> <p><input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of aggressive, opportunistic plant species (see list of species on p. 100).</p> <p><input type="checkbox"/> At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or unmowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 ac (4350 ft²)</p> <p style="text-align: right;">Yes = Category I No = Category II</p>	<p>Cat. I</p> <p>Cat. II</p>
<p>SC 6.0. Interdunal Wetlands</p> <p>Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? <i>If you answer yes you will still need to rate the wetland based on its habitat functions.</i></p> <p>In practical terms that means the following geographic areas:</p> <p><input type="checkbox"/> Long Beach Peninsula: Lands west of SR 103</p> <p><input type="checkbox"/> Grayland-Westport: Lands west of SR 105</p> <p><input type="checkbox"/> Ocean Shores-Copalis: Lands west of SR 115 and SR 109</p> <p style="text-align: right;">Yes – Go to SC 6.1 No = not an interdunal wetland for rating</p> <p>SC 6.1. Is the wetland 1 ac or larger and scores an 8 or 9 for the habitat functions on the form (rates H,H,H or H,H,M for the three aspects of function)?</p> <p style="text-align: right;">Yes = Category I No – Go to SC 6.2</p> <p>SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?</p> <p style="text-align: right;">Yes = Category II No – Go to SC 6.3</p> <p>SC 6.3. Is the unit between 0.1 and 1 ac, or is it in a mosaic of wetlands that is between 0.1 and 1 ac?</p> <p style="text-align: right;">Yes = Category III No = Category IV</p>	<p>Cat I</p> <p>Cat. II</p> <p>Cat. III</p> <p>Cat. IV</p>
<p>Category of wetland based on Special Characteristics</p> <p>If you answered No for all types, enter "Not Applicable" on Summary Form</p>	<p>N/A</p>




Wetland name or number **A**

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MUNDORF - 8TH ST
WETLAND RATING FIGURE 1 - WETLAND A

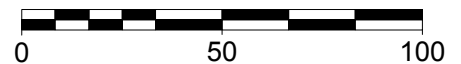


LEGEND

-  FORESTED VEGETATION
-  SATURATED ONLY
-  150' FROM WL BOUNDARY



Scale 1" = 50'



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Fax: (425) 337-3045

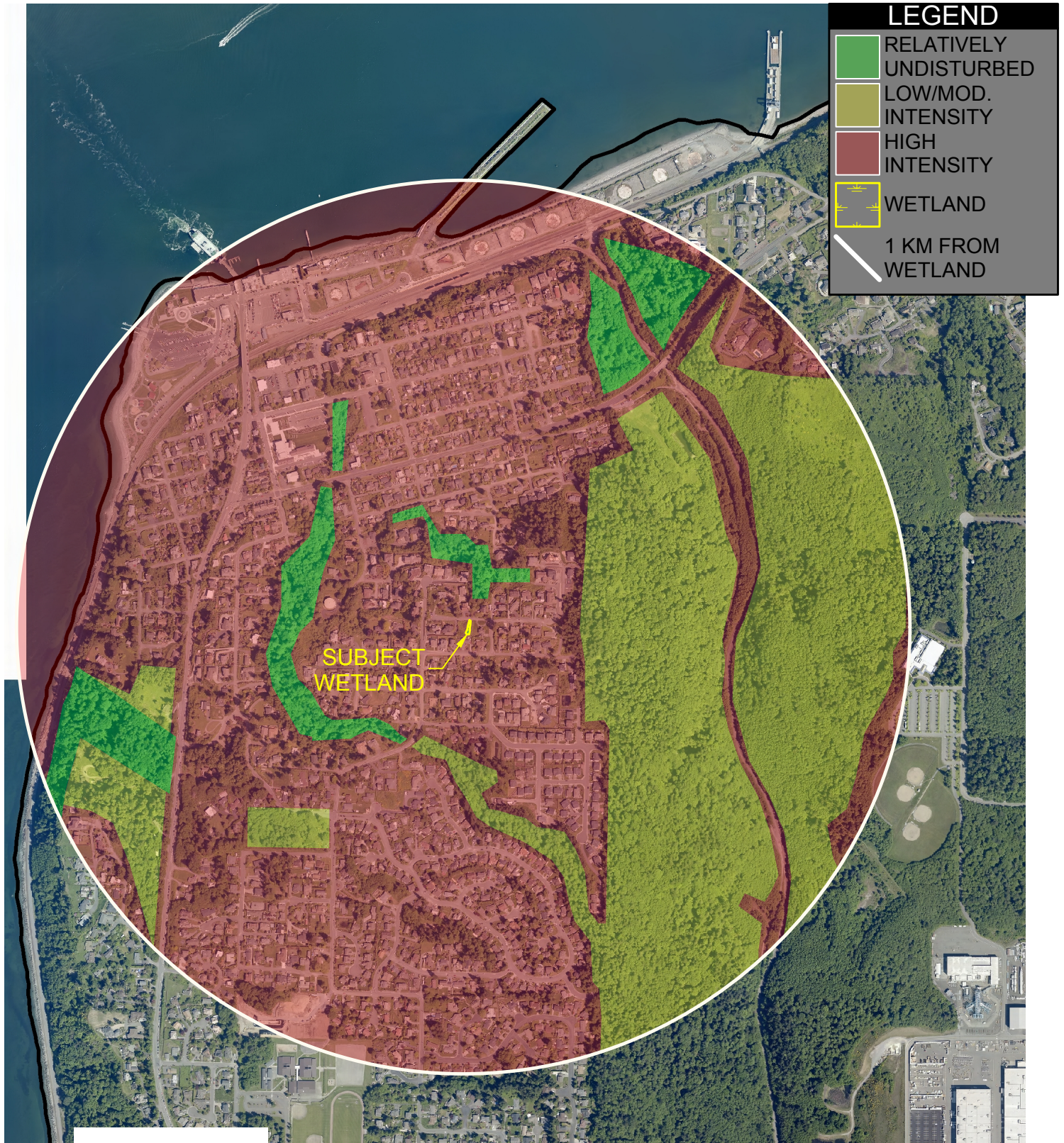
Email: mailbox@wetlandresources.com

WETLAND RATING MAP
Wetland A

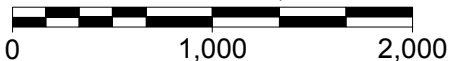
Terry Mundorf
9824 NE Rose Trail Lane
Bainbridge Island, WA 98110

Figure 1/4
WRI Job # 16233
Drawn by: JM

MUNDORF - 8TH ST
WETLAND RATING FIGURE 2 - WETLAND A



Scale 1" = 1,000'



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Email: mailbox@wetlandresources.com

**CONTRIBUTING BASIN/ 1 KM
FROM WETLAND BOUNDARY MAP
Wetland A**

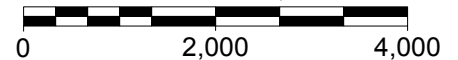
Terry Mundorf
9824 NE Rose Trail Lane
Bainbridge Island, WA 98110

Figure 2/4
WRI Job # 16233
Drawn by: JM

MUNDORF - 8TH ST
WETLAND RATING FIGURE 3 - WETLAND A



Scale 1" = 2,000'



LEGEND

○ WETLAND LOCATION

— AQUATIC RESOURCES ON THE 303(d) LIST



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Cat 5 - 303d Listed Waters
Within Basin
Wetland A

Terry Mundorf
9824 NE Rose Trail Lane
Bainbridge Island, WA 98110

Figure 3/4
WRI Job # 16233
Drawn by: JM

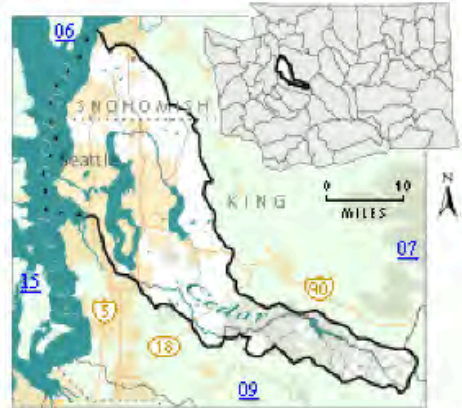
MUNDORF - 8TH ST WETLAND RATING FIGURE 4 - WETLAND A

WRIA 8: Cedar-Sammamish

The following table lists overview information for water quality improvement projects (including total maximum daily loads, or TMDLs) for this water resource inventory area (WRIA). Please use links (where available) for more information on a project.

Counties

- [King](#)
- [Snohomish](#)



Waterbody Name	Pollutants	Status**	TMDL Lead
Ballinger Lake	Total Phosphorus	Approved by EPA	Tricia Shoblom 425-649-7288
Bear-Evans Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
	Dissolved Oxygen Temperature	Approved by EPA	
Cottage Lake	Total Phosphorus	Approved by EPA Has an implementation plan	Tricia Shoblom 425-649-7288
Issaquah Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Little Bear Creek Tributaries: Trout Stream Great Dane Creek Cutthroat Creek	Fecal Coliform	Approved by EPA	Ralph Svrcek 425-649-7036
North Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrcek 425-649-7036
Pipers Creek	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Sammamish River	Dissolved Oxygen Temperature	Field work starts summer 2015	Ralph Svrcek 425-649-7036
Swamp Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrcek 425-649-7036

** Status will be listed as one of the following: Approved by EPA, Under Development or Implementation



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Email: mailbox@wetlandresources.com

List of TMDLs for WRIA in which
unit is located
Wetland A

Terry Mundorf
9824 NE Rose Trail Lane
Bainbridge Island, WA 98110

Figure 4/4
WRI Job # 16233
Drawn by: JM

APPENDIX C:
CRITICAL AREA STUDY MAPS

EXISTIING CONDITONS MAP

Mundorf - 8th St

PORTION OF SECTION 4, TOWNSHIP 28N, RANGE 4E, W.M.



LEGEND



WETLAND



BUFFER

— PARCEL



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EXISTING CONDITIONS MAP

Mundorf - 8th St

Mukilteo, Washington

Sheet 1/1

WRI Job # 16233

Terry Mundorf

9824 NE Rose Trail Lane

Bainbridge Island, WA 98110

Drawn by: JIM

Date: Nov. 11, 2016

WETLAND CREATION AREA MAP

Mundorf - 8th St

PORTION OF SECTION 4, TOWNSHIP 28N, RANGE 4E, W.M.



LEGEND



WETLAND
CREATION



BUFFER
ENHANCE.



PARCEL

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Email: mailbox@wetlandresources.com

EXISTING CONDITIONS MAP
Mundorf - 8th St
Mukilteo, Washington

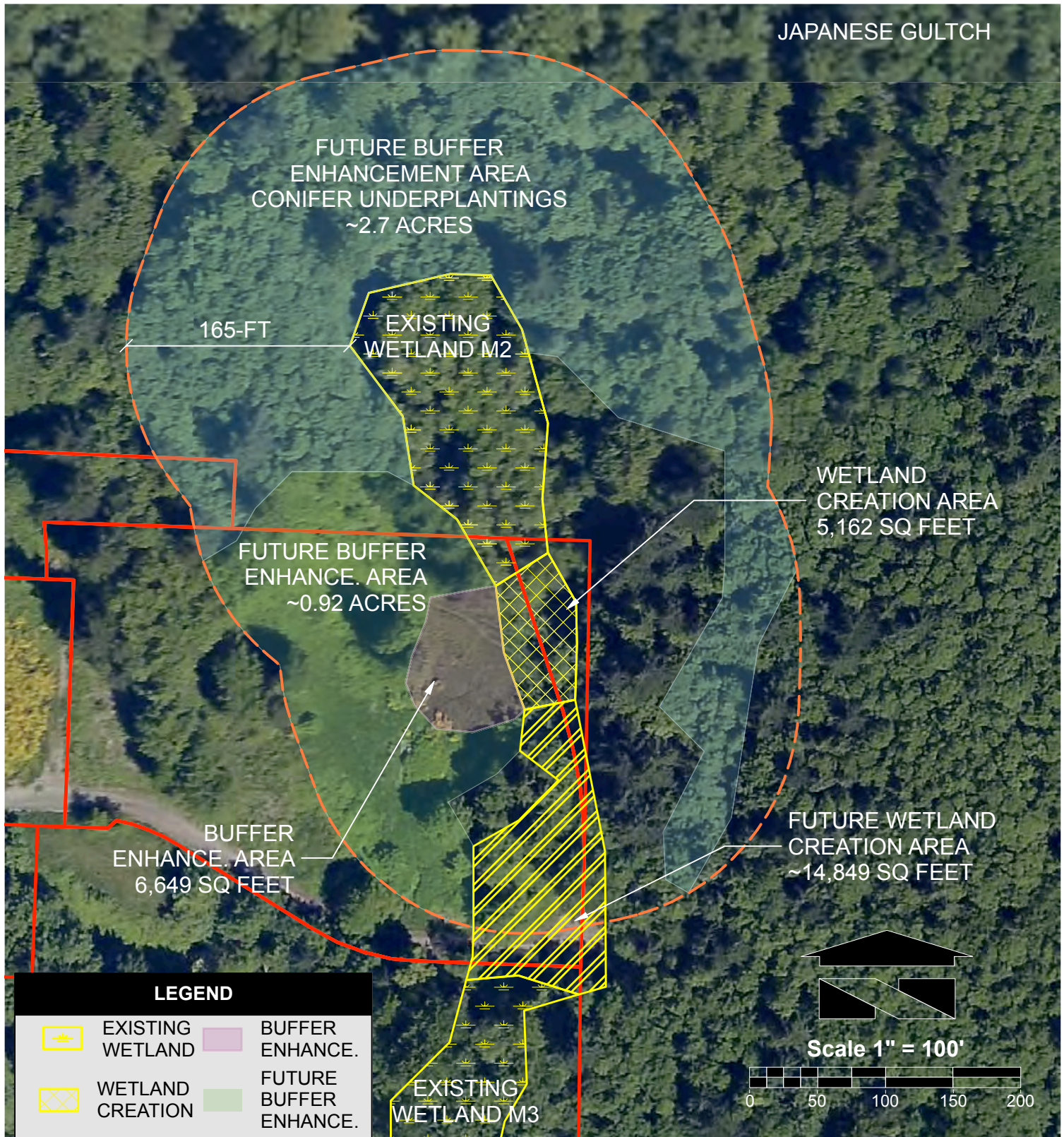
Terry Mundorf
9824 NE Rose Trail Lane
Bainbridge Island, WA 98110

Sheet 1/1
WRI Job # 16233
Drawn by: JM
Date: Nov. 11, 2016

CONCEPTUAL MITIGATION PLAN

Mundorf - 8th St

PORTION OF SECTION 4, TOWNSHIP 28N, RANGE 4E, W.M.



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Fax: (425) 337-3045
Email: mailbox@wetlandresources.com

EXISTING CONDITIONS MAP
Mundorf - 8th St
Mukilteo, Washington

Terry Mundorf
9824 NE Rose Trail Lane
Bainbridge Island, WA 98110

Sheet 1/1
WRI Job # 16233
Drawn by: JMI
Date: April 14, 2017

Compost and Topsoil Calculation Worksheet for the Pre-approved Amendment Rate

NOTE: For Options 2 and 3, use this worksheet if you plan to use the pre-approved compost amendment rate of 2 inches. This worksheet should not be used if a custom compost amendment rate is selected for Options 2 and/or 3.

Option 1

Leave native soil undisturbed, and protect from compaction during construction.

- Enter lettered areas from site plan where this option will be used:

No calculations for compost or topsoil are necessary for this option.

Option 2

Amend existing soil in-place (2-inch layer of compost).

- Enter lettered areas from site plan where this option will be used:
A _____
- Enter combined square footage of lettered areas in thousands 5.48
_____ (example: for 4,525 sq ft, enter 4.525; for 500 sq ft, enter 0.5)
- Multiply combined square footage by **6.2** and enter product in box A

A

34

=Cubic Yards

AMOUNT OF COMPOST NEEDED FOR THESE AREAS

Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.

Option 3

Native Soil – stockpile site duff and topsoil and reapply after grading and construction.

- Enter lettered areas from site plan where this option will be used:

A _____

- Enter combined square footage of lettered areas in thousands 5.48
(example: for 4,525 sq ft, enter 4.525; for 500 sq ft, enter 0.5)

Multiply **combined square footage** by **25** and enter product in box B:

B

138

=Cubic Yards

AMOUNT OF TOPSOIL TO BE STOCKPILED AND REAPPLIED IN THESE AREAS

Option 4

Import topsoil.

- Enter lettered areas from site plan where this option will be used:

A _____

- Enter combined square footage of lettered areas in thousands 5.48
(example: for 4,525 sq ft, enter 4.525; for 500 sq ft, enter 0.5)

- Multiply **combined square footage** by **25** and enter product in box C:

C

138

=Cubic Yards

AMOUNT OF IMPORTED TOPSOIL NEEDED FOR THESE AREAS

Order

Order These Amounts:

34

Enter amount in Box A: _____ **Cubic Yards of Compost**

138

Enter amount in Box C: _____ **Cubic Yards of Topsoil**

Note: MR 5 is triggered on sites with more than 2,000 sq. ft. of new, replaced, or new plus replaced impervious surface, or 7,000 sq. ft. or greater of land disturbing activity.

SITE PHOTOS



View of edge of 8th St where proposed driveway will take access



View west of CB north of northeastern property corner (site visit performed during very heavy rain event)

SITE PHOTOS



View of buried inlet of small PVC culvert that flows into CB



View north of CB at top of private driveway off of Campbell Ave