PRELIMINARY STORM WATER SITE PLAN REPORT

GROUNDHOG PLANNED RESIDENTIAL DEVELOPMENT

5110 83RD AVENUE NE, MARYSVILLE, WA

CITY FILE #: PREA22-009

05/06/2022

Prepared for:

Groundhog Land Development Company, LLC
2502 161 Avenue SE
Bellevue, WA 98008-5423

LATTA ENGINEERING, PLLC

Consulting Civil Engineers

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Note:

The report also includes by reference the preliminary civil plan set titled “Inspiration Point Preliminary Plat Planned Residential Development” dated 04-29-2022.

3 ENGINEER'S DECLARATION

I, Neil A. Latta, a Professional Engineer registered in the State of Washington as a Civil Engineer, do hereby declare that this preliminary stormwater site plan report titled *Groundhog PRD, Marysville WA* dated May 6, 2022 was prepared by, or under my personal supervision, that said report was prepared in accordance with generally accepted engineering practices. I hereby affirm that, to the best of my knowledge, information and belief, subject report was prepared in compliance with the City of Marysville Development Standards and the Washington State Department of Ecology (WSDOE) 2012/2014 Stormwater Management Manual for Western Washington (2014 SWMM).

05-06-2022

…… ……..

Neil Latta, PE Date

Latta Engineering, PLLC

4 INTRODUCTION

4.1 PROJECT BACKGROUND

The Groundhog Planned Residential Development is a proposed single family residential subdivision development located within the East Sunnyside -Whiskey Ridge area of the City of Marysville within the NE¼ SE ¼ of Section 35, Township 30 North, Range 5 East, WM, City of Marysville, WA. The 4.635 acre subject property area is currently developed with a single-family residence and associated infrastructure including a barn, paved driveway, and maintained lawn with the remainder of the site as undeveloped forest area. A site vicinity map of the project location and surrounding area is illustrated on Figure 1.

The applicant proposes to subdivide the property to create 25 single family building lots on the site with access to 83rd Ave NE. The project will be built-out in a single phase. The proposed site work will generally involve site clearing, grading, on-site roadways and single family home building construction, with associated civil utilities including water, sewer, storm drainage and franchise utilities. The project size and land disturbance will be greater than 1.0 acre and therefore is subject to the National Pollution Discharge Elimination System (NPDES) permit process regulated by the WA State Department of Ecology. Upon completion of development there will be an estimated total impervious surface area (on-site) of approximately 2.51 acres (52% of development area) with the remaining area to be pervious landscaping.

Additional project information for this project is as follows:

Subject Property Tax Numbers:	**005907000-10500**
Zoning:	**High Density Single Family Residential (R-6.5)**
Applicant:	**Groundhog Land Development Company, LLC** **2502 161 Avenue SE** **Bellevue, WA 98008-5423**
Engineer / Authorized Agent:	**Neil A. Latta, PE** **Latta Engineering, PLLC** **5970 Birch Point Road** **Blaine, WA 98230**

4.2 SCOPE OF STUDY

The purpose of this preliminary report is to evaluate the effects and consequences of stormwater surface runoff resulting from the proposed development of the subject property and to detail the methods and assumptions used for this evaluation. This report will also provide preliminary mitigation design recommendations that will assure that the post-development stormwater release rates from the site do not exceed the pre-development flows for the design frequency storm events and that the quality of stormwater runoff is not degraded in accordance with City of Marysville Development Guidelines and the WSDOE 2014 Stormwater Management Manual.

4.3 METHOD OF APPROACH

All nine storm water management minimum requirements apply to the proposed development in accordance with Figure 2.4-1 of the 2014 SWMM (SWMM, Volume 1, page 2-5).

The Western Washington Hydrology Model (WWHM 2012) was used to size proposed storm water facilities to satisfy the 2014 SWMM requirements.

WWHM's Hydrological Simulation Program FORTRAN parameters are based on calibrated watersheds located in Western Washington. For Snohomish County, the program uses precipitation data from a gauge located in Everett and then scales the precipitation to a specific project site using published National Oceanic and Atmospheric Administration rainfall map data. Site rainfall data for this site is scaled to 120% (precipitation scale).

The model generates 40+ years of hourly runoff data for both predevelopment and post-development land use conditions. Flow duration analysis is conducted for 100 flow levels between the lower erosive zone limit (50% of the pre-development two-year flow frequency) and the upper limit (predevelopment 50-year flow frequency value). There are three criteria by which flow duration values are compared (SWMM, Vol. 3, page 2-9):

- If the post-development flow duration values exceed any of the predevelopment flow levels between 50% and 100% of the two-year predevelopment peak flow values (100% threshold) then the flow duration requirement has not been met.
- If the post-development flow duration values exceed any of the predevelopment flow values between 100% of the two-year and 100% of the 50-year predevelopment peak flow values more than 10% of the time (110% threshold) then the flow duration requirement has not been met.
- If more than 50% of the flow duration levels exceed the 100% threshold then the flow duration requirement has not been met.

Existing conditions and the pre-development basin characteristics were defined using topographic survey data, aerial photography, and aerial topographic information obtained from Snohomish County. The hydrologic soil types were determined from the US Department of Agriculture's, Natural Resources Conservation Service (NRCS) and from a project specific geotechnical investigation. Soil infiltration rate feasibility was based on a site specific geotechnical engineering investigation report prepared by Robinson Noble Inc. dated May 5, 2021.

The post-development basin characteristics were estimated by quantifying land disturbance associated with the proposed development site plan. The quantities of impervious and pervious cover were overlaid with soil types and land uses and then tabulated for flow analyses. The total impervious area in the developed condition includes proposed building roofs, roads, driveways and sidewalks. The remaining developed area was modeled as landscaped lawn area and forested open space.

Runoff from pollutant generating impervious and pervious areas (all hardscape and lawns) will be routed to stormwater detention vaults with permanent wet pools for flow control and water quality treatment to fully mitigate storm water runoff in accordance with the 2014 SWMM to satisfy the flow duration standards.

4.4 DESIGN REFERENCES

The following references were applied for the storm water site planning and design:

- City of Marysville County Development Standards,
- WSDOE 2012/2014 Stormwater Management Manual for Western Washington (2014 SWMM),
- Clear Creek Solutions, Inc. WWHM 2012 Project Book.

5 EXISTING CONDITIONS

5.1 LAND USE

The proposed development is located within limits of the City of Marysville (East Sunnyside / Whiskey Ridge Area) and is zoned High Density Single Family Residential (R-6.5). The 4.635 acre subject property area is currently developed with a single-family residence, barn, paved driveway and a maintained lawn with the remainder of the site as undeveloped forest area

The site is bound by 83rd Ave NE and new single family residential plat developments currently being developed to the east, single family residence on wooded acreage tracts to the north and south, and an open space utility tract to the west. A site vicinity map of the project location is provided in Appendix 1 for reference (Figure 1).

5.2 VEGETATION & CRITICAL AREAS

The vegetation across the subject property area consists of upland forest and brush areas with maintained lawn areas around existing single family home and driveway areas. General upland forested vegetation on the subject property consists of a canopy dominated by Douglas fir, big leaf maple, and red alder with an understory dominated by salmonberry, non-native invasive Himalayan blackberry, trailing blackberry, and non-native invasive English ivy.

A wetland delineation report prepared by Soundview Consultants LLC identified four potentially-regulated wetlands (Wetlands A to D) on the subject property. In addition, one potentially regulated offsite wetland (Offsite Wetland E) was identified within 150 feet south of the subject property. No other potentially-regulated wetlands, waterbodies, or priority species were identified within 150 feet of the subject property.

Wetland A is approximately 1,190 square feet (0.03 acre) in size onsite and is located on the southeast portion of the subject property, extending slightly offsite to the south. Wetland A is a Category III depressional wetland. Wetland B is approximately 2,840 square feet (0.07 acre) in size onsite and is located on the southeastern portion of the subject property. Wetland B is a Category III depressional wetland. Wetland C is approximately 910 square feet (0.02 acre) in size onsite and is located on the northeastern portion of the subject property. Wetland C is a Category IV depressional wetland. Wetland D is approximately 8,880 square feet (0.20 acre) in size onsite and is located on the eastern portion of the subject property. Wetland D is a Category III depressional wetland. Offsite Wetland E is located entirely offsite, approximately 40 feet south of the subject property. Offsite Wetland E is a Category III depressional wetland.

The full Wetland and Fish and Wildlife Habitat Assessment Report prepared by Soundview Consultants LLC (Soundview) dated May 5, 2022 in included in Appendix 2 for reference.

5.3 TOPOGRAPHY AND DRAINAGE

Topography across the site is described as slopping gently down from west to east towards the wetland area adjacent to 83 Ave NE. Elevation across the site ranges from approximately 396 feet above mean sea level (msl) in the western portion of the subject property down to approximately 382 feet msl near the eastern boundary of the subject property adjacent to 83rd Ave NE. Soundview Consultants LLC determined that Wetlands A – B and Offsite Wetland E are insolated in nature with no surface water connections to any jurisdictional waters. Wetland D flows both north and south into Wetlands A and C. Wetland C continues north through a culvert, flowing into a stormwater pond located north of the subject property. The offsite pond does not provide surface water connections to any jurisdictional waters.

Figure 2 (Pre-Developed Condition) in Appendix 1 illustrates the existing elevation contours and drainage characteristics within the subject property site and the 83rd Ave NE frontage right of way.

5.4 SOILS

The figure below illustrates the USDA Natural Resource Conservation Service (NRCS) soil classification of the subject property area. The soil survey identifies two soil series on the subject property: Tokul gravelly medial loam, 0 to 8 percent slopes (72).

According to the NRCS survey, Tokul gravelly medial loam is a moderately well drained soil formed in glacial till and volcanic ash. In a typical profile, the surface layer is approximately 4 inches thick and is a dark brown gravelly loam. From 4 to 24 inches the subsoil is a brown to yellowish brown gravelly medial loam. From 24 to 33 inches the soil is a gravelly medial fine sandy loam. A cemented hard pan is present at a depth of approximately 33 inches. Tokul gravelly medial loam, 0 to 8 percent slopes is listed as a non-hydric soil by the NRCS.

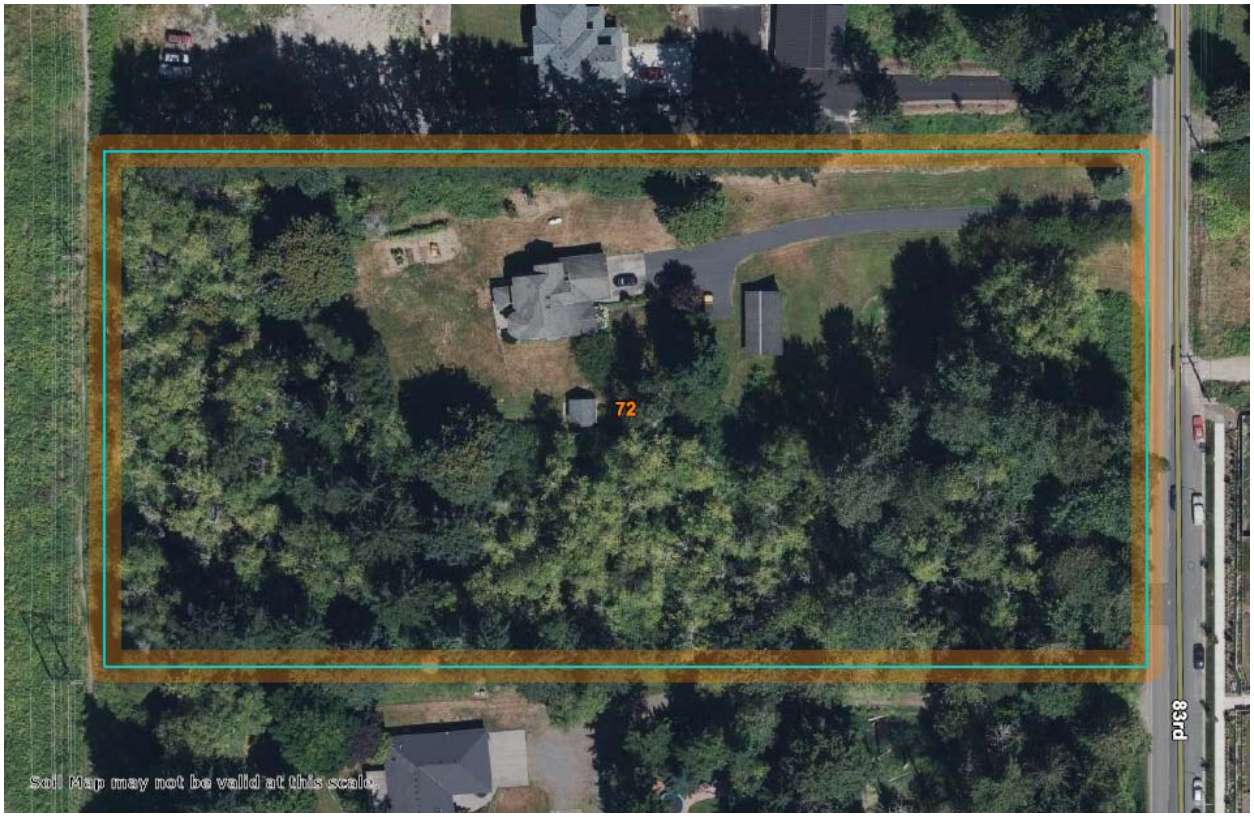
A site specific geotechnical engineering investigation report was also completed for the project by Robinson Noble Inc. dated May 5, 2021 which is included in Appendix 2 for reference. This report concluded that the site was typically underlain by four soil units:

intermittent disturbed soil grouped into artificial fill, loose surficial soils interpreted as topsoil and forest duff, medium dense to dense silty sands interpreted as weathered glacial till, and dense to very dense silty sands interpreted as glacial till.

Based on the geotechnical test pit findings, Robinson Noble Inc opined that the native subsurface soils are not conducive for stormwater infiltration. Moreover, the project site soil conditions are not considered suitable for on-site stormwater management via infiltration for flow control or water quality treatment.

The NRCS survey classifies Toluk (soil units 72 and 73) as a Hydrologic Group B soil, however for the purpose of our storm water design, the site soils were classified as Hydrologic Group C soils due to the presence of the shallow underlying restrictive layer encountered during the site specific geotechnical investigation (in accordance with 2014 SWMM, Vol 3, Appendix 3-B).

Figure 5-1: Soils Map of Subject Property (NRCS Web Soil Survey)



6 STORMWATER SYSTEM EVALUATION

6.1 PRE-DEVELOPMENT CONDITION BASIN ANALYSIS

The pre-development condition hydrology was modeled on the basis of site topographic survey data and field reconnaissance observations of the site drainage conditions. The pre-development vegetation condition was modelled as forested land in accordance with the 2014 SWMM.

The subject property is defined by a two drainage basin areas delineated for the project design. Basin 1 (3.155 acres) represents the majority of subject property area to be developed (proposed lots and roadway areas). This basin area generally slopes east towards the Basin 1 analysis point of concentration (POC-1) located near the southeast limit of the site.

Basin 2 (1.703 acres) includes the wetland open space area (eastern portion of the site) as well as the 83rd Ave NE right-of way frontage. This basin area generally slopes west towards the Basin 2 analysis point of concentration (POC-2) located near the southeast limit of the site adjacent to 83rd Avenue NE.

WWHM hydrologic modeling analysis was performed under the pre-developed condition scenario. Storm water runoff routed to the project point of concentration in the pre-developed condition represents the "match" runoff condition permitted to be released from the developed site in accordance with flow duration analysis methodology outlined in Section 4.3 above.

Figure 2 (Pre-Developed Condition) in Appendix 1 illustrates the existing condition topography, basin delineations and general site conditions. An existing condition *Land Use Summary* (summary of basin pervious and impervious surface area types) and the WWHM modeling project reports are provided in Appendix 3.

6.2 DEVELOPED CONDITION BASIN ANALYSIS

Developed basin conditions were quantified based on the proposed site plan configuration and boundaries shown on Figure 3 (Developed Condition) in Appendix 1. The developed condition basin areas match the pre-developed condition basin areas. The developed basin areas include all site improvements proposed for the entire project build out.

Impervious surface area within the developed condition basins include the proposed roadway pavements, driveways, sidewalks, future home roof tops and all miscellaneous hardscape areas. The developed basin conditions are proposed to have approximately 67% impervious surface area coverage and 23% impervious surface area coverage for Basin 1 and Basin 2, respectively.

Pervious surface area within the developed condition basins include all landscape area within the public right-of-ways building lots, storm water tracts as well as the open space tracts. The proposed impervious and pervious areas are summarized in the Land Use Area Summary provided in Appendix 3. Storm water detention vaults with permanent wet pools are proposed to serve and fully mitigate all project runoff.

The estimated impervious and pervious surface areas were incorporated with the types of ground cover, land usage, and soils to model runoff for the proposed developed condition basins. These characteristics were input into the computer hydrologic simulation model to estimate the development runoff rates and used to determine required flow control and detention vault sizing associated with the design storm events as outline in Section 4.3 (Method of Approach).

Figure 3 (Developed Condition) in Appendix 1 illustrates the existing and proposed condition topography, basin delineations and general site conditions. The detailed developed condition land use area summary and the WWHM modeling project reports are provided in Appendix 3.

6.3 FLOW CONTROL

Flow control (Minimum Requirement #7) is required for the project in accordance with 2014 SMWW best management practices. The proposed flow control design approach for each basin is to collect and convey stormwater to stormwater detention vault facilities to be located within open space tracts to detain and attenuate storm water runoff rates in accordance with the 2014 SWMM to satisfy the all flow duration standards. Emergency overflow structures will be provided sized to pass the 100 year developed peak flows.

The WWHM screenshot figures below illustrate the proposed 1.211 ac-ft and 0.198 ac-ft stormwater detention vaults for Basins 1 and 2, respectively. Each detention vault pond model element proposes a flow control riser structure, vertical side walls, and 1 ft of freeboard over the peak storage depth. The complete WWHM design modelling report details for Basins 1 and 2 are is provided in Appendix 2.

Figure 6-1: WWHM Detention Vault Model Element Serving Basin 1

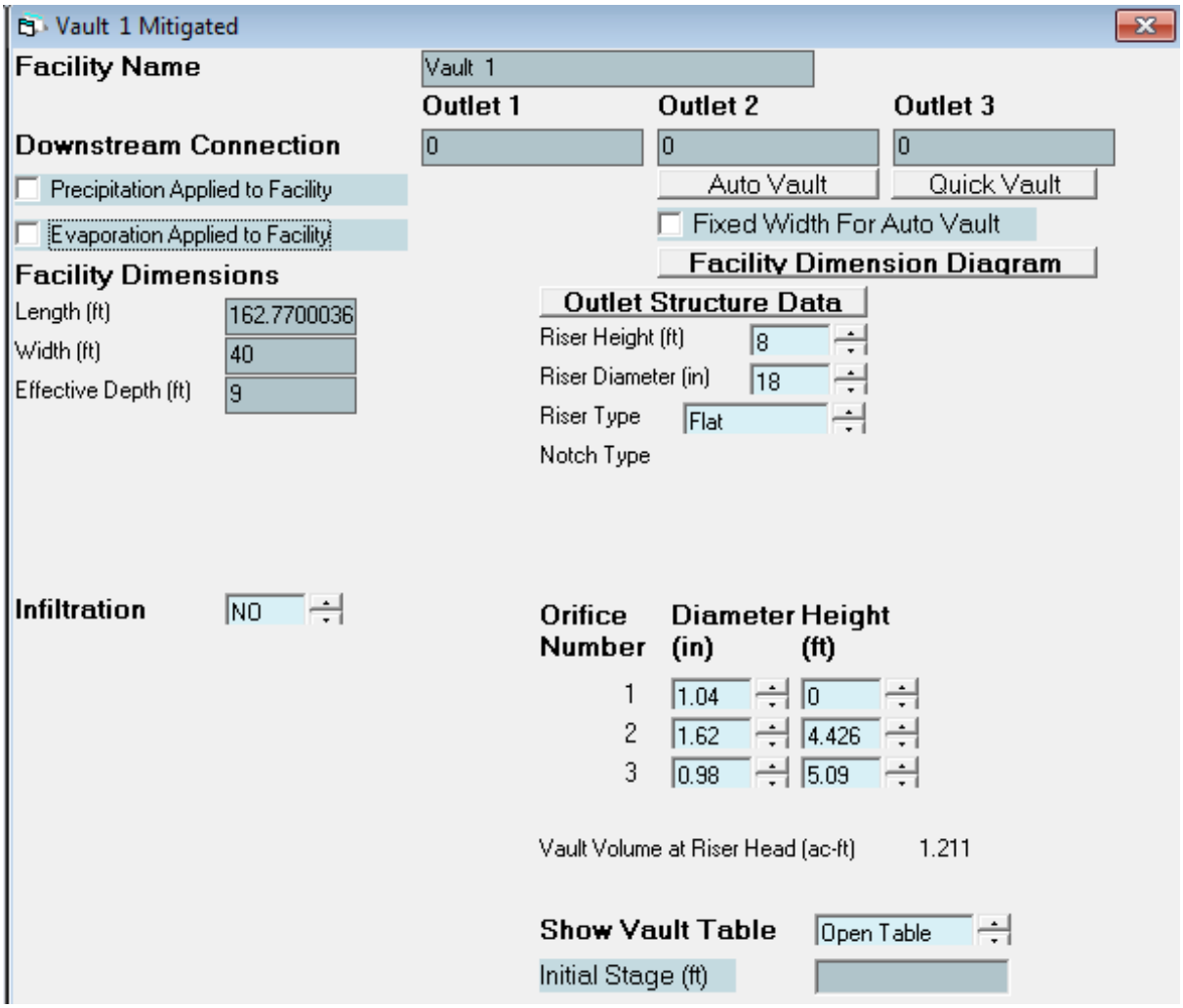
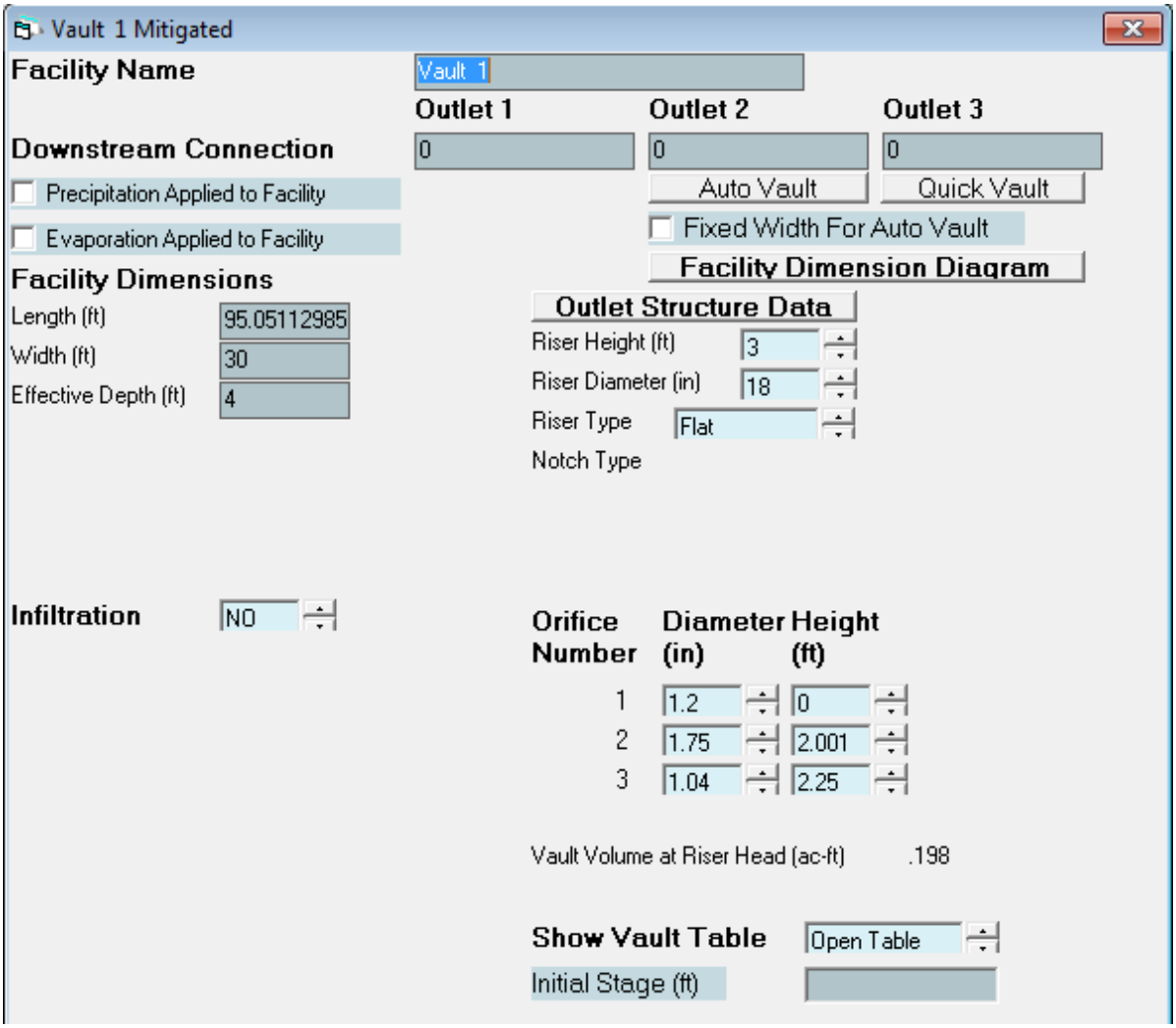


Figure 6-2: WWHM Detention Vault Model Element Serving Basin 2



6.4 WATER QUALITY

Basic water quality treatment (Minimum Requirement #6) is required for the project's pollutant generating impervious surface areas (asphalt pavement, driveway and parking areas) and pervious surface areas (lawns) in accordance with 2014 SMWW best management practices.

Water quality treatment for basin runoff will be provided by proposing permanent wet pools within each stormwater detention vault (0.093 ac-ft and 0.063 ac-ft for Basins 1 and 2, respectively) in accordance with BMP T10.20 of the 2014 SWMM. The required wet pool water quality design storm volumes were derived using the WWHM continuous runoff model (volume equal to the simulated daily volume that represents the upper limit of the range of daily volumes that accounts for 91% of the entire runoff volume over a multi-decade period of record).

The wet wool configuration and pipe inlet / outlet locations will be designed to maximize the flow path length through the facility (greater than the 3:1 minimum ratio of flow path length to width from the pond inlet to the outlet).

6.5 CONVEYANCE

The storm drainage for the project will be designed to ensure conveyance for the peak runoff flow per City of Marysville Development Standards. All stormwater piping will adequately convey the peak flow from the 25-year storm event. The project site and roadway system grading design also ensures that the 100 year design storm event can be safely conveyed via overland flow to the down gradient basin points of concentration.

6.6 DOWNSTREAM CONVEYANCE

Stormwater drainage released at the project POC discharges to the 83rd Ave NE storm drainage system as shown on Figure 3 (Developed Condition). From this point, drainage routes offsite to the south within the drainage corridor adjacent to the west side 83rd Ave NE right-of-way.

A detailed offsite downstream conveyance summary will be provided in the project's Full Storm Water Site Plan Report to document the offsite drainage path for approximately 1 mile downstream of the subject property and also to verify the ultimate downstream receiving water body.

6.7 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A detailed temporary erosion and sedimentation control (TESC) plan will be prepared to define control measures to minimize site erosion and sedimentation during construction. Quarry spall construction entrance road, silt fencing, interceptor drainage swales, sedimentation pond and related Best Management Practices (BMPs) will be proposed to ensure protection of neighboring properties and downstream drainage systems. A detailed Storm Water Pollution Prevention Plan (SWPPP) will also be prepared for the project.

7 MINIMUM STORMWATER REQUIREMENTS

This project must comply with the nine minimum requirements outlined in the 2014 WSDOE *Storm Water Management Manual*. The nine minimum requirements will be addressed as follows:

7.1 REQUIREMENT NO. 1 – PREPARE STORMWATER SITE PLANS

A storm water site plan is required in accordance with the steps outlined below per SMWW Volume 1, Chapter 3.

7.1.1 STEP 1: COLLECT AND ANALYZE EXISTING CONDITIONS INFORMATION

A site visit was performed to determine the existing drainage conditions. A storm water hydrologic model was developed to estimate the pre-development runoff conditions based on a topographic survey of the site. The downstream conveyance will be investigated by performing a field investigation of the downstream conveyance system, and utilizing regional topographic map information.

7.1.2 STEP 2: PREPARE PRELIMINARY DEVELOPMENT LAYOUT

A site development plan has been prepared. The storm water analysis has been prepared in accordance with the proposed plans.

7.1.3 STEP 3: PERFORM OFF-SITE ANALYSIS

An off-site drainage investigation will be completed for the downstream conveyance to 1 mile offsite with narrative and general mapping. The release point for the development remains the same as the pre-developed drainage POCs. The release rates from the final development will be attenuated and not exceed those generated in the existing condition per the modeling parameters defined in this report. The downstream system will not suffer any long term impacts from the proposed development.

7.1.4 STEP 4: DETERMINE APPLICABLE MINIMUM REQUIREMENTS

All nine minimum requirements apply to the project as outlined in the 2014 SWMM in accordance with the Figure 2.4-1 (SWMM Volume I).

7.1.5 STEP 5: PREPARE A PERMANENT STORMWATER CONTROL PLAN

The permanent storm water control plan proposed for this project includes engineered water quality treatment and flow control facilities. BMP and Facility Selection Process for Permanent Storm Water Control Plans was derived per Chapter 4, Volume I of the 2014 SWMM.

Step 1: Determine and Read the Applicable Minimum Requirements

Minimum requirements were reviewed to establish the project size thresholds for the application of the SWMM minimum requirements. In accordance with Figure 2.4-1– Flow Chart for Determining Requirements for New Development, all 9 Minimum Requirements apply to the new and related hard surfaces and converted vegetation areas.

Step 2: Select Source Control BMPs

Suitable temporary source control BMPs will be selected based on the nature of the proposed project. Storm water runoff from the developed site area site shall be conveyed to the storm water management facilities. Detailed design plans will be prepared based on the analysis and findings outlined in this report.

Step 3: Determine Threshold Discharge Areas and Applicable Requirements for Treatment, Flow Control, and Wetlands Protection

The project threshold discharge area proposes new impervious surface area that triggers the requirement for both water quality treatment and flow control facilities to satisfy minimum requirement #6 (runoff treatment) and #7 (flow control). Appendix 3 includes the project Land Use Area Summary tables that quantify the amount of effective pollution-generating impervious surfaces and pollution–generating pervious surfaces in the threshold discharge area. Wetland B is proposed to be filled to accommodate the required road improvements. The remaining critical area wetlands on the site will be protected and enhanced in accordance with mitigation plans to be prepared by Soundview Consultants, LLC.

Step 4: Select Flow Control BMPs and Facilities

Flow control facilities were designed for the project using WWHM to size a preliminary detention vaults to serve each Basin. The site soils are not conducive or feasible for infiltration.

Step 5: Select Treatment Facilities

Wet vaults are proposed to provide treatment for the project basin runoff.

Step 6: Review Selection of BMPs and Facilities

The list of on-site treatment and flow control facilities, and the list of source control BMPs were reviewed. The site layout will be revaluated to review the need for construction of facilities, the size of the facilities, the amount of impervious surfaces created and areas to be left undisturbed.

Step 7: Complete Development of Permanent Storm Water Control Plan

The final design and location of the BMPs and facilities on the site will be determined using the detailed guidance in SWMM Volumes 3, 4, and 5. An operation and maintenance manual will be prepared for the treatment and flow control facilities proposed.

7.1.6 STEP 6: PREPARE A CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A complete SWPPP will be prepared for the project addressing all 13 elements in accordance with the 2014 SWMM (see below).

7.1.7 STEP 7: COMPLETE THE STORMWATER SITE PLAN

This preliminary storm water site plan design has been completed to encompass the entire project submittal to the City of Marysville (local government agency with drainage review authority).

7.1.8 STEP 8: CHECK COMPLIANCE WITH ALL APPLICABLE MINIMUM REQUIREMENTS

The preliminary storm water site plan design complies with applicable City requirements.

7.2 REQUIREMENT NO. 2 – CONSTRUCTION STORMWATER POLLUTION PREVENTION (SWPPP)

7.2.1 ELEMENT 1: PRESERVE VEGETATION / MARK CLEARING LIMITS

The project will require land clearing to remove trees and brush vegetation. A qualified land surveyor will physically mark the property clearing limits on the site. Temporary buffer zones (BMP C102) of natural

vegetation beyond the proposed clearing limit will provide a living filter to reduce soil erosion and runoff velocities during construction.

7.2.2 ELEMENT 2: ESTABLISH CONSTRUCTION ACCESS

A stabilized construction entrance will be proposed to 83rd Ave NE in general accordance with BMP C105. Public roads shall at a minimum be cleaned thoroughly at the end of each day. Sediment shall be removed from roads by shoveling or pickup sweeping and shall be transported to a controlled sediment disposal area. Street washing will be allowed only after sediment is removed in this manner.

7.2.3 ELEMENT 3: CONTROL FLOW RATES

A temporary sediment pond will be proposed per BMP C241 to protect properties downstream of the development site from erosion and the potential discharge of turbid stormwater runoff from the project site. The 2 yr WWHM flow frequency for the project will be used to determine the required minimum surface area at the top of the riser pipe. The equation and design criterion for the sediment pond are as follows:

Surface Area: SA = Q2 x 2080

The temporary pond will discharge to the project point of concentration.

7.2.4 ELEMENT 4: INSTALL SEDIMENT CONTROLS

Runoff from disturbed areas will be collected by temporary interceptor swales (BMP C200) and directed to the temporary sediment pond (BMP C241). Perimeter silt fencing (BMP C233) will be installed at down gradient clearing limits. Earthen structures shall be seeded according to timing indicated in Element 5 below.

7.2.5 ELEMENT 5: STABILIZE SOILS

All exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact and flowing water, and wind erosion. From Oct 1 to April 30th, no soils shall remain exposed and unworked for more than 2 days. May 1 to September 30 of each year, no soils shall remain exposed and unworked for more than 7 days. Applicable practices include, but are not limited to, temporary and permanent seeding (BMP C120), mulching (BMP C121), early application of gravel base on driveway and parking areas, and dust control. Soil stabilization measures selected should be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization agents may have on downstream waters or ground water. Soil stockpiles must be stabilized and protected with sediment trapping measures. Work on construction sites shall not exceed the capability of the individual contractor to re-stabilize the disturbed soils, meeting the timing conditions listed above.

7.2.6 ELEMENT 6: PROTECT SLOPES

Existing vegetation surrounding the project area shall remain undisturbed to protect the existing slopes. Temporary slopes shall be protected with temporary seeding (BMP C120) and mulching (BMP C121). Provide drainage to remove potential ground water intersecting the slope surface of exposed soil areas. Excavated material shall be placed on the uphill side of trenches, consistent with safety and space considerations. Check dams shall be placed at regular intervals within trenches that are cut down a slope. Stabilize soils on slopes, as specified in Element #5.

7.2.7 ELEMENT 7: PROTECT DRAIN INLETS

Protect all storm drain inlets made operable during construction so that stormwater runoff shall not enter the conveyance system without first being filtered or treated to remove sediment. Clean or remove and replace inlet protection devices when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

7.2.8 ELEMENT 8: STABILIZE CHANNELS AND OUTLETS

Interceptor swales will be positively graded and seeded (BMP C120). Temporary interceptor swales shall be stabilized with grass vegetation and triangular silt dike check dams (BMP C208) at min. 50 lf on-center as required. Stabilization, including armoring material, adequate to prevent erosion of outlets and adjacent to slopes shall be provided at the outlets of all conveyance systems.

7.2.9 ELEMENT 9: CONTROL POLLUTANTS

All pollutants including waste materials and construction debris, that occur on-site shall be handled and disposed of in a manner that does not cause contamination of storm water. BMPs shall be utilized to control and protect the site for vehicle maintenance and repair, use of chemicals, pH modifying substances etc. (BMP C151 Concrete Handling, BMP C153 Material Delivery, Storage and Containment).

7.2.10 ELEMENT 10: CONTROL DE-WATERING

De-watering shall be routed to the on-site temporary sediment pond (BMP C241). All foundation and trench de-watering water, which has similar characteristics to storm water runoff at the site, shall be discharged into a controlled conveyance system, prior to discharge to a sediment trap or sediment pond. Channels must be stabilized, as specified in Element #8.

7.2.11 ELEMENT 11: MAINTAIN BMPS

All temporary and permanent erosion and sediment control BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Sediment control BMPs shall be inspected weekly or after a runoff-producing storm event during the dry season (daily if construction takes place during the wet season). Following project completion and full final site stabilization, temporary TESC elements shall be removed from the site within 30 days.

7.2.12 ELEMENT 12: MANAGE THE PROJECT

All BMPs shall be inspected and maintained by the Contractor's Certified Erosion and Sediment Control Lead.

Phasing of Construction - The project site work will be constructed over a single phase.

Permitted clearing and grading shall be limited to delineated areas on site per the approved plans.

Inspection and Monitoring - All BMPs shall be inspected, maintained, and repaired as needed to assure continued performance of their intended function. 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, the SWPPP shall be modified, as appropriate, in a timely manner.

Maintenance of the Construction SWPPP - The Construction SWPPP shall be retained on-site. The Construction SWPPP shall be modified whenever there is a significant change in the design, construction, operation, or maintenance of any BMP. From Oct 1 to April 30th, no soils shall remain exposed and

unworked for more than 2 days. May 1 to September 30 of each year, no soils shall remain exposed and unworked for more than 7 days.

Civil plan sheets (Existing Conditions and TESC Plan) will be prepared to illustrate all proposed controls.

7.2.13 ELEMENT #13: PROTECT LOW IMPACT DEVELOPMENT BMPS

Protect any and all potential LID system BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs on portions of the site that drain into infiltration BMPs. Restore the BMPs to their fully functioning condition if they accumulate sediment during construction. Restoring the BMPs must include removal of sediment and any sediment-laden soils, and replacing the removed soils with soils meeting the design specification. Prevent compacting soils within infiltration BMPs by excluding construction equipment and foot traffic. Keep all heavy equipment off existing soils under LID facilities that have been excavated to final grade to retain the infiltration rate of the soils.

7.3 REQUIREMENT NO. 3 – SOURCE CONTROL OF POLLUTION

The following source control and conveyance Best Management Practices (BMP's) have been preliminarily selected for implementation on this project:

- BMP C102 Buffer Zones
- BMP C105 Stabilized Construction Entrance / Exit
- BMP C120 Temporary and Permanent Seeding
- BMP C121 Mulching
- BMP C123 Plastic Covering
- BMP C160: Certified Erosion and Sediment Control Lead
- BMP C200 Interceptor Dike and Swales
- BMP C208 Triangular Silt Dike
- BMP C209 Outlet Protection
- BMP C220 Storm Drain Inlet Protection
- BMP C233 Silt Fence
- BMP C241 Temporary Sediment Pond

7.4 REQUIREMENT NO.4 – PRESERVATION OF NATURAL DRAINAGE SYSTEMS AND OUTFALLS

The natural drainage pattern will be maintained, and discharges from the project site shall occur at the natural location. The developed site will mitigate storm water runoff to maintain the "targeted" pre-development flows to the downstream system. The manner by which runoff is discharged from the project site must not cause a significant adverse impact to downstream receiving waters and down gradient properties. The developed project site design will attenuated storm water flows to not exceed the target peak flow duration standard in accordance with flow duration analysis methodology outlined in Section 4.3 to preserve and protect the natural drainage system.

7.5 REQUIREMENT NO. 5 – ON-SITE STORMWATER MANAGEMENT

The project employs on-site storm water management BMPs to infiltrate, disperse, and retain stormwater runoff on-site to the extent feasible without causing flooding or erosion impacts.

On-site stormwater management BMPs were selected in accordance with List #2 (On-site Stormwater Management BMPs for Projects Triggering Minimum Requirements #1 through #9) per the SWMM (Volume I, Chapter 2, page 2-26). Feasibility was determined by evaluation against the design criteria, limitations, and infeasibility criteria identified for each BMP in the SWMM.

Lawn and Landscape Areas:

BMP T5.13 (Post-Construction Soil Quality and Depth) is proposed for all new lawn and landscaped areas, as well as any areas disturbed by landscape grading activities.

Roofs:

BMP T5.10C (Perforated Stub-out Connections) is proposed to partially infiltrate runoff from roof downspout drains. Roof runoff is proposed to be routed to the project stormwater vaults for mitigation.

Other Hard Surfaces:

Runoff from other hard surfaces on the project (paved driveway, sidewalks, and roadway areas) will be mitigated by appropriate and feasible water quality treatment and flow control BMPs.

Permeable pavement in accordance with BMP T5.15 was reviewed and concluded to be infeasible (based on the soil condition constraints).

A wet vault is proposed for water quality treatment and flow control mitigation per the 2014 SWMM.

7.6 REQUIREMENT NO. 6 – RUNOFF TREATMENT

The project threshold discharge area proposes new pollutant generation impervious surface areas that triggers the requirement for water quality treatment to satisfy minimum requirement #6. Water quality assurance for this project will be provided via a basic wet vaults per 2014 SWMM requirements.

7.7 REQUIREMENT NO. 7 – FLOW CONTROL

The project threshold discharge area proposes new impervious surface area that triggers the requirement for flow control to satisfy minimum requirement #7. Flow control, achieved by temporarily storing the runoff volumes resulting from attenuating runoff peak flows, has been designed to ensure post-development runoff release rates do not exceed that resulting from the pre-development basin condition at the project point of concentration in accordance with the target peak flow standard outlined this report (see detailed description in Section 4.3).

Runoff flow control for each basin will be mitigated by detention vaults per 2014 SWMM requirements.

7.8 REQUIREMENT NO. 8 – WETLANDS PROTECTION

All earthwork grading activities will be performed in a manner to ensure protection of adjacent areas to remain un-disturbed. Wetland B is proposed to be filled in accordance with a wetland Bank Use Plan being prepared by Soundview Consultants LLC. The Bank Use Plan will describe the rationale for purchasing credits at the Snohomish Basin Mitigation Bank (SBMB) to compensate for impacts from the proposed project. Buffer enhancement mitigation will also be proposed by Soundview for potential indirect impacts to Wetlands A, C and D as required.

7.9 REQUIREMENT NO. 9 – OPERATION AND MAINTENANCE

Future ongoing operation and maintenance of the proposed storm water management facilities shall be performed based on maintenance standards and procedures outlined in the 2014 WSDOE storm water manual.

8 APPENDICES

Appendix 1 - Figures

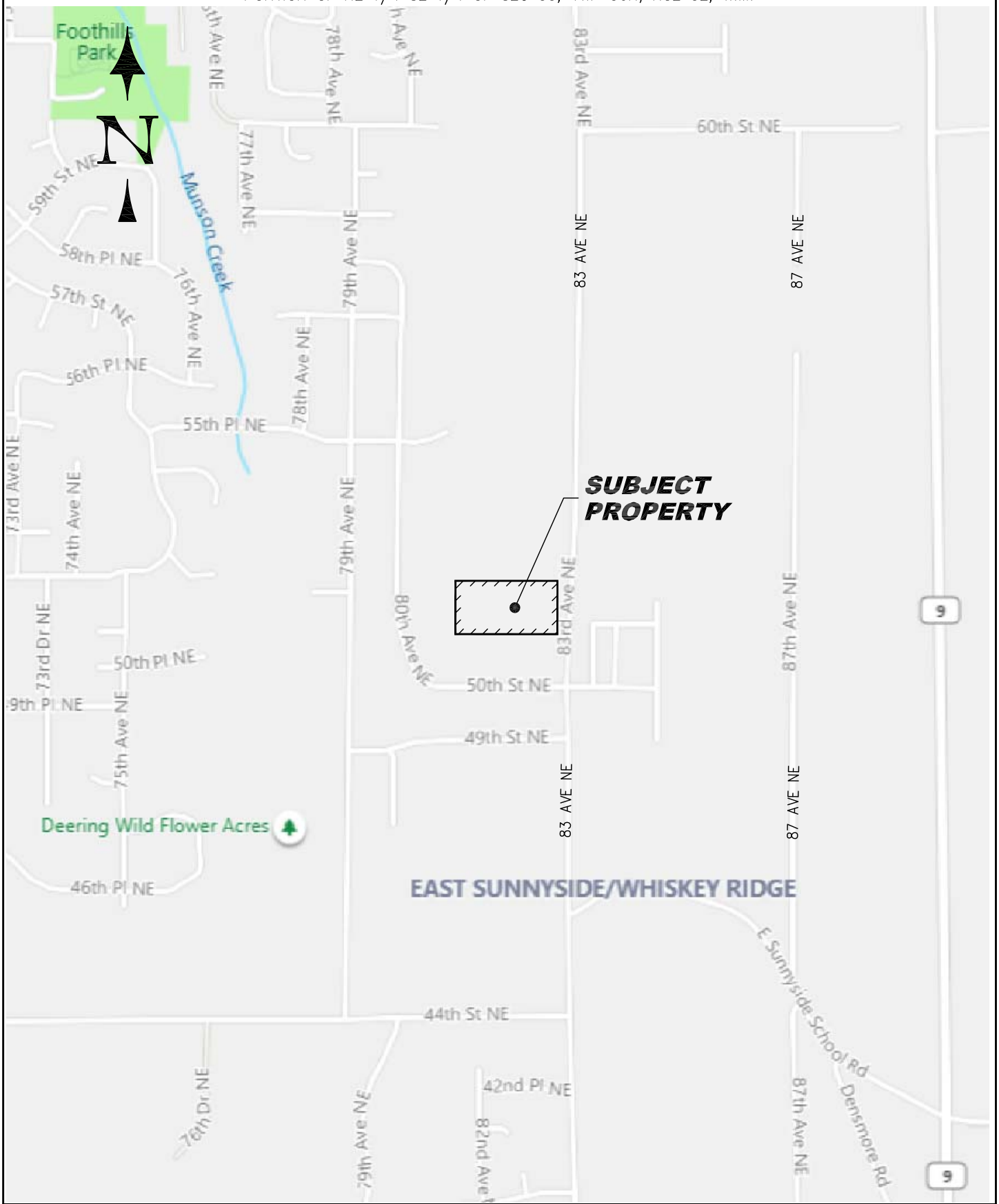
Appendix 2 - Geotechnical Engineering Report & Wetland Delineation Report

Appendix 3 - Land Use Summary & WWHM Project Reports

APPENDIX 1

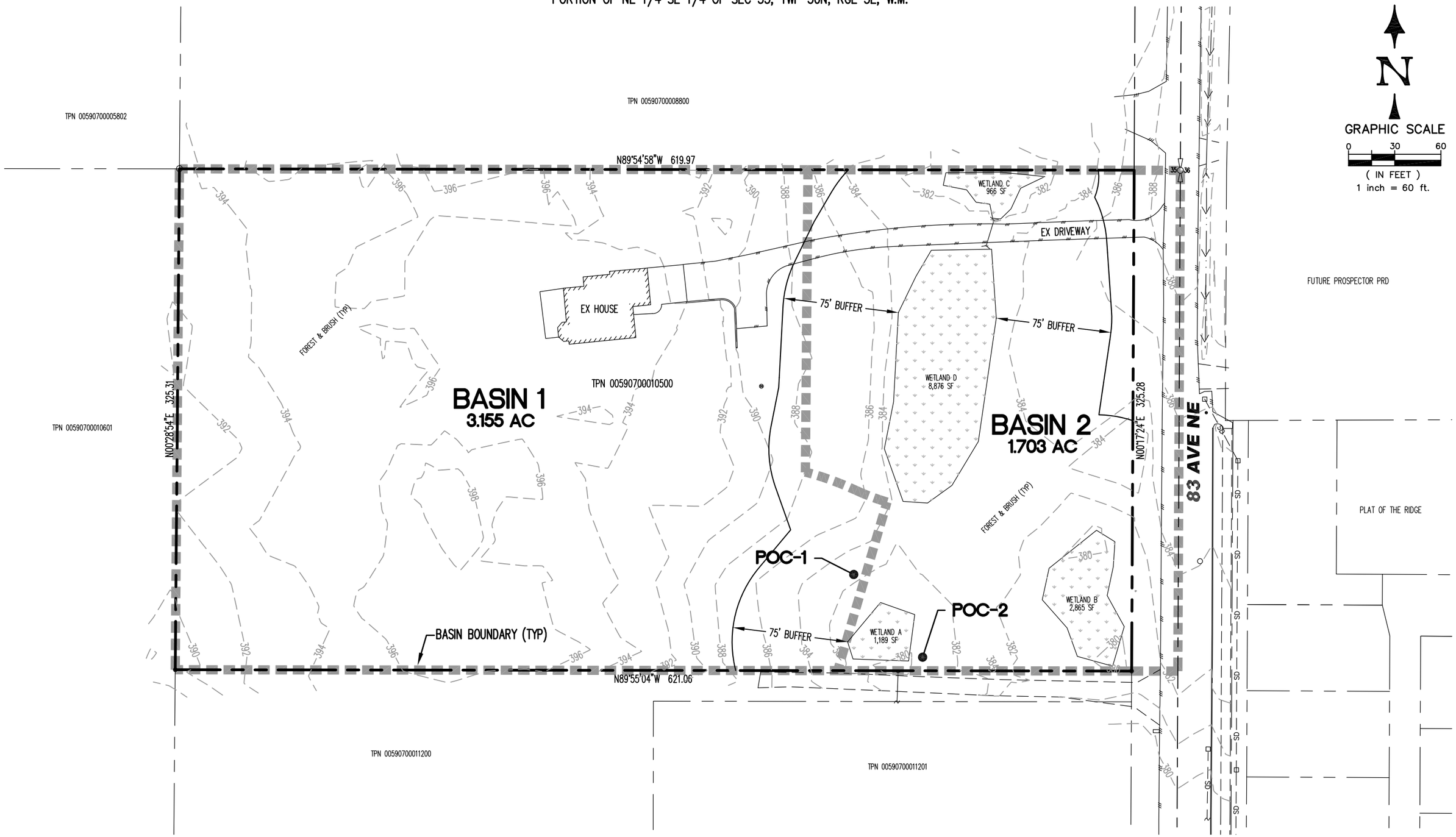
Figures

PORTION OF NE 1/4 SE 1/4 OF SEC 35, TWP 30N, RGE 5E, W.M.



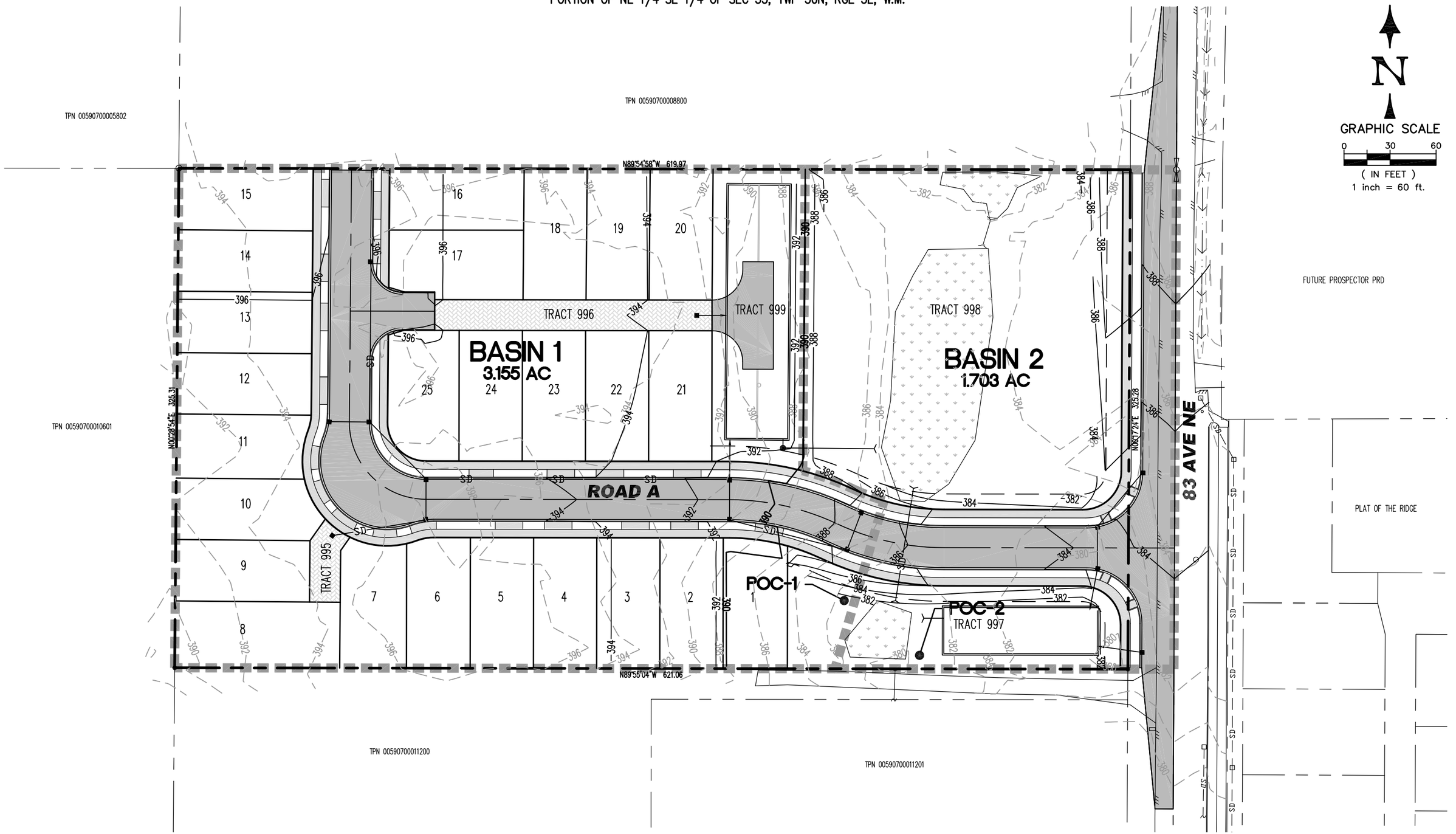
LATTA ENGINEERING PLLC Consulting Civil Engineers 5970 Birch Point Road, Blaine, WA 98230 Ph: 360 671 7002 	**VICINITY MAP** **GROUNDHOG PRD PRELIMINARY PLAT** **5110 83 AVENUE NE, MARYSVILLE, WA** DATE: MAY 6, 2022 SCALE: N.T.S.	FIGURE 1

PORTION OF NE 1/4 SE 1/4 OF SEC 35, TWP 30N, RGE 5E, W.M.



LATTA ENGINEERING PLLC Consulting Civil Engineers 5970 Birch Point Road, Blaine, WA 98230 Ph: 360 671 7002 	DESIGNED BY: NL DRAWN BY: KJ CHECKED BY: NL	GROUNDHOG LAND DEVELOPMENT COMPANY, LLC 2502 161 AVENUE SE BELLEVUE, WA 98008-5423	**PRE-DEVELOPED CONDITION** GROUNDHOG PRD PRELIMINARY PLAT 5110 83 AVENUE NE, MARYSVILLE, WA DATE: MAY 6, 2022 SCALE: H: 1" = 60' V: N/A	FIGURE: 2

PORTION OF NE 1/4 SE 1/4 OF SEC 35, TWP 30N, RGE 5E, W.M.



N

GRAPHIC SCALE

0 30 60

(IN FEET)

1 inch = 60 ft.

LATTA ENGINEERING PLLC Consulting Civil Engineers 5970 Birch Point Road, Blaine, WA 98230 Ph: 360 671 7002 	DESIGNED BY: NL DRAWN BY: KJ CHECKED BY: NL	GROUNDHOG LAND DEVELOPMENT COMPANY, LLC 2502 161 AVENUE SE BELLEVUE, WA 98008-5423	**DEVELOPED CONDITION** GROUNDHOG PRD PRELIMINARY PLAT 5110 83 AVENUE NE, MARYSVILLE, WA DATE: MAY 6, 2022 SCALE: H: 1" = 60' V: N/A	FIGURE: 3

APPENDIX 2

Geotechnical Engineering Report

Wetland Delineation Report

Geotechnical Report

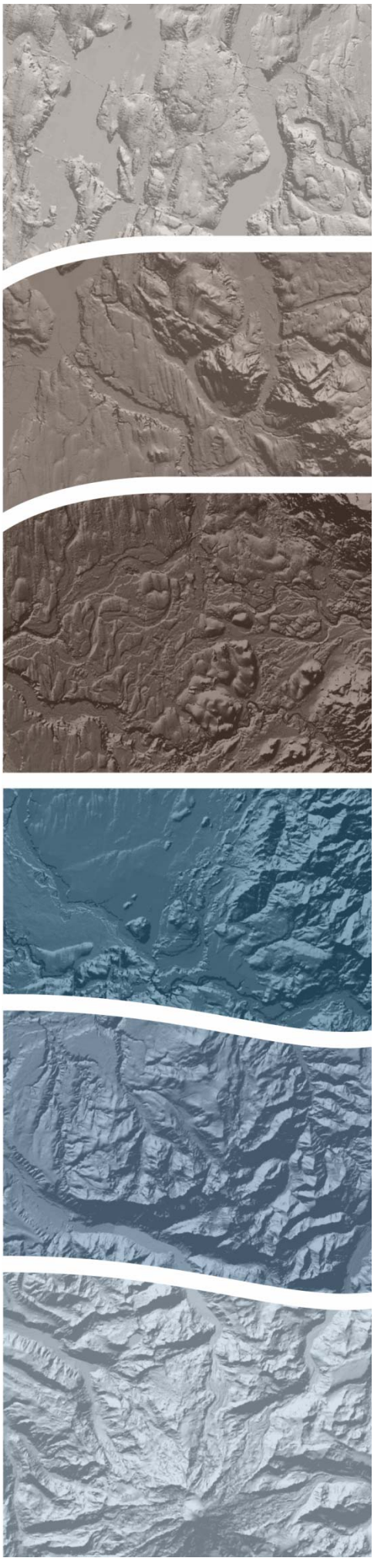
Kostenick Property

Marysville, Washington

Prepared for:

Joey Ferrick
KW Commercial

RN File No. 3395-004A • May 5, 2021



ROBINSON NOBLE

Geotechnical Report

Kostenick Property

Marysville, Washington

RN File No. 3395-004A ● May 5, 2021

Prepared for:

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Cover sheet graphic shows western Washington geomorphology as a hillshade from Mount Rainier to the Seattle metropolitan area. Image is derived from a compilation of Washington State DNR LIDAR surveys obtained from the Washington Lidar Portal: http://lidarportal.dnr.wa.gov/

1 INTRODUCTION

This report presents the results of our geotechnical engineering investigation at your subdivision in Marysville, Snohomish County, Washington. The site is located at 5110 83rd Avenue NE, as shown on the Vicinity Map in **Figure 1**.

1.1 Project Description

We understand you plan to develop the site as a subdivision with multiple residential lots with associated access roads and improvements. We have not been provided a conceptual site plan at this time and understand the final configuration of the subdivision is subject to modification.

You have requested we produce this geotechnical report to evaluate the subsurface conditions at the site. To prepare this report, you have provided us with a survey of the parcel by Pacific Coast Surveys, Inc. dated March 9, 2021.

1.2 Scope

Our scope of services as outlined in our Services Agreement, dated February 23, 2021, includes the following:

- Review available geologic maps for the site.
- Explore the subsurface soil and groundwater conditions at the site with test pits using a subcontracted excavator.
- Evaluate pertinent physical and engineering characteristics of the soils encountered in the test pits.
- Prepare a geotechnical report containing the results of our subsurface explorations, and our conclusions and recommendations for geotechnical design elements of the project.

We completed these services in general accordance with our service agreement dated February 23, 2021. We received notice to proceed on February 23, 2021.

2 SITE CONDITIONS

2.1 Geologic Setting

Most of the Puget Sound Region was affected by past intrusion of continental glaciation. The last period of glaciation, the Vashon Stade of the Fraser Glaciation, ended approximately 14,000 years ago. Many of the geomorphic features seen today are a result of scouring and overriding by glacial ice and sediment deposition related to glacial advance and retreat. Many of the geomorphic features seen today are a result of scouring and overriding by glacial ice. During the Vashon Stade, areas of the Puget Sound region were overridden by over 3,000 feet of ice. Soil layers overridden by the ice sheet were compacted to a much greater extent than those that were not. Part of a typical glacial sequence within the area of the site includes the following soil deposits from newest to oldest:

Artificial Fill (af) – Fill material is often locally placed by human activities, consistency will depend on the source of the fill. The thickness and expanse of this material will be dependent on the extent of fill required to grade land to the desired elevations. Density of the fill will depend on earthwork activities and compaction efforts made during the placement of the material.

Recessional Outwash (Qvr) – These deposits were derived from the stagnating and receding Vashon glacier and consist mostly of stratified sand and gravel, but include unstratified ablation and melt-out deposits. Recessional deposits were not compacted by the glacier and are typically not as dense as those that were.

Vashon Till (Qvt) – The till is a non-sorted mixture of clay, sand, pebbles, cobbles and boulders, all in variable amounts. The till was deposited directly by the ice as it advanced over and eroded irregular surfaces of previously deposited formations and sediments. The till was well compacted by the advancing glacier and exhibits high strength and stability. Drainage is considered very poor in the till.

Advance Outwash (Qva) – The advance outwash typically is a thick section of mostly clean, pebbly sand with increasing amounts of gravel higher in the section. The advance outwash was placed by the advancing glaciers and was overridden and well compacted by the glacier.

The geologic units for this area are mapped on the Geologic Map of the Lake Stevens Quadrangle, Snohomish County, Washington, by James P. Minard (U.S. Geological Survey, 1985). The site is mapped as being underlain by glacial till. Our site explorations encountered glacial till consistent with the mapped geology.

2.2 Seismic Setting

The Pacific Northwest is very seismically active. Off the coast, the Juan de Fuca Oceanic Plate collides into and descends (subducts) under the North American Continental Plate. The contact between these plates forms an approximately 600 mile long fault known as the Cascadia Subduction Zone (CSZ). The resulting stresses generate three unique types of earthquakes that contribute to seismic risk in the region (Cascadia Region Earthquake Workgroup, 2013):

Subduction (or Megathrust) Earthquakes: Megathrust earthquakes are formed by a rupture of the contact between the plates along the CSZ. These events are capable of generating a

magnitude 9 or larger earthquake. These earthquakes are relatively far from the Puget Sound, but still pose great risk due to their extreme intensity and duration. Along the CSZ, megathrust earthquakes are understood to have a recurrence interval of roughly every 500 years. The last such event along the CSZ happened in 1700 AD, lowering the coastline several feet and generating a large tsunami across the Pacific Ocean.

Shallow (or Crustal) Earthquakes: Stress from the subduction zone fractures and deforms the continental crust across the Pacific Northwest. When these near-surface crustal faults break, they generate earthquakes that affect smaller areas, but can locally be more intense than the subduction events off the coast. Such faults happen to pass under some of the most populous areas in Washington State, including the greater Seattle and Tacoma areas. Because of their proximity and local intensity, these fault zones are often the greatest contributing factor to seismic risk in the Puget Sound.

Deep (or Intraslab) Earthquakes: Intraslab earthquakes are associated with fractures within the subducting Juan de Fuca plate. Because they occur at depths over 18 to 30 miles beneath the surface, the energy of these earthquakes is dissipated over large areas of ground surface, increasing their zone of influence but limiting their severity. However, these earthquakes are still capable of causing significant damage to structures and are the most frequent seismic events in the Puget Sound region. A magnitude 6.5 or larger earthquake affecting the region can be expected, on average, every 30 years. The 2001 Nisqually earthquake was an intraslab earthquake with over $4 billion in damages, 400 injuries, and one death. (Cascadia Region Earthquake Workgroup, 2008).

The site is mapped on the U.S. Quaternary Faults and Folds Database web application by the U.S. Geological Survey as located approximately 12 miles northeast of the South Whidbey Island Fault Zone (SWIFZ). The SWIFZ is a series of shallow, crustal thrust fault strands that trend from northwest to southeast. This is a class A fault, meaning there is sufficient evidence of fault displacement during the Quaternary Period for the fault to be considered active. Research from the area has shown at least 4 earthquakes since ice retreat approximately 16,000 years ago, with the potential to generate magnitude 7.0 to 7.5 earthquakes (Washington Department of Natural Resources, 2012-2013).

2.3 Surface Conditions

The site is bordered by 83th Avenue NE to the east and a transmission line right-of-way to the west. The surrounding area consists mostly of existing rural residential acreage, wetlands, patchy woodlands, and newly completed/under construction subdivisions of single family residences. A layout of the site is shown on the Site Plan in **Figure 2**.

The rectangular parcel is about 4.64 acres in size and has maximum dimensions of approximately 621 feet in the east-west direction and approximately 325 feet in the north-south direction. Access to the site is provided by 83th Avenue NE.

The site is developed with a single family residence located in the north-central portion of the lot and a barn/outbuilding in the east/central portion of the lot. The buildings are surrounded by grass lawn landscaping. The western and southern perimeter of the lot is vegetated with small to large deciduous trees, conifers, and dense underbrush. The lot slopes gently down to the east to a pond in the eastern third of the site. We observed ponded water extending through the trees to the southeast corner of the lot.

2.4 Field Explorations

We explored subsurface conditions at the site on February 23 and February 24, 2021, by excavating seven test pits with a trackhoe. The test pits were excavated to depths of 3.0 to 7.0 feet below the ground surface. The explorations were located in the field by a representative from this firm who also examined the soils and geologic conditions encountered, and maintained logs of the test pits. The approximate locations of the test pits are shown on the Site Plan in Figure 2. The soils were visually classified in general accordance with the Unified Soil Classification System, a copy of which is presented as Figure 3. The logs of the test pits are presented in Figures 4 through 10.

2.5 Subsurface Conditions

The subsurface conditions at the site are briefly described below, based upon our completed field explorations of soils and review of geologic maps for the site. For a more detailed description of the soils encountered, review the Test Pit Logs in Figures 4 through 10.

2.5.1 Stratigraphy/Soil Conditions

Based on our completed explorations, we interpret that the subsurface stratigraphy on site can be grouped into four soil units: intermittent disturbed soil grouped into artificial fill, loose surficial soils interpreted as topsoil and forest duff, medium dense to dense silty sands interpreted as weathered glacial till **(Qvt)**, and dense to very dense silty sands interpreted as glacial till **(Qvt)**.

Artificial Fill: Artificial fill was encountered in Test Pit 3, and is likely to be encountered near previously developed areas at the site. In Test Pit 3, the material generally consisted of grayish brown silty sand with trace gravel.

Topsoil/Forest Duff: Topsoil/forest duff was encountered at all other explorations at the ground surface. It averaged approximately 0.5 to 1.5 feet in thickness. Duff in forested areas tended to be a little thinner. This material generally consisted of loose dark brown sandy silt with roots and organics.

Weathered Glacial Till: Underlying the surficial topsoil/duff, we generally encountered soils interpreted as weathered glacial till. The soils were generally loose to medium dense, brown sandy silt with gravel and trace cobbles/boulders. This material was generally 0.5 to 1.7 feet thick and extended to depths up to 2.5 feet below the ground surface.

Glacial Till: This material was encountered underlying the surficial topsoil and/or weathered glacial till in all explorations except possibly Test Pit 6 (discussed below). The till generally consisted of gray dense to very dense silty sand to sandy silt with gravel and varying amounts of cobbles and boulders. We observed that the uppermost 1.0 to 3.0 feet of the glacial till was generally brownish gray, medium dense to dense and exhibited rust mottling. We interpret this till as weathered from the seasonally perched water above it. The transition between the rust mottled till and the unweathered till was generally encountered between depths of 3.0 and 4.0 feet. The glacial till extended to the depths explored in all test pits.

At Test Pit 6 and in stratified layers of Test Pit 4, the encountered soil appears sandier in texture. We have previously interpreted sandy soil zones in nearby sites to likely represent small, discontinuous meltout or similar till deposits. Based on the presence of the pond and the

topographic low near these explorations, it is also possible that these soils represent an exposure of advance outwash sands underlying the till cap.

2.5.2 Hydrologic Conditions

We observed shallow groundwater seepage in every test pit at the site. We also observed standing water at the ground surface across the eastern side of the site extending from the southeast corner of the site, through the mapped pond, and then north from the pond along the topographic low to the northern property line. We generally observed seepage in the test pits from depths of 0.5 feet to 3.0 feet, with multiple zones of seepage in some test pits. A 1.0 to 3.0 foot thick layer of rust mottling from perched water over the till deposit was also observed.

The encountered groundwater seepage is considered to be perched. Perched water does not represent a regional groundwater "table" within the upper soil horizons. The underlying partially cemented till is considered to be nearly impermeable. Volumes of perched groundwater vary depending upon the time of year and the upslope recharge conditions. Based on the frequent areas of standing water and extensive seepage, as well as rust mottling observed in test pits, we expect that perched water conditions in the shallow soil horizons could occur widely across the entire project site during the wetter times of the year. In some topographic lows and drainages, this perched water can be expected to reach the ground surface in the wet season, and shallow seepage could remain all year round.

We noted the soils adjacent to the pond appeared to be sandier and may represent advance outwash soils. These soils were found to be wet at depths near pond-level in Test Pit 4 and Test Pit 6. If these soils are advance outwash and extend laterally underneath the till encountered elsewhere on site, then it is possible the pond level is associated with a regional water table in the permeable advance outwash. Further explorations would be necessary to determine whether the sandy soils are in fact advance outwash.

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 Summary of Geotechnical Considerations

It is our opinion that the site is compatible with the planned development. The underlying medium dense to very dense glacial till deposits are capable of supporting the planned structures. We recommend that the foundations for the structures extend through any fill, topsoil, loose, or disturbed soils, and bear on the underlying medium dense or firmer native glacial till, or on structural fill extending to these soils. Based on our site explorations, we anticipate these soils will generally be encountered at typical footing depths after the topsoil is stripped.

The near-surface soils likely to be exposed during site stripping and construction contain significant quantities of perched water. Volumes of water seepage likely vary seasonally, but may be present year round in places. We anticipate that the on-site soils will be very sensitive during grading and nearly impossible to compact when wet or during wet conditions. We recommend that construction take place during the drier summer months, if possible. If construction takes place during the wet season, additional expenses and delays should be expected due to the wet conditions. Additional expenses could include costs for cement-treating the on-site soils and/or an increased depth of site stripping (up to roughly 4 feet depth to reach unaffected soils below the perched water), export of on-site soil, and the import of clean granular soil for fill.

3.1 Seismic Engineering

3.1.1 Seismic Design

Seismic design for the 2018 International Building Code (IBC) is based on the mapped values for the risk-targeted maximum considered earthquake (MCE_R). Ground motion values in these maps include a probability of exceedance equal to 2% in 50 years, which corresponds to a 2,475-year return period. These mapped values have been prepared by the USGS in collaboration with the FEMA-funded Building Seismic Safety Council (BSSC) and the American Society of Civil Engineers (ASCE).

The mapped MCE_R spectral response accelerations are referred to as S_s for short periods (0.2 seconds) and S_1 for a 1 second period. IBC 2018 directs that correction factors be applied to these response spectra based on an evaluation of site specific subsurface conditions, referred to as the soil site class (defined in ASCE 7 Section 20.3), as well as additional project specific factors as determined by the structural engineer. The Seismic Design Category shall be determined by the design in accordance ASCE 7 and IBC 2018.

Table 1: Seismic Design Inputs

Seismic Design Maps Tool Inputs	Value
Site Latitude	48.0425309254953
Site Longitude	-122.12031551017272
Site Class	C

3.1.2 Seismic Hazards.

Aside from the direct impact of ground shaking on structures, additional seismic hazards to be considered in a seismic event include ground surface displacement from fault rupture, liquefaction and amplification of ground motion, and landslides.

Surface Displacement: Due to the distance from the site to the nearest known strand (discussed in Section 3.1.1) and the lack of evidence of past fault displacement onsite, we expect the site to have a low risk for surface displacement.

Liquefaction: The liquefaction potential is highest for loose sand with a high groundwater table. The underlying dense till is considered to have a very low potential for liquefaction and amplification of ground motion and seismically induced lateral spread.

3.2 Erosion Hazard

The erosion hazard criteria used for determination of affected areas includes soil type, slope gradient, vegetation cover, and groundwater conditions. The erosion sensitivity is related to vegetative cover and the specific surface soil types (group classification), which are related to the underlying geologic soil units. We reviewed the Web Soil Survey by the Natural Resources Conservation Service (NRCS) to determine the erosion hazard of the on-site soils. The site surface soils were classified using the SCS classification system as Tokul gravelly medial loam, 0 to 8 percent slopes. The corresponding geologic unit for these soils is volcanic loess over till, which is in general agreement with the soils encountered in our site explorations. The erosion hazard for the soil is listed as being slight for the gently sloping conditions at the site.

3.3 Foundation Design

Conventional shallow spread foundations should be founded on undisturbed, medium dense or firmer soil. If the soil at the planned bottom of footing elevation is not suitable, it should be overexcavated to expose suitable bearing soil. Footings should extend at least 18 inches below the lowest adjacent finished ground surface for frost protection. Minimum foundation widths should conform to IBC requirements. IBC guidelines should be followed when considering short-term transitory wind or seismic loads. Standing water should not be allowed to accumulate in footing trenches. All loose or disturbed soil should be removed from the foundation excavation prior to placing concrete.

We recommend the allowable design bearing pressure value in **Table 2** for foundations constructed as outlined above. Higher soil bearing values may be appropriate with wider footings. These higher values can be determined after a review of a specific design.

Table 2: Recommendations for Shallow Foundation Design

Parameter	Value for Weathered Glacial Till
Allowable Bearing Pressure	3,000 psf
Approximate total settlement[1]	1 inch
Approximate differential settlement[2]	½ inch

Notes:

[1] Assumes foundation built upon firm, medium dense or denser native soil.

[2] Differential settlement between footings or across a distance of about 30 feet.

3.4 Slabs-On-Grade

Slab-on-grade areas should be prepared as recommended in the **Site Preparation and Grading** subsection. Slabs should be supported on medium dense or firmer native soils, or on structural fill extending to these soils. Where moisture control is a concern, we recommend that slabs be underlain by 6 inches of pea gravel for use as a capillary break. A suitable vapor barrier, such as heavy plastic sheeting, should be placed over the capillary break. An additional 2-inch-thick damp sand blanket can be used to cover the vapor barrier to protect the membrane and to aid in curing the concrete. This will also help prevent cement paste bleeding down into the capillary break through joints or tears in the vapor barrier. The capillary break material should be connected to the footing drains to provide positive drainage.

3.5 Drainage

We recommend that runoff from impervious surfaces, such as roofs, driveway and access roadways, be collected and routed to an appropriate storm water discharge system. The finished ground surface should be sloped at a gradient of 5 percent minimum for a distance of at least 10 feet away from the buildings, or to an approved method of diverting water from the foundation, per IBC Section 1804.4. Surface water should be collected by permanent catch basins and drain lines, and be discharged into a storm drain system.

We recommend that footing drains be used around all of the structures where moisture control is important. The underlying till may pond water that could accumulate in crawlspaces. It is good practice to use footing drains installed at least 1 foot below the planned finished floor slab or crawlspace elevation to provide drainage for the crawlspace. At a minimum, crawlspaces should be sloped to drain to an outlet tied to the drainage system. If drains are omitted around slab-on-grade floors where moisture control is important, the slab should be a minimum of 1 foot above surrounding grades.

Where used, footing drains should consist of 4-inch-diameter, perforated PVC pipe that is surrounded by free-draining material, such as pea gravel. Footing drains should discharge into tightlines leading to an appropriate collection and discharge point. Crawlspaces should be sloped to drain, and a positive connection should be made into the foundation drainage system. For slabs-on-grade, a drainage path should be provided from the capillary break material to the footing drain system. Roof drains should not be connected to wall or footing drains.

Our experience with gently-sloping till sites is that the volume of water collected by residence foundation drains and routed to the stormwater detention system is insignificant when considered in the storm drainage design. We do not expect that the foundation drain water will impact the design of the stormwater detention system.

3.6 Retaining Wall Design

3.6.1 Lateral Loads

The lateral earth pressure acting on retaining walls is dependent on the nature and density of the soil behind the wall, the amount of lateral wall movement, which can occur as backfill is placed, and the inclination of the backfill. Walls that are free to yield at least one-thousandth of the height of the wall are in an "active" condition. Walls restrained from movement by stiffness or bracing are in an "at-rest" condition.

We recommend design earth pressure values as given in **Table 3** below. H represents the wall height. These values assume that the on-site soils or imported granular fill are used for backfill, and that the wall backfill is drained. The given values do not include the effects of surcharges, such as due to foundation loads or other surface loads. Surcharge effects should be considered where appropriate. Seismic lateral loads are a function of the site location, soil strength parameters and the peak horizontal ground acceleration (PGA) for a given return period. We used the seismic input parameters discussed in **Section 3.1.1** above, to obtain PGA parameters for the site from the SEAOC Seismic Design Maps Tool web application. We used the output parameters to compute the additional seismic lateral loads for the site.

Table 3: Lateral Earth Pressure Parameters

Earth Pressure Condition	Backslope Angle	Equivalent Fluid Density (pcf)	Seismic Earth Pressure Kicker* (psf)
Active (K_a)	Level	35	5H
At-Rest (K_o)	Level	55	5H

*Kicker is to be applied at 60% of the wall height

The above lateral pressures may be resisted by friction at the base of the wall and passive resistance against the foundation. We recommend resistance values as given in **Table 4** below. To achieve these values of passive resistance pressure, the foundations should be poured "neat" against the native dense soils, or compacted fill should be used as backfill against the front of the footing, and the soil in front of the wall should extend a horizontal distance at least equal to three times the foundation depth. A resistance factor of 0.67 has been applied to the passive pressure to account for required movements to generate these pressures.

Table 4: Passive Resistance Parameters

Soil Type	Coefficient of Friction	Equivalent Fluid Density (pcf)
Weathered Glacial Till	0.5	320

All wall backfill should be well compacted. Care should be taken to prevent the buildup of excess lateral soil pressures due to overcompaction of the wall backfill.

3.7 Stormwater Management

3.7.1 Detention Pond

If a stormwater detention pond is planned, it should be excavated into the underlying dense native soils. We recommend that any fill berms be constructed of soils having a maximum permeability of 1×10^{-5} centimeters per second (4×10^{-6} inches/second). The on-site till encountered in our test pit explorations meets this criterion. We should evaluate any proposed berm fill material prior to construction of the berm.

If a pond is to be constructed, the cut slopes of the pond should be no steeper than 3H:1V on the inside of the detention pond and no steeper than 2H:1V above the water table or on the

outside portions of the pond berms. Inside slopes as steep as 2H:1V are possible but may require maintenance until vegetation is established. Areas with seepage may require a blanket of rock spalls or other measures to limit sloughing.

Where any berms for the pond are to be constructed, the topsoil and loose soils should be removed down to the medium dense to very dense till. Areas to receive new fill should be stripped of unsuitable surface soils and compacted to a firm, non-yielding state prior to placement of the new fill. The excavation should be kept dry to allow the proper placement of structural fill. Structural fill should be placed and compacted as discussed in **Section 3.8.4**. We recommend that the fill in any pond berms be compacted to a minimum of 92 percent of its maximum dry density as determined by the ASTM D1557 compaction test procedure. After each lift of the fill in a berm is compacted to specification, the surface should be scarified to a depth of 2 inches prior to placement of the next lift. The purpose of the scarification is to reduce the risk of creating preferential seepage paths through the pond or berms.

It will be important to compact the face of any pond fill embankments. This should be made explicit to the contractor performing the on-site work. Uncompacted soils on a berm face will be more susceptible to erosion and sloughing. If groundwater seepage is encountered within a cut slope face, a layer of rock spalls may be necessary to minimize erosion of the slope face. The spall layer can be placed at the time of construction, or in the future if sloughing of the slope is observed.

3.7.2 Detention Vault

If a stormwater detention vault is planned, the concrete walls of the vault may be supported on footing foundations bearing on the underlying dense native glacial till soils. We recommend a soil bearing pressure as described in **Table 5** below for the design of the wall footings poured on undisturbed dense glacial till.

Table 5: Detention Vault Foundation Design

Parameter	Value for Glacial Till
Allowable Bearing Pressure	4,500 psf
Approximate total settlement	1 inch
Approximate differential settlement	½ inch

We recommend that footing drains be installed on the outside of perimeter footings. The footing drains should be at least 4 inches in diameter and should consist of perforated or slotted, rigid, smooth-walled PVC pipe, laid at the bottom of the footings. The drain line should be surrounded with free-draining pea gravel or coarse sand and wrapped with a layer of non-woven filter fabric. A vertical drainage blanket at least 12 inches thick, consisting of compacted pea gravel or other free-draining granular soils, should be placed against the walls. A vertical drain mat, such as G100N by Mirafi Inc., may be placed against the walls in lieu of the vertical drainage blanket. Structural fill is then placed behind the vertical drainage blanket or drain mat to backfill the walls. The vertical drainage blanket or drain mat should be hydraulically connected to the drain line at the base of the walls. Sufficient number of cleanouts at strategic locations should be installed for periodic cleaning of the wall drain line to prevent clogging.

The perimeter walls of the concrete vault with a lid would be restrained at their top from horizontal movement and should be designed for at-rest lateral soil pressure, while the perimeter walls of a vault without a lid would be unrestrained at the top and may be designed for active lateral soil pressure. Active earth pressure and at rest earth pressure can be calculated based on equivalent fluid density. We recommend design earth pressures for the vault as given in **Table 6** below. These values assume that the on-site soils are used for backfill, and that the wall backfill is drained. The preceding values do not include the effects of surcharges due to foundation loads, traffic or other surface loads. Surcharge effects should be considered where appropriate. Recommended seismic lateral loading is provided in **Section 3.6.1**. Undrained conditions may occur in the lower portion of the vault if there is not suitable fall to place a wall drain at the footing elevation.

Table 6: Detention Vault Lateral Earth Pressure Parameters

Earth Pressure Condition	Backslope Angle	Equivalent Fluid Density (pcf)	Undrained Equivalent Fluid Density (pcf)
Active (K_a)	Level	35	80
At-Rest (K_o)	Level	55	90

The above lateral pressures may be resisted by friction at the base of the wall and passive resistance against the foundation. We recommend resistance values as given in **Table 7** below. To achieve these values of passive resistance pressure, the foundations should be poured "neat" against the native dense soils, or compacted fill should be used as backfill against the front of the footing, and the soil in front of the wall should extend a horizontal distance at least equal to three times the foundation depth. A resistance factor of 0.67 has been applied to the passive pressure to account for required movements to generate these pressures.

Table 7: Detention Vault Passive Resistance Parameters

Soil Type	Coefficient of Friction	Equivalent Fluid Density (pcf)	Undrained Equivalent Fluid Density (pcf)
Glacial Till	0.6	360	190

3.7.3 Infiltration

We understand that the City of Marysville has adopted the 2012 Department of Ecology Stormwater Management Manual for Western Washington as Amended in December 2014 (SWMMWW). This manual provides guidelines for evaluating the feasibility of infiltration facilities in Volume III, Section 3.3. The baseline soil conditions that must be available at the site for infiltration to be feasible is a vertical separation of at least 5 feet from the base of an infiltration facility to bedrock, a seasonal high groundwater table, or impermeable layer. The glacial till underlying the site is considered to be an impermeable layer due to the highly compact and cemented nature of the deposit. The existing hydrologic conditions of the site consist of perched groundwater that sits on top of this till layer and is unable to percolate through the deposit. We observed late winter-early spring high groundwater levels to range

from the ground surface (0.0 feet) to 2.0 feet below the ground surface. It is our opinion that the use of infiltration best management practices are not feasible at the site due to the lack of sufficient vertical separation to the perched groundwater and the glacial till layer.

3.8 Earthwork and Construction Considerations

3.8.1 Site Preparation and Grading

The first step of site preparation should be to strip the vegetation, topsoil, or loose soils to expose medium dense or firmer native soils in pavement and building areas. The excavated material should be removed from the site, or stockpiled for later use as landscaping fill. The resulting subgrade should be compacted to a firm, non-yielding condition. Areas observed to pump or yield should be repaired prior to placing hard surfaces. Special care should be taken to overexcavate disturbed soils and backfill with structural fill as described in Section 3.8.4 in the artificial ponds or demolished basement areas.

3.8.2 Pavement Subgrade

The performance of roadway pavement is critically related to the conditions of the underlying subgrade. We recommend that the subgrade soils within the roadways be prepared as described in Section 3.8.1. Prior to placing base material, the subgrade soils should be compacted to a non-yielding state with a vibratory roller compactor and then proof-rolled with a piece of heavy construction equipment, such as a fully-loaded dump truck. Any areas with excessive weaving or flexing should be overexcavated and recompacted or replaced with a structural fill or crushed rock placed and compacted in accordance with recommendations provided in Section 3.8.4.

3.8.3 Temporary and Permanent Slopes

Temporary cut slope stability is a function of many factors, such as the type and consistency of soils, depth of the cut, surcharge loads adjacent to the excavation, length of time a cut remains open, and the presence of surface or groundwater. It is exceedingly difficult under these variable conditions to estimate a stable temporary cut slope geometry. Therefore, it should be the responsibility of the contractor to maintain safe slope configurations, since the contractor is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered.

For planning purposes, we recommend that temporary cuts in the near-surface weathered soils be no steeper than 1.5 Horizontal to 1 Vertical (1.5H:1V). Temporary cuts in the dense to very dense glacial till should be no steeper than 0.75H:1V. If groundwater seepage is encountered, we expect that flatter inclinations would be necessary.

We recommend that cut slopes be protected from erosion. Measures taken may include covering cut slopes with plastic sheeting and diverting surface runoff away from the top of cut slopes. We do not recommend vertical slopes for cuts deeper than 4 feet, if worker access is necessary. We recommend that cut slope heights and inclinations conform to local and WISHA/OSHA standards.

Final slope inclinations for granular structural fill and the native soils should be no steeper than 2H:1V. Lightly compacted fills, common fills, or structural fill predominately consisting of fine grained soils should be no steeper than 3H:1V. Common fills are defined as fill material with some organics that are "trackrolled" into place. They would not meet the compaction

specification of structural fill. Final slopes should be vegetated and covered with straw or jute netting. The vegetation should be maintained until it is established.

3.8.4 Structural Fill

All fill placed beneath buildings, pavements or other settlement sensitive features should be placed as structural fill. Structural fill, by definition, is placed in accordance with prescribed methods and standards, and is observed by an experienced geotechnical professional or soils technician. Field observation procedures would include the performance of a representative number of in-place density tests to document the attainment of the desired degree of relative compaction.

Materials: Imported structural fill should consist of a good quality, free-draining granular soil, free of organics and other deleterious material, and be well graded to a maximum size of about 3 inches. Imported, all-weather structural fill should contain no more than 5 percent fines (soil finer than a Standard U.S. No. 200 sieve), based on that fraction passing the U.S. 3/4-inch sieve.

The use of on-site soil as structural fill will be dependent on moisture content control. Some drying of the native soils may be necessary in order to achieve compaction. During warm, sunny days this could be accomplished by spreading the material in thin lifts and compacting. Some aeration and/or addition of moisture may also be necessary. We expect that compaction of the native soils to structural fill specifications would be difficult, if not impossible, during wet weather.

Fill Placement: Following subgrade preparation, placement of the structural fill may proceed. Fill should be placed in 8- to 10-inch-thick uniform lifts, and each lift should be spread evenly and be thoroughly compacted prior to placement of subsequent lifts. All structural fill underlying building areas, and within a depth of 2 feet below pavement and sidewalk subgrade, should be compacted to at least 95 percent of its maximum dry density. Maximum dry density, in this report, refers to that density as determined by the ASTM D1557 compaction test procedure. Fill more than 2 feet beneath sidewalks and pavement subgrades should be compacted to at least 90 percent of the maximum dry density. The moisture content of the soil to be compacted should be within about 2 percent of optimum so that a readily compactable condition exists. It may be necessary to overexcavate and remove wet surficial soils in cases where drying to a compactable condition is not feasible. All compaction should be accomplished by equipment of a type and size sufficient to attain the desired degree of compaction.

3.8.5 Utilities

Our explorations indicate that deep dewatering will not be needed to install standard depth utilities. Anticipated groundwater is expected to be handled with pumps in the trenches. We also expect that groundwater seepage may develop during and following the wetter times of the year. Based on our test pit explorations, we expect that undrained or unpumped utility trenches may fill with water if left open during the wet season, especially along topographically low areas.

The soils likely to be exposed in utility trenches after site stripping are considered highly moisture sensitive. We recommend that they be considered for trench backfill during the drier portions of the year. Provided these soils are within 2 percent of their optimum moisture content, they should be suitable to meet compaction specifications. During the wet season, it

may be difficult to achieve compaction specifications; therefore, soil amendment with kiln dust or cement may be needed to achieve proper compaction with the on-site materials.

3.8.6 Dewatering

We expect that shallow groundwater seepage will be encountered during and following the wetter times of the year as water impounds over the impermeable glacial till. We do not expect significant volumes of water in these excavations. Encountered groundwater seepage is expected to be handled with pumps in the excavated area. Temporary ponds may be needed to collect seepage and pumped water to avoid sediment-laden runoff. Groundwater seepage behind any proposed retaining walls should be collected in a drainage system as discussed in Section 3.5.

3.8.7 Wet Weather Considerations

The on-site glacial till soils likely to be exposed during construction will disturb easily when wet. We expect these soils would be difficult, if not impossible, to compact to structural fill specifications in wet weather. We recommend that earthwork be conducted during the drier months. Additional expenses of wet weather or winter construction could include extra excavation and use of imported fill or rock spalls. During wet weather, alternative site preparation methods may be necessary. These methods may include utilizing a smooth-bucket trackhoe to complete site stripping and diverting construction traffic around prepared subgrades. Soil amendment with kiln dust or cement may be needed to achieve proper compaction with the on-site materials. Disturbance to the prepared subgrade may be minimized by placing a blanket of rock spalls or imported sand and gravel in traffic and roadway areas. Cutoff drains or ditches can also be helpful in reducing grading costs during the wet season. These methods can be evaluated at the time of construction.

4 FUTURE WORK

4.1 Engineering and Design

The intent of this geotechnical report is to provide KW Commercial with a professional evaluation of existing subsurface and slope conditions at the site and to provide recommendations for geotechnical design elements of the proposed project.

As KW Commercial proceeds with the project, we may be retained to provide additional services including engineering, design work, and project management specific to their needs.

4.2 Construction Observation

We should be retained to provide observation and consultation services during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, and to provide recommendations for design changes, should the conditions revealed during the work differ from those anticipated. As part of our services, we would also evaluate whether or not installation activities comply with contract plans and specifications.

We recommend that Robinson Noble perform the following tasks:

- Review contractor submittals
- Observe foundation installation
- Observe wall foundation and drainage installation
- Perform compaction tests
- Perform laboratory tests as needed
- Attend meetings as needed
- Provide geotechnical consultation

5 USE OF THIS REPORT

We have prepared this report for KW Commercial and their agents, for use in planning and design of this project. The data and report should be provided to prospective contractors for their bidding and estimating purposes, but our report, conclusions and interpretations should not be construed as a warranty of subsurface conditions.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractors' methods, techniques, sequences or procedures, except as specifically described in our report, for consideration in design. There are possible variations in subsurface conditions. We recommend that project planning include contingencies in budget and schedule, should areas be found with conditions that vary from those described in this report.

Within the limitations of scope, schedule and budget for our services, we have strived to take care that our services have been completed in accordance with generally accepted practices followed in this area at the time this report was prepared. No other conditions, expressed or implied, should be understood.

We appreciate the opportunity to be of service to you. If there are any questions concerning this report or if we can provide additional services, please call.

6 REFERENCES

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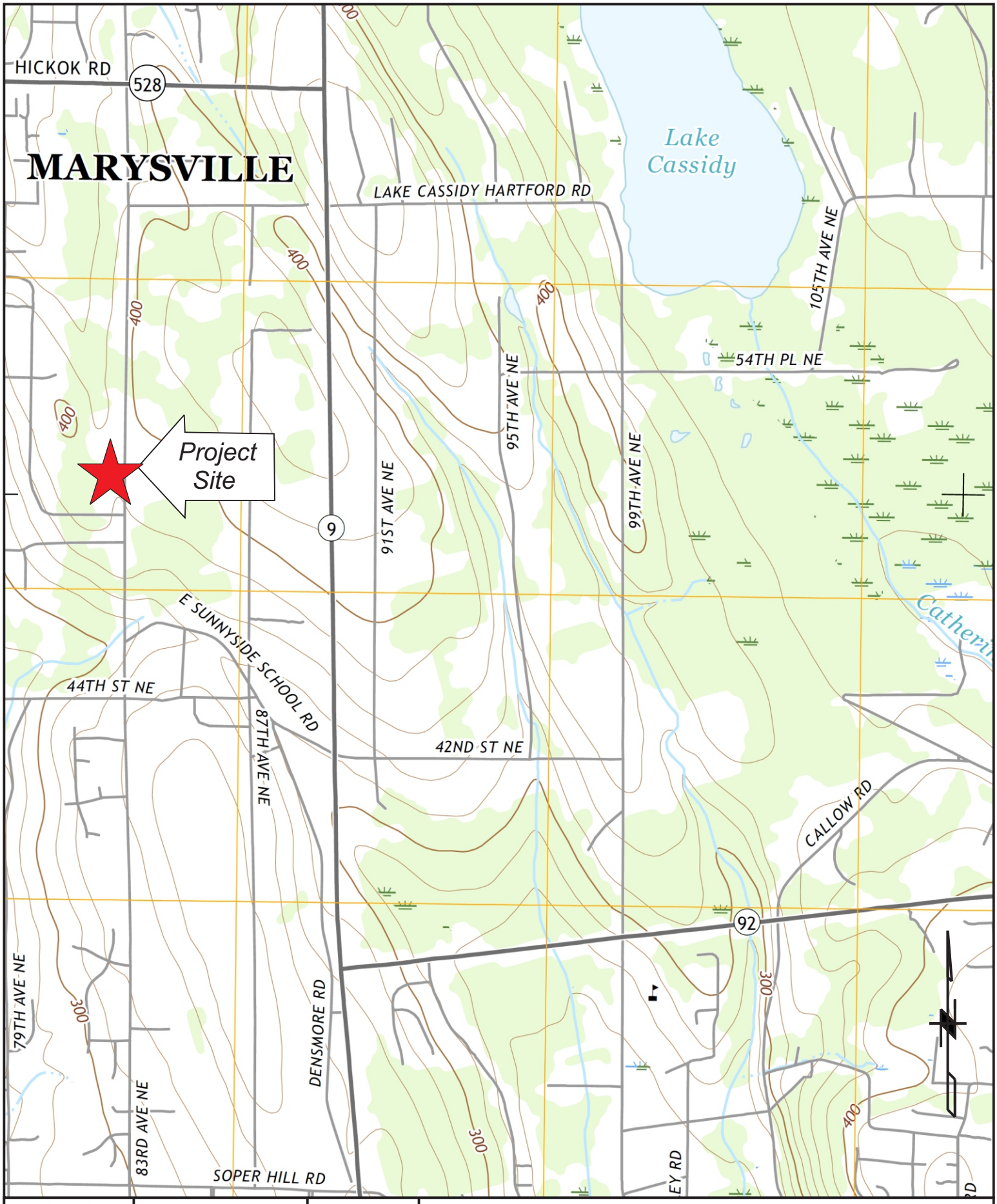

ROBINSON NOBLE	Note: Basemap taken from Lake Stevens 7.5-minute series. USGS 2017.	PM: BRP May 2021 3395-004A	Figure 1 Vicinity Map Groundhog Land Development Company, LLC: Kostenick Property

00590700008800

FOUND REBAR W/ILLEGIBLE CAP 0.1'(W) OF CORNER. END FENCE 2.2'(E) & 0.3'(S) OF CORNER

IE 12" RCP=385.48

FOUND CASED CONC. MON. W/BRASS NAIL IN CONC. DOWN 0.6'. VISITED 2.24.21

IE 12" RCP=386.88

N 89°54'58" W 619.97'

WIRE FENCE

30.00'

TP-1 P5

TP-2

TP-3

TP-4

TP-5

TP-6

TP-7

PROPANE TANK

PPM-TPM

HOUSE #5110 F.F.=395.84'

CONC.

CONC. BLOCK WALL

ASPHALT

IE 10" PVC=381.29

IE 10" PVC=381.91

GATE

CALL BOX

WETLAND 966 SF

WETLAND 8,876 SF

WETLAND 1,189 SF

WETLAND 2,865 SF

SSCO RIM=388.58

CB RIM=386.16

IE 12" CPP(SE)=382.66

SSCO RIM=385.93

82RD AVE. N.E.

SSMH RIM=384.07

IE 8" PVC(N)=375.94

IE 8" PVC(S)=375.84

2602.24' (BASIS OF BEARING)

N 00°28'54" E 325.31'

N 00°17'24" E 325.28'

LOT 105

201,846 SF

00590700010500

N 89°55'04" W 621.06'

GRAVEL

IE 12" CMP=379.21

IE 12" CPP(S)=376.82

00590700011200

LEGEND

TP-1 Number and Approximate Location of Test Pit

0 50 100

Scale 1" = 50'

ROBINSON NOBLE

Note: Basemap taken from Topographic Survey prepared by Pacific Coast Surveys, Inc. dated 3/9/2021.

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May 2021
3395-004A

Figure 2

Site Plan

Groundhog Land Development, LLC: Kostenick Property

Unified Soil Classification System

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE - GRAINED SOILS MORE THAN 50% RETAINED ON number 200 SIEVE	GRAVEL MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE - GRAINED SOILS MORE THAN 50% PASSES NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT LESS THAN 50%	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY LIQUID LIMIT 50% OR MORE	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1) Field classification is based on visual examination of soil in general accordance with ASTM D 2488-83.
2) Soil classification using laboratory tests is based on ASTM D 2487-83.
3) Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS

Dry- Absence of moisture, dusty, dry to the touch

Moist- Damp, but no visible water

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

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3395-004A

Figure 3

Unified Soil Classification System

Groundhog Land Development, LLC: Kostenick Property

Test Pit 1

Date: 2/23/2021
Logged By: BRP
Location: 5110 - 83rd Avenue NE Marysville, WA

Depth (ft.)	Soil Description	USC
0.0 - 1.2	Dark brown organic silt with roots (loose, moist) **(Duff)**	OL
1.2 - 2.0	Brown sandy silt with gravel trace roots and cobbles (medium dense, moist)	ML
2.0 - 3.5	Rust stained brownish-gray sandy silt to silty fine to coarse sand with gravel and cobbles (medium dense, moist to wet)	ML/SM
3.5 - 7.0	Brownish-gray weakly cemented sandy silt to silty fine to coarse sand with gravel and cobbles (dense to very dense, moist)	ML/SM

View of Test Pit 1

Notes

- Test pit completed at 7.0 feet
- Groundwater observed at 2.5 feet
- Samples collected at 1.0 and 4.0 feet

Tacoma
2105 South C Street
Tacoma, Washington 98402
253.475.7711

Woodinville
17625 - 130th Avenue NE, Suite 102
Woodinville, Washington 98072
425.488.0599

ROBINSON NOBLE

Kostenick Property
3395-004A
Figure 4

Test Pit 2

Date: 2/24/2021
Logged By: BRP
Location: 5110 - 83rd Avenue NE Marysville, WA

Depth (ft.)	Soil Description	USC
0.0 - 0.8	Dark brown sandy silt with organics, wood and roots (loose, moist) **(Duff)**	ML
0.8 - 2.5	Brown sandy silt with gravel trace roots and cobbles (medium dense, moist to wet)	ML
2.5 - 4.0	Rust stained brownish-gray sandy silt to silty fine to coarse sand with gravel and cobbles, banded rust mottling (medium dense to dense, moist to wet)	ML/SM
4.0 - 5.5	Brownish-gray weakly cemented sandy silt to silty fine to coarse sand with gravel and cobbles (dense to very dense, moist)	ML/SM

View of Test Pit 2

Notes

- Test pit completed at 5.5 feet
- Groundwater observed at 2.5 feet
- Samples collected at 2.0, 3.0 and 5.0 feet

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Figure 5

Test Pit 3

Date: 2/24/2021
Logged By: BRP
Location: 5110 - 83rd Avenue NE Marysville, WA

Depth (ft.)	Soil Description	USC
0.0 - 0.5	Grayish-brown silty sand with trace gravel and roots (loose, wet) **(Fill)**	SM
0.5 - 1.0	Brown sandy silt with gravel trace roots and cobbles (loose, moist to wet)	ML
1.0 - 4.0	Rust mottled brownish-gray sandy silt to fine to coarse sand with gravel (medium dense to dense, moist to wet)	ML/SM
4.0 - 5.0	Brownish-gray weakly cemented sandy silt to silty fine to coarse sand with gravel and cobbles (dense to very dense, moist)	ML/SM

View of Test Pit 3

Notes

- Test pit completed at 5.0 feet
- Groundwater observed at 0.5 and 3.0 feet
- Samples collected at 2.0 and 4.5 feet

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Figure 6

Test Pit 4

Date: 2/24/2021
Logged By: BRP

Location: 5110 - 83rd Avenue NE
Marysville, WA

Depth (ft.)	Soil Description	USC
0.0 - 0.7	Dark brown sandy silt with roots and gravel (loose, moist) **(Topsoil)**	ML
0.7 - 2.0	Brown sandy silt trace roots, gravel and cobbles (loose, moist to wet)	ML
2.0 - 3.5	Rust stained brownish-gray silty fine sand with gravel and cobbles (medium dense, moist)	SM
3.5 - 7.0	Brownish-gray layered fine to medium sand with silt, silty sand, and sandy silt trace gravel (dense, moist to wet)	SM/ML/ SP-SM

View of Test Pit 4

Notes

- Test pit completed at 7.0 feet
- Groundwater observed at 1.5 and 5.0 feet
- Sample collected at 3.5 feet

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Figure 7

Test Pit 5

Date: 2/24/2021
Logged By: BRP

Location: 5110 - 83rd Avenue NE
Marysville, WA

Depth (ft.)	Soil Description	USC
0.0 - 0.5	Dark brown sandy silt with organics, wood and roots (loose, moist) **(Duff)**	ML
0.5 - 2.0	Brown sandy silt with gravel trace roots and cobbles (medium dense, moist to wet)	ML
2.0 - 3.0	Lightly rust mottled brownish-gray sandy silt to silty fine to coarse sand with gravel and cobbles (medium dense to dense, moist)	ML/SM
3.0 - 5.5	Brownish-gray weakly cemented sandy silt to silty fine to coarse sand with gravel and and cobbles (dense to very dense, moist)	ML/SM

View of Test Pit 5

Notes

- Test pit completed at 5.5 feet
- Groundwater observed at 2.0 feet
- Sample collected at 5.0 feet

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3395-004A
Figure 8

Test Pit 6

Date: 2/24/2021
Logged By: BRP

Location: 5110 - 83rd Avenue NE
Marysville, WA

Depth (ft.)	Soil Description	USC
0.0 - 0.5	Dark brown sandy silt with organics, wood and roots (loose, moist) **(Duff)**	ML
0.5 - 1.0	Brown sandy silt with gravel trace roots and cobbles (medium dense, moist)	ML
1.0 - 3.0	Rust stained brownish-gray sandy silt to silty fine to coarse sand with gravel and cobbles (loose to medium dense, wet)	ML/SM
3.0 - 3.5	Rust mottled brownish-gray fine to medium sand trace to with silt trace gravel (dense, moist)	SP/SP-SM
3.5 - 7.0	Rust mottled brownish-gray fine to medium sand trace to with silt trace gravel (dense, wet)	SP/SP-SM

View of Test Pit 6

Notes

- Test pit completed at 7.0 feet
- Groundwater observed at 2.5 and 3.5 feet
- Samples collected at 2.5, 3.5 and 7.0 feet

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Figure 9

Test Pit 7

Date: 2/24/2021
Logged By: BRP
Location: 5110 - 83rd Avenue NE Marysville, WA

Depth (ft.)	Soil Description	USC
0.0 - 0.5	Dark brown sandy silt with organics, wood and roots (loose, moist) **(Duff)**	ML
0.5 - 1.5	Dark brown to black organic silt with roots and gravel (loose, wet)	OL
1.5 - 2.0	Brown sandy silt with gravel trace roots and cobbles (loose, wet)	ML
2.0 - 3.0	Rust stained brownish-gray sandy silt to silty fine to coarse sand with gravel and cobbles (medium dense, wet)	ML/SM

View of Test Pit 7

Notes

- Test pit completed at 3.0 feet
- Groundwater observed at 0.5 feet
- Samples collected at 1.5 and 2.5 feet

Tacoma
2105 South C Street
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ROBINSON NOBLE

Kostenick Property
3395-004A
Figure 10

WETLAND AND FISH AND WILDLIFE HABITAT ASSESSMENT REPORT

PROSPECTOR 6

MAY 2022

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

WETLAND AND FISH AND WILDLIFE HABITAT ASSESSMENT REPORT

PROSPECTOR 6

MAY 5, 2022

PROJECT LOCATION
5110 83RD AVENUE NORTHEAST
MARYSVILLE, WASHINGTON 98270

PREPARED FOR
GROUNDHOG LAND DEVELOPMENT COMPANY, LLC
505 106TH AVENUE NORTHEAST, SUITE 110
BELLEVUE, WASHINGTON 98004

PREPARED BY
SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
(253) 514-8952

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

Executive Summary

Soundview Consultants LLC (SVC) has been assisting Groundhog Land Development Company, LLC (Applicant) with a wetland and fish and wildlife habitat assessment for a proposed residential development of an approximately 4.64-acre site located at 5110 83rd Avenue Northeast in the City of Marysville, Washington. The subject property consists of one parcel situated in the Southeast ¼ of Section 35, Township 30 North, Range 5 East, W.M. (Snohomish County Tax Parcel Number 00590700010500).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species in February of 2021. Using current methodology, the site investigations identified four potentially-regulated wetlands (Wetlands A-D) on the subject property. In addition, one potentially regulated offsite wetland (Offsite Wetland E) was identified within 150 feet south of the subject property. Wetlands A, B, D, and Offsite Wetland E are classified as Category III wetlands, which are subject to standard 75-foot buffers per Marysville Municipal Code (MMC) 22E.010.100(4). Wetland C is classified as Category IV wetland and is subject to a standard 35-foot buffer. However, Wetland C may be waived from the buffer and compensation requirements if the wetland meets the criteria under MMC 22E.010.080(c), including its small size (less than 0.10-acre), low habitat functions, and isolation in the landscape. No other potentially-regulated wetlands, waterbodies, or priority species were identified within 150 feet of the subject property during the site investigation.

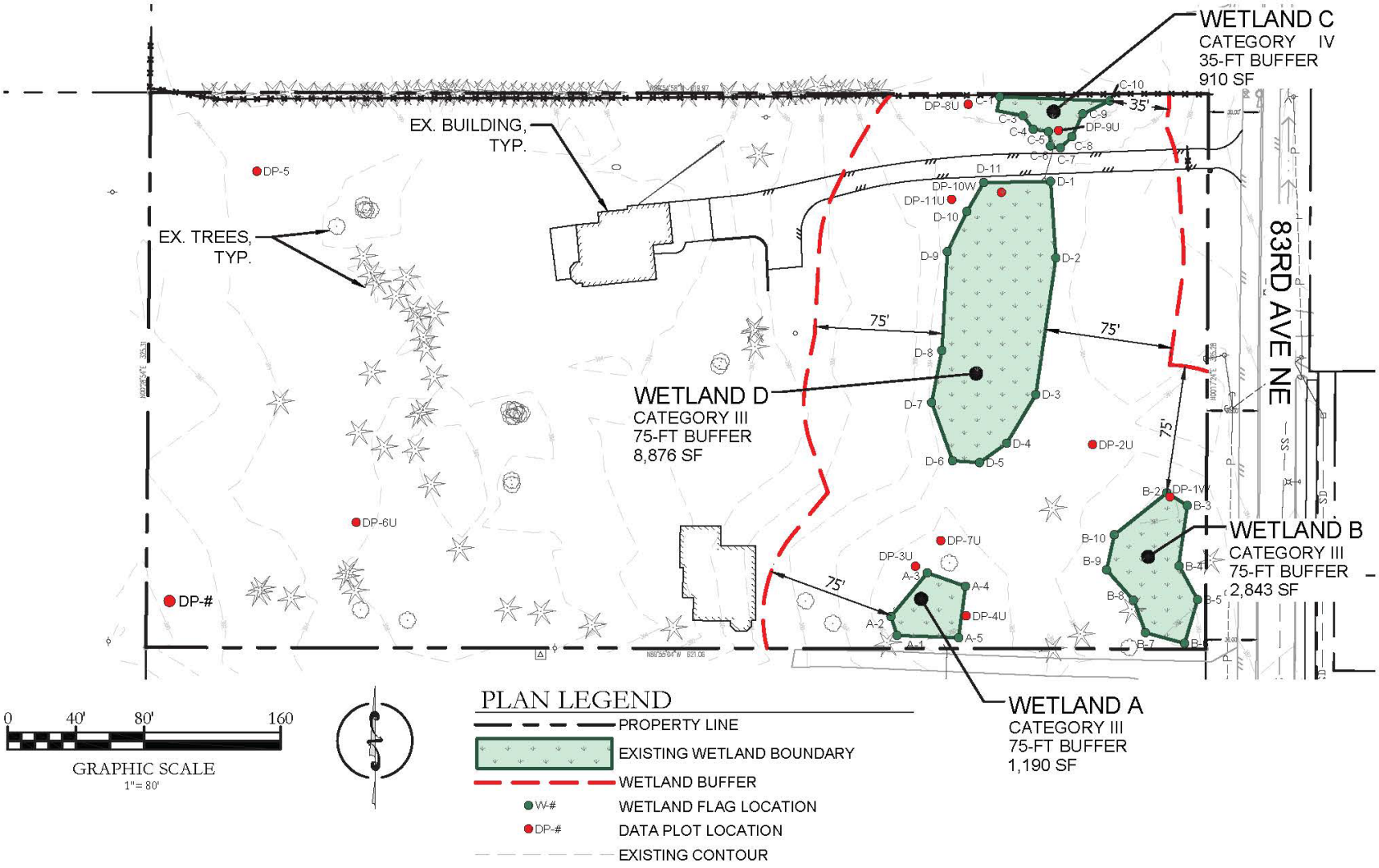
The summary table below identifies the potential regulatory status of the identified critical areas by local, state, and federal agencies.

Feature Name	Size Onsite	Category[1]	Regulated Under MMC Chapter 22E.010	Regulated Under RCW 90.48	Regulated Under Clean Water Act
Wetland A	1,190 SF	III	Yes	Yes	Potentially
Wetland B	2,843 SF	III	Yes	Yes	Potentially
Wetland C	910 SF	IV	Yes	Yes	Potentially
Wetland D	8,876 SF	III	Yes	Yes	Potentially
Offsite Wetland E	N/A	III	Yes	Yes	Potentially

Note:

1. Current Washington State Department of Ecology (WSDOE) wetland rating system (Hruby, 2014) per MMC 22E.010.060.

Site Map


WETLAND C
CATEGORY IV
35-FT BUFFER
910 SF
EX. BUILDING, TYP.
EX. TREES, TYP.
83RD AVE NE
WETLAND D
CATEGORY III
75-FT BUFFER
8,876 SF
WETLAND B
CATEGORY III
75-FT BUFFER
2,843 SF
WETLAND A
CATEGORY III
75-FT BUFFER
1,190 SF
35'
75'
DP-5
DP-6U
DP-#
DP-2U
DP-3U
DP-4U
DP-7U
DP-8U
DP-9U
DP-10W
DP-11U
DP-1W
0 40' 80' 160
GRAPHIC SCALE
1"= 80'
PLAN LEGEND
PROPERTY LINE
EXISTING WETLAND BOUNDARY
WETLAND BUFFER
W-# WETLAND FLAG LOCATION
DP-# DATA PLOT LOCATION
EXISTING CONTOUR

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Appendices

Chapter 1. Introduction

Soundview Consultants LLC (SVC) has been assisting Groundhog Land Development Company, LLC (Applicant) with a wetland and fish and wildlife habitat assessment for a proposed residential development of an approximately 4.64-acre site located at 5110 83rd Avenue Northeast in the City of Marysville, Washington. The subject property consists of one parcel situated in the Southeast ¼ of Section 35, Township 30 North, Range 5 East, W.M. (Snohomish County Tax Parcel Number 00590700010500).

The purpose of this wetland, and fish and wildlife habitat assessment is to identify the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species on or near the subject site. All project details, proposed impacts, necessary code analytics, and mitigation strategy will be outlined in a Conceptual Mitigation Plan under a separate cover.

This report provides conclusions and recommendations regarding:

- Site description and area of assessment;
- Background research and identification of potentially-regulated critical areas within the vicinity of the proposed project;
- Identification and assessment of potentially-regulated wetlands and other aquatic features;
- Identification and assessment of potentially-regulated fish and wildlife habitat;
- Existing site map detailing identified critical areas and standard buffers and setbacks; and
- Supplemental information necessary for local regulatory review.

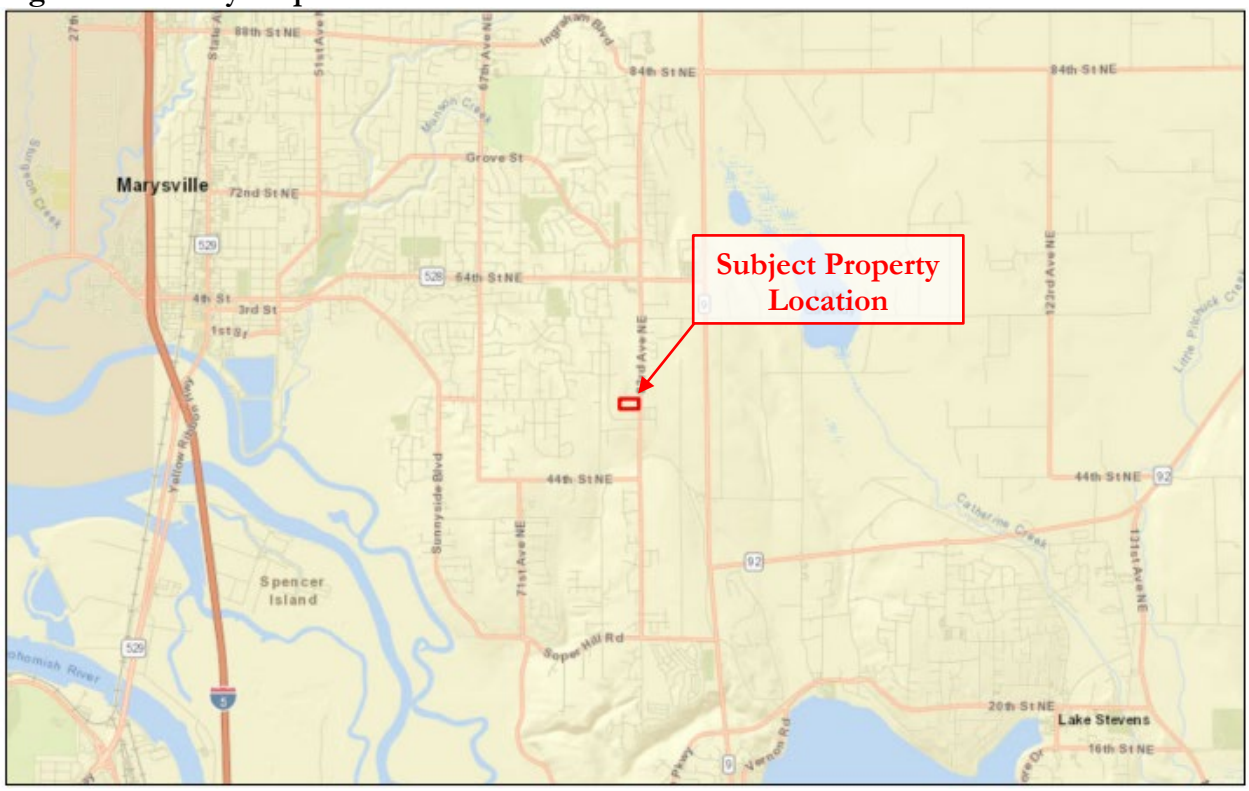
Chapter 2. Proposed Project Location

2.1 Project Location

The subject property consists of an approximately 4.64-acre site located at 5110 83rd Avenue Northeast in the City of Marysville, Washington. The subject property consists of one parcel situated in the Southeast ¼ of Section 35, Township 30 North, Range 5 East, W.M. (Snohomish County Tax Parcel Number 00590700010500).

To access the subject site from Interstate-5 North from the Everett area, take exit 199 for State Route 528 East toward Marysville. Use the right two lanes to turn right onto 4th Street and continue onto 64th Street Northeast. After 2.3 miles, turn right onto 83rd Avenue Northeast. After 0.8 mile, the subject property will be located on the right.

Figure 1. Vicinity Map.



Chapter 3. Methods

SVC investigated, delineated, and assessed any potentially regulated wetlands, waterbodies, and other fish and wildlife habitat on and within 150 feet of the subject property in February of 2021. All determinations were made using observable vegetation, hydrology, and soils in conjunction with data from the U.S. Geological Survey (USGS) topographic maps, National Resource Conservation Service (NRCS) soil survey, Snohomish County and City of Marysville Geographic Information Systems (GIS) data, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI), Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) and SalmonScape mapping tools, Washington State Department of Natural Resources (DNR) water typing system, and various orthophotographic resources (Appendix B). Appendix A contains further details for the methods and tools used to prepare this report.

Wetlands, streams, and select fish and wildlife habitats and species are regulated features per Marysville Municipal Code (MMC) Chapter 22E.010 Critical Areas Management and subject to restricted uses/activities under the same title. Wetland boundaries were determined in accordance with MMC 22E.010.060(1) and using the routine approach described in the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and modified according to the guidelines established in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE, 2010) and *Field Indicators of Hydric Soils in the United States* (NRCS, 2018). Qualified wetland scientists marked the boundary of the onsite wetland with orange surveyor's flagging labeled alpha-numerically and tied to 3-foot lath or vegetation along the wetland boundaries. Pink surveyor's flagging was labeled alpha-numerically and tied to 3-foot lath or vegetation at formal sampling locations to mark the points where detailed data was collected (DP-1 to DP-9). Additional tests pits were excavated at regular intervals inside and outside of the wetland boundaries to further confirm the delineations. Offsite wetlands were not flagged but rather estimated based on offsite observations coupled with aerial imagery and topographic data.

Wetlands were classified using both the hydrogeomorphic (Brinson, 1993) and Cowardin (Cowardin, 1979; Federal Geographic Data Committee, 2013) classification systems. Following classification and assessment, the wetland was rated and categorized using the *Washington State Wetlands Rating System for Western Washington—Washington Department of Ecology, 2014, Publication No. 04-06-029,* per MMC 22E.010.060.

The fish and wildlife habitat assessment was conducted during the same site visits by qualified fish and wildlife biologists. The experienced biologists made visual and auditory observations using stationary and walking survey methods for both aquatic and upland habitats noting any special habitat features and direct and indirect signs of fish and wildlife activity (e.g. nesting, foraging, and migration/movement). Special attention was given to assessing the presence of critical fish and wildlife species outlined under MMC 22E.010.170(1) and species of local importance per MMC 22E.010.170(2).

Chapter 4. Existing Conditions

4.1 Landscape Setting

The subject property is located in a residential setting in the City of Marysville (Figure 2). The subject property is currently developed with a single-family residence and associated infrastructure including a barn, paved driveway, and maintained lawn; the remainder of the site is otherwise undeveloped forest. The subject property abuts single-family residences to the north and south, a utility corridor to the west, 83rd Avenue Northeast to the east. Topography onsite is generally flat, with elevations ranging between approximately 395 feet above mean sea level (amsl) to 380 feet amsl. A Snohomish County contours map is provided in Appendix B1.

Figure 2. Aerial Image of the Subject Property.

4.2 Soils

The NRCS Soil Survey of Snohomish County, Washington identifies one soil series on the subject property: Tokul gravelly medial loam, 0 to 8 percent slopes. A soil map is provided in Appendix B2. Below is a detailed description of the soil profile.

Tokul gravelly medial loam, 0 to 8 percent slopes (72)
According to the NRCS survey, Tokul gravelly medial loam, 0 to 8 percent slopes is a moderately well drained soil formed in glacial till and volcanic ash. In a typical profile, the surface layer is approximately 4 inches thick and is a dark brown gravelly loam. From 4 to 22 inches the subsoil is a brown, strong brown and dark yellowish-brown gravelly loam. From 22 to 31 inches the soil is light olive brown

gravelly fine sandy loam. A hard pan is present at a depth of approximately 31 inches. Tokul gravelly medial loam, 0 to 8 percent slopes is listed as a non-hydric soil (NRCS, N.d.), but mapped areas may contain up to 5 percent of hydric inclusions of McKenna or Norma soils.

4.3 Vegetation

General upland forested vegetation on the subject property consists of a canopy dominated by Douglas fir (*Pseudotsuga menziesii*), bigleaf maple (*Acer macrophyllum*), and red alder (*Alnus rubra*) with an understory dominated by salmonberry (*Rubus spectabilis*), non-native invasive Himalayan blackberry (*Rubus armeniacus*), trailing blackberry (*Rubus ursinus*), and non-native invasive English ivy (*Hedera helix*).

4.4 Critical Area Inventories

The USFWS NWI map (Appendix B3), Snohomish County Stream and Wetland Inventory (Appendix B4), and City of Marysville Critical Areas map (Appendix B5) identify a potential wetland on the eastern portion of the subject property. The WDFW PHS map (Appendix B6) identifies a potential offsite to the north within 150 feet of the subject property. The WDFW SalmonScape map (Appendix B7) and DNR stream typing map (Appendix B8) do not identify any streams or fish presence on or in the vicinity of the subject property. No other potential wetlands, waterbodies, or priority habitats or species are documented on or within 150 feet of the subject property.

4.5 Precipitation

Precipitation data was acquired from the National Oceanic and Atmospheric Administration (NOAA) station at SeaTac International Airport in order to obtain percent of normal precipitation for the general Puget Sound region during and preceding the investigation. A summary of data collected is provided in Table 1.

Table 1. Precipitation Summary[1]

Date	Day Of	Day Before	1 Week Prior	2 Weeks Prior	30 Days Prior (Observed/Normal)	Year to Date (Observed/Normal)[2]	Percent of Normal[3]
2/2/2021	0.61	0.88	2.29	2.51	8.11/5.69	25.05/22.02	143/114

Notes:
1. Precipitation levels provided in inches. Data obtained from NOAA (http://w2.weather.gov/climate/xmacis.php?wfo=sew) for SeaTac International Airport.
2. Year-to-date precipitation is for the 2020/2021 water year from October 1 to the onsite date.
3. Percent of normal is shown for the last 30 days and the 2019/2020 water year to date.

Precipitation levels during the February 2021 site investigation were above normal for the prior 30 days (143 percent of normal) and within the normal range for the 2020/2021 water year (114 percent of normal). This precipitation data suggests that hydrologic conditions encountered may have been slightly wetter than normal. Such conditions were considered in making professional wetland boundary determinations.

Chapter 5. Results

The February of 2021 site investigation identified four potentially-regulated wetlands (Wetlands A-D) on the subject property. In addition, one potentially regulated offsite wetland (Offsite Wetland E) was identified within 150 feet south of the subject property. No other potentially-regulated wetlands, waterbodies, or priority species were identified within 150 feet of the subject property during the site investigation.

5.1 Wetlands

5.1.1 Overview

The five identified wetlands contained a predominance of hydrophytic vegetation, hydric soils (presumed for Offsite Wetland E), and indicators of wetland hydrology according to current wetland delineation methodology. Data forms are provided in Appendix E; wetland rating forms are provided in Appendix F; and wetland rating maps are provided in Appendix G. Table 2 summarizes the wetlands identified during the site investigation.

Table 2. Wetland Summary

Wetland	Predominant Wetland Classification / Rating				Onsite Size (square feet)	Buffer Width (feet)[5]
	Cowardin[1]	HGM[2]	WSDOE[3]	City of Marysville[4]		
A	PSS/EMC	Depressional	III	III	1,190 SF	75
B	PFO/SSC	Depressional	III	III	2,840 SF	75
C	PEMA	Depressional	IV	IV	910 SF	35
D	PFO/EMAH	Depressional	III	III	8,880 SF	75
Offsite E	PEMC	Depressional	III	III	N/A	75

Notes:

1. Cowardin et al. (1979); Federal Geographic Data Committee (2013); class based on vegetation: PFO = Palustrine Forested; PSS = Palustrine Scrub-Shrub, PEM = Palustrine Emergent; Modifiers for Water Regime: A = Temporarily Flooded; C = Seasonally Flooded; H = Permanently Flooded.
2. Brinson, M. M. (1993).
3. Current WSDOE wetland rating system for Western Washington (Hruby, 2014).
4. MMC 22E.010.060(1) wetland definitions.
5. MMC 22E.010.100(4) wetland buffer standards.

Wetland A

Wetland A is approximately 1,190 square feet (0.03 acre) in size onsite and is located on the southeast portion of the subject property, extending slightly offsite to the south. Hydrology for Wetland A is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table. Wetland vegetation is dominated by red alder, salmonberry, fringed willowherb (*Epilobium ciliatum*), trailing blackberry, and creeping buttercup (*Ranunculus repens*). Wetland A is a Palustrine Scrub-Shrub/Emergent, Seasonally Flooded (PEMC) wetland. Per MMC 22E.010.060(1), Wetland A is a Category III depressional wetland. Table 3 summarizes Wetland A.

Wetland B

Wetland B is approximately 2,840 square feet (0.07 acre) in size onsite and is located on the southeastern portion of the subject property. Hydrology for Wetland B is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table. Wetland vegetation is dominated by red alder, salmonberry, non-native invasive Himalayan blackberry, and

sword fern. Wetland B is a Palustrine Forested/Scrub-Shrub, Seasonally Flooded (PSS/EMC) wetland. Wetland B is a Category III depressional wetland. Table 4 summarizes Wetland B.

Wetland C

Wetland C is approximately 910 square feet (0.02 acre) in size onsite and is located on the northeastern portion of the subject property. Hydrology for Wetland C is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table. Wetland vegetation is dominated by non-native reed canarygrass. Wetland C is a Palustrine Emergent, Temporarily Flooded (PEMA) wetland. Wetland C is a Category IV depressional wetland. Table 5 summarizes Wetland C.

Wetland D

Wetland D is approximately 8,880 square feet (0.20 acre) in size onsite and is located on the eastern portion of the subject property. Hydrology for Wetland D is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table. Wetland vegetation is dominated western red cedar (*Thuja plicata*), red alder, salmonberry, and Kentucky bluegrass. Wetland D is a Palustrine Forested/Emergent, Temporarily Flooded and Permanently Flooded (PFO/EMAH) wetland. Wetland D is a Category III depressional wetland. Table 6 summarizes Wetland D.

Offsite Wetland E

Offsite Wetland E is located entirely offsite, approximately 40 feet south of the subject property. Hydrology for Offsite Wetland E is likely provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table. Wetland vegetation observed was primarily Kentucky bluegrass and creeping buttercup. Offsite Wetland E is a Palustrine Emergent, Seasonally Flooded (PEMC) wetland. Offsite Wetland E is a Category III depressional wetland. Due to the wetland's offsite location, no detailed table is provided.

Table 3. Wetland A Summary

<table>
<tr><th colspan="3">WETLAND A – INFORMATION SUMMARY</th></tr>
<tr><td>Location:</td><td colspan="2">Located on the southeast portion of the subject property.</td></tr>
<tr><td colspan="2">  </td><td>
<table>
<tr><td>Local Jurisdiction</td><td>City of Marysville</td></tr>
<tr><td>WRIA</td><td>7 – Snohomish</td></tr>
<tr><td>WSDOE Rating (Hruby, 2014)</td><td>III</td></tr>
<tr><td>City of Marysville Rating</td><td>III</td></tr>
<tr><td>City of Marysville Buffer Width</td><td>75 feet</td></tr>
<tr><td>Wetland Size</td><td>1,190 SF</td></tr>
<tr><td>Cowardin Classification</td><td>PSS/EMC</td></tr>
<tr><td>HGM Classification</td><td>Depressional</td></tr>
<tr><td>Wetland Data Sheet(s)</td><td>DP-4W</td></tr>
<tr><td>Upland Data Sheet(s)</td><td>DP-3U, DP-7U</td></tr>
<tr><td>Boundary Flag color</td><td>Orange</td></tr>
</table>
</td></tr>
<tr><td>Dominant Vegetation</td><td colspan="2">Wetland vegetation is dominated by red alder, salmonberry, fringed willowherb, trailing blackberry, and creeping buttercup.</td></tr>
<tr><td>Soils</td><td colspan="2">Hydric soil indicators A11 (Depleted Below Dark Surface) and F3 (Depleted Matrix) were observed.</td></tr>
<tr><td>Hydrology</td><td colspan="2">Hydrology for Wetland A is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table.</td></tr>
<tr><td>Rationale for Delineation</td><td colspan="2">Wetland boundaries were determined by slight topographic drop and a transition to a hydrophytic plant community.</td></tr>
<tr><td>Rationale for Local Rating</td><td colspan="2">Local rating is based upon Hruby (2014) rating system per MMC 22E.010.060(1).</td></tr>
<tr><th colspan="3">Wetland Functions Summary</th></tr>
<tr><td>Water Quality</td><td colspan="2">Wetland A has moderate potential to improve water quality due to the presence of an intermittent outlet, seasonal ponding in less than half of the unit to trap and filter pollutants, its proximity to land use that generates pollutants, and the presence of water quality issues within the sub-basin and watershed. Wetland A's score for Water Quality function is moderate (7).</td></tr>
<tr><td>Hydrologic</td><td colspan="2">Wetland A has moderate potential to provide hydrologic function due to the presence of an intermittent outlet, moderate flood storage depth, proximity to land uses that generate pollutants, and the presence of flooding problems downgradient. However, these functions are limited due to the units' minimal contribution to storage in the watershed. Wetland A's score for Hydrologic function is low (5).</td></tr>
<tr><td>Habitat</td><td colspan="2">Wetland A provides limited potential to provide habitat functions due to the lack of habitat complexity, low habitat interspersion and minimal accessible habitat within the highly developed surrounding landscape. However, the wetland does contain special habitat features and WDFW priority habitats. Wetland A's score for Habitat function is low (4).</td></tr>
<tr><td>Buffer Condition</td><td colspan="2">The majority of the onsite buffer surrounding Wetland A is relatively intact with native vegetation.</td></tr>
</table>

Table 4. Wetland B Summary

WETLAND B – INFORMATION SUMMARY			
Location:	Located on the southeastern portion of the subject property.		
		**Local Jurisdiction**	City of Marysville
		WRIA	7 – Snohomish
		WSDOE Rating (Hruby, 2014)	III
		City of Marysville Rating	III
		City of Marysville Buffer Width	75 feet
		Wetland Size	2,840 SF
		Cowardin Classification	PFO/SSC
		HGM Classification	Depressional
		Wetland Data Sheet(s)	DP-1W
		Upland Data Sheet(s)	DP-2U
		Boundary Flag color	Orange
Dominant Vegetation	Wetland vegetation is dominated by red alder, salmonberry, non-native invasive Himalayan blackberry, and sword fern.		
Soils	Hydric soil indicator F3 (Depleted Matrix) was observed.		
Hydrology	Hydrology for Wetland B is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table.		
Rationale for Delineation	Wetland boundaries were determined by transition to a hydrophytic plant community and wetland hydrology.		
Rationale for Local Rating	Local rating is based upon Hruby (2014) rating system per MMC 22E.010.060(1).		
Wetland Functions Summary			
Water Quality	Wetland B has moderate potential to improve water quality due to no outlet, presence of persistent, ungrazed plants and seasonal ponding in less than half of the unit, proximity to land uses that generate pollutants, and the presence of water quality issues within the sub-basin and watershed. Wetland B's score for Water Quality function is moderate (7).		
Hydrologic	Wetland B has moderate potential to provide hydrologic function due no outlet, moderate flood storage depth, proximity to land uses that generate pollutants, and presence of flooding problems down-gradient. However, these functions are limited due to the units' small size relative to the contributing basin. Wetland B's score for Hydrologic function is moderate (5).		
Habitat	Wetland B provides potential for habitat functions due to the presence of two Cowardin classes and multiple special habitat features and WDFW priority habitats which increases habitat suitability and complexity. However, these functions are limited due to the low habitat interspersion and minimal accessible habitat within the highly developed surrounding landscape. Wetland B's score for Habitat function is low (4).		
Buffer Condition	The majority of the buffer surrounding Wetland B is intact with native vegetation; however, it is within close proximity to 83rd Avenue Northeast.		

Table 5. Wetland C Summary

WETLAND C – INFORMATION SUMMARY			
Location:	Located on the northeastern portion of the subject property.		
		**Local Jurisdiction**	City of Marysville
		WRIA	7 – Snohomish
		WSDOE Rating (Hruby, 2014)	IV
		City of Marysville Rating	IV
		City of Marysville Buffer Width	35 feet
		Wetland Size	910 SF
		Cowardin Classification	PEMA
		HGM Classification	Depressional
		Wetland Data Sheet(s)	DP-9W
		Upland Data Sheet(s)	DP-8U
		Boundary Flag color	Orange
Dominant Vegetation	Wetland vegetation is dominated by Kentucky bluegrass, creeping buttercup, and non-native reed canarygrass.		
Soils	Hydric soil indicator A11 (Depleted Below Dark Surface) and F6 (Redox Dark Surface) were observed.		
Hydrology	Hydrology for Wetland A is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table.		
Rationale for Delineation	Wetland boundaries were determined by slight topographic drop and a transition to a hydrophytic plant community.		
Rationale for Local Rating	Local rating is based upon Hruby (2014) rating system per MMC 22E.010.060(1).		
Wetland Functions Summary			
Water Quality	Wetland C has moderate potential to improve water quality due to the presence of an intermittent outlet, seasonal ponding in over half of the unit to trap and filter pollutants, its proximity to land use that generates pollutants, and the presence of water quality issues in the sub-basin and watershed. However, these functions are limited due to the minimal amount of persistent, ungrazed vegetation and lack of seasonal ponding to trap and filter pollutants. Wetland C's score for Water Quality functions is moderate (6).		
Hydrologic	Wetland C has moderate potential to provide hydrologic function due to the presence of intermittent outlet, proximity to land uses that generate pollutants, and presence of flooding problems down-gradient. However, these functions are limited due to the units' lack of flood storage and small size relative to the contributing basin. Wetland C's score for Hydrologic functions is low (5).		
Habitat	Wetland C provides limited potential for habitat functions due to the lack of habitat complexity, low habitat interspersion, and minimal accessible habitat within the highly developed surrounding landscape. Wetland C's score for Habitat function is low (3).		
Buffer Condition	The majority of the buffer surrounding Wetland C is degraded due to the maintained lawn surrounding the unit and a paved driveway south of the unity.		

Table 6. Wetland D Summary

WETLAND C – INFORMATION SUMMARY			
Location:	Located on the eastern portion of the subject property.		
		**Local Jurisdiction**	City of Marysville
		WRIA	7 – Snohomish
		WSDOE Rating (Hruby, 2014)	III
		City of Marysville Rating	III
		City of Marysville Buffer Width	75 feet
		Wetland Size	8,880 SF
		Cowardin Classification	PFO/EMCH
		HGM Classification	Depressional
		Wetland Data Sheet(s)	DP-10W
		Upland Data Sheet(s)	DP11U
		Boundary Flag color	Orange
Dominant Vegetation	Wetland vegetation is dominated western red cedar, red alder, salmonberry, and Kentucky bluegrass.		
Soils	Hydric soil indicator F3 (Depleted Matrix) was observed.		
Hydrology	Hydrology for Wetland A is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table.		
Rationale for Delineation	Wetland boundaries were determined by slight topographic drop and a transition to a hydrophytic plant community.		
Rationale for Local Rating	Local rating is based upon Hruby (2014) rating system per MMC 22E.010.060(1).		
Wetland Functions Summary			
Water Quality	Wetland D has moderate potential to improve water quality due to presence of an intermittent outlet, proximity to land uses that generate pollutants, and the presence of water quality issues in the sub-basin and watershed. However, these functions are limited due to lack of seasonal ponding. Wetland D's score for Water Quality function is moderate (6).		
Hydrologic	Wetland D has moderate potential to provide hydrologic function due to the presence of an intermittent outlet, moderate flood storage depth, proximity to land uses that generate pollutants, and presence of flooding problems down-gradient. However, these functions are limited due to the units' small size relative to the contributing basin. Wetland D's score for Hydrologic function is moderate (6).		
Habitat	Wetland D provides potential for habitat functions due to the two Cowardin classes and presence of special habitat features and WDFW priority habitats, which increases habitat suitability and complexity. However, these functions are limited due to the low habitat interspersion and minimal accessible habitat within the highly developed surrounding landscape. Wetland D's score for Habitat function is low (4).		
Buffer Condition	The majority of the buffer surrounding Wetland D is partially degraded to the maintained lawn west of the unit and a paved driveway north of the unit. The eastern and southern portions of the buffer contain relatively intact native vegetation.		

5.2 Fish and Wildlife Habitat Assessment

Per MMC 22E.010.170(1), primary fish and wildlife habitat conservation areas include species federally listed as threatened, endangered, and candidate species and state designated sensitive, threatened, and endangered species; state designated priority habitats and areas that are associated species with listed species previously described; and species and habitats of local importance as outlined under MMC 22E.010.170(2). The landscape surrounding the subject property review area consists primarily of residential development with limited accessible suitable habitat. No evidence of critical fish or wildlife habitats or species direct or indirect use were observed after walking several transects throughout the site. Therefore, no primary associated areas of critical species were identified that would designate part of the site as a fish and wildlife habitat conservation area per MMC 22E.010.170.

Chapter 6. Regulatory Considerations

The February of 2021 site investigation identified four potentially-regulated wetlands (Wetlands A-D) on the subject property. In addition, one potentially regulated offsite wetland (Offsite Wetland E) was identified within 150 feet south of the subject property. No other potentially-regulated wetlands, waterbodies, or priority species were identified within 150 feet of the subject property during the site investigation.

6.1 Local Considerations

6.1.1 Buffer Standards

MMC 22E.010.060(1) has adopted the current wetland rating system (Hruby, 2014). Category III wetlands generally provide a moderate level of function, have usually been disturbed in some way, and are often less diverse and/or more isolated in the landscape than Category II wetlands. Category III wetlands score between 16 and 19 points on the *Revised Washington State Wetland Rating System for Western Washington* (Hruby, 2014). Category IV wetlands generally provide low levels of function; they are often heavily disturbed, smaller, and/or more isolated in the landscape than Category I, II, or III wetlands. Category IV wetlands provide low levels of functions and score less than 16 points.

Wetlands A, B, D, and Offsite Wetland E are classified as Category III wetlands, which are subject to standard 75-foot buffers per MMC 22E.010.100(4). Wetland C is classified as Category IV wetland and is subject to a standard 35-foot buffer. However, Wetland C may be waived from the buffer and compensation requirements if the wetland meets the criteria under MMC 22E.010.080(c), including its small size (less than 0.10-acre), low habitat functions, and isolation in the landscape. An additional 15-foot building setback is also required from the outer edge of all critical area buffers or from the outer edge of all critical areas, when no buffer is required per MMC 22E.010.380.

6.2 State and Federal Considerations

In a December 2, 2008 memorandum from the Environmental Protection Agency (EPA) and USACE, joint guidance is provided that describes waters that are to be regulated under section 404 of the CWA (USACE, 2008). This memorandum was amended on February 2, 2012 where the EPA and USACE issued a final guidance letter on waters protected by the CWA.

The 2012 guidance describes the following waters where jurisdiction would be asserted: 1) traditional navigable waters, 2) interstate waters, 3) wetlands adjacent to traditional navigable waters, 4) non-navigable tributaries of traditional navigable waters that are relatively permanent meaning they contain water at least seasonally (e.g. typically three months and does not include ephemeral waters), and 5) wetlands that directly abut permanent waters. The regulated waters are those associated with naturally occurring waters and water courses and not artificial waters (i.e. stormwater pond outfalls).

The 2012 memorandum further goes on to describe waters where jurisdiction would likely require further analysis: 1) Tributaries to traditional navigable waters or interstate waters, 2) Wetlands adjacent to jurisdictional tributaries to traditional navigable waters or interstate waters, and 3) Waters that fall under the "other waters" category of the regulations.

In addition, the 2012 guidance identifies thirteen waters or areas where jurisdiction will not be asserted: 1) Wet areas that are not tributaries or open waters and do not meet the agencies regulatory definition of "wetlands", 2) Waters excluded from coverage under the CWA by existing regulations, 3) Waters that lack a "significant nexus: where one is required for a water to be jurisdictional, 4) Artificially irrigated areas that would revert to upland if the irrigation ceased, 5) Artificial lakes or ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing, 6) Artificial reflecting pools or swimming pools excavated in uplands, 7) Small ornamental waters created by excavating and/or diking dry land to retain water for primarily aesthetic reasons, and puddles, 8) Water-filled depressions created incidental to construction activity, 9) Groundwater, including groundwater drained through subsurface drainage systems, 10) Erosional features (gullies and rills), 11) Non-wetland swales, 12) Ditches that are excavated wholly in uplands, drain only uplands or non-jurisdictional waters, and have no more than ephemeral flow, and 13) Ditches that do not contribute flow, either directly or through other waterbodies, to a traditional navigable water, interstate water, or territorial sea.

Wetlands A – B and Offsite Wetland E appear insolated in nature with no surface water connections and/or potential significant nexus to any jurisdictional waters. Wetland D flows both north and south into Wetlands A and C. Wetland C continues north through a culvert, flowing into a stormwater pond located north of the subject property. The pond does not provide surface water connections to any jurisdictional waters. As such, the identified wetlands are potentially not regulated by the USACE. However, all identified wetlands are considered natural waters and are regulated by the WSDOE through the Revised Code of Washington (RCW) 90.48.

Chapter 7. Closure

The findings and conclusions documented in this assessment report have been prepared for specific application to this project. These findings and conclusions have been developed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. The conclusions and recommendations presented in this assessment report are professional opinions based on an interpretation of information currently available to us and are made within the operation scope, budget, and schedule of this project. No warranty, expressed or implied, is made. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this assessment may need to be revised wholly or in part in the future.

Wetland status and boundaries identified by SVC are based on conditions present at the time of the site visit and considered preliminary until the flagged wetland boundaries are validated by the jurisdictional agencies. Validation of the wetland and jurisdictional status of such features by the regulatory agencies provides a certification, usually written, that the wetland determination and boundaries verified are the units that will be regulated by the agencies until a specific date or until the regulations are modified. Only the regulatory agencies can provide this certification.

As wetlands are dynamic communities affected by both natural and human activities, changes in boundaries may be expected; therefore, delineations cannot remain valid for an indefinite period of time. Regulatory agencies typically recognize the validity of wetland delineations for a period of 5 years after completion of an assessment report. Development activities on a site five years after the completion of this assessment report may require reassessment of the wetland boundaries. In addition, changes in government codes, regulations, or laws may occur. Due to such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

Chapter 8. References

Brinson, M. M. 1993. *A hydrogeomorphic classification for wetlands, Technical Report WRP-DE-4*. U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.

Cowardin, L.M. V. Carter, F. Golet, and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service. Washington D.C.

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Appendix A — Methods and Tools

Table A1. Methods and tools used to prepare the report.

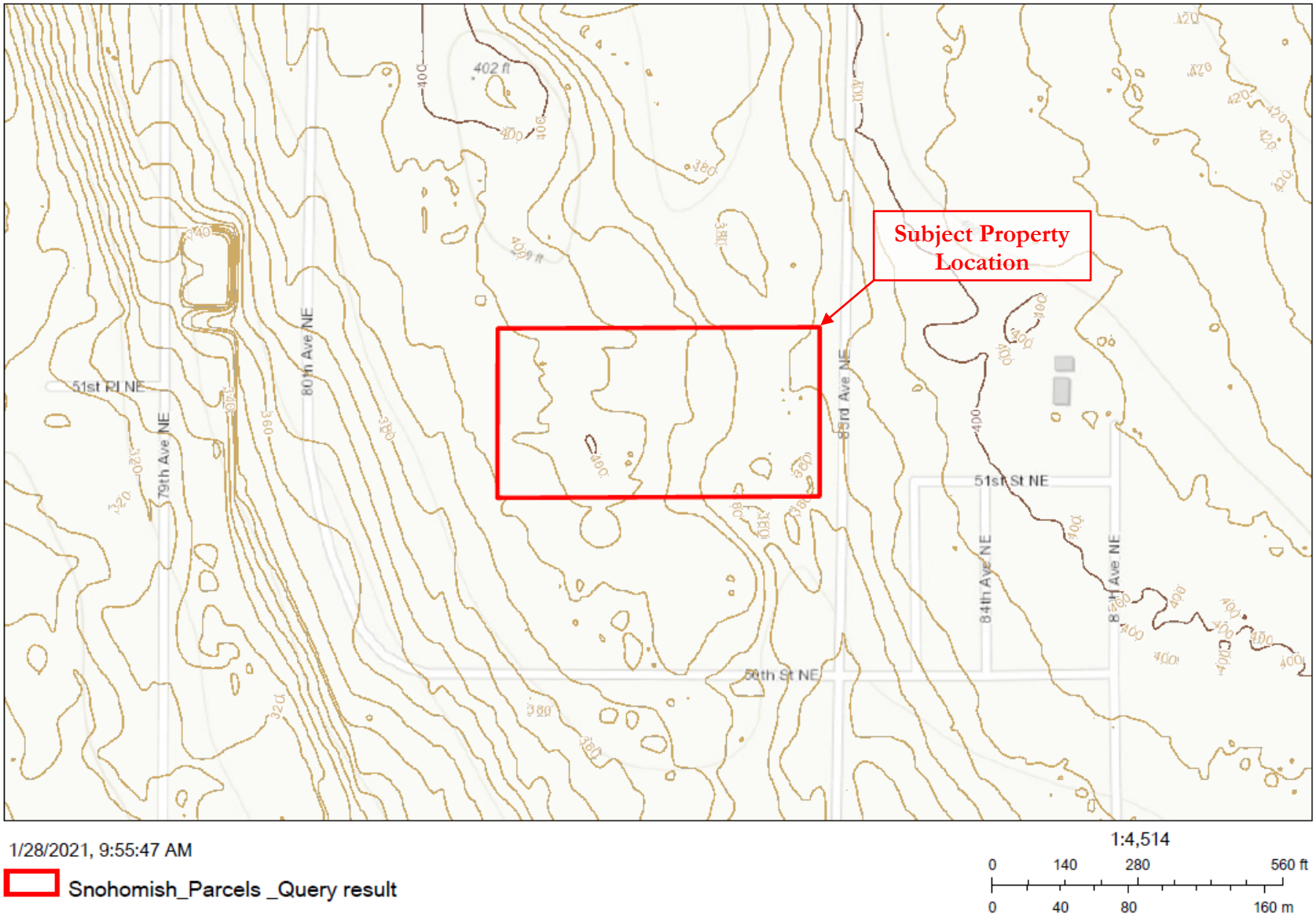
Parameter	Method or Tool	Website	Reference
Wetland Delineation	USACE 1987 Wetland Delineation Manual	http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf	**Environmental Laboratory.** 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
	Western Mountains, Valleys, and Coast Region Regional Supplement	http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/west_mt_finalsupp.pdf	**U.S. Army Corps of Engineers.** 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
Wetland Classification	USFWS / Cowardin Classification System	http://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf https://www.fgdc.gov/standards/projects/wetlands/nvcs-2013	**Cowardin**, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. Government Printing Office, Washington, D.C. **Federal Geographic Data Committee.** 2013. Classification of Wetlands and Deepwater Habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.
	Hydrogeomorphic Classification (HGM) System	http://el.erdc.usace.army.mil/wetlands/pdfs/wrpde4.pdf	**Brinson**, M. M. (1993). "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
Wetland Rating	Washington State Wetland Rating System	http://www.ecy.wa.gov/biblio/0406025.html	**Hruby, T**. 2014. Washington State wetland rating system for western Washington –Revised. Publication # 04-06-025.
Wetland Indicator Status	2016 National Wetland Plant List	https://www.fws.gov/wetlands/documents/National-Wetland-Plant-List-2016-Wetland-Ratings.pdf	**U.S. Army Corps of Engineers.** 2018. National Wetland Plant List, version 3.4.
Plant Names and Identification	USDA Plant Database	http://plants.usda.gov/	Website.
	Flora of the Pacific Northwest	http://www.pnwherbaria.org/florapnw.php	**Hitchcock**, C.L. & A. Cronquist, Ed. by D. Giblin, B. Ledger, P. Zika, and R. Olmstead. 2018. Flora of the Pacific Northwest, 2nd Edition. U.W. Press and Burke Museum. Seattle, Washington.
Soils Data	NRCS Soil Survey	http://websoilsurvey.nrcs.usda.gov/app/	Website GIS data based upon: Debose, Alfonso and M. W. Klungland. 1983. Soil Survey of Snohomish County Area, Washington. Soil Conservation Service United States Department of Agriculture, Soil Conservation Service, in cooperation with the

Parameter	Method or Tool	Website	Reference
			Washington Agricultural Experiment Station. Natural Resource Conservation Service.
	Soil Color Charts		**Munsell®** Color. 2000. Munsell® Soil Color Charts. New Windsor, New York.
	Soil Data Access Hydric Soils List	https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1316620.html	**Natural Resources Conservation Service.** N.d. Soil Data Access Hydric Soils List (Soil Data Access Live).
	Field Indicators of Hydric Soils	https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_053171.pdf	**NRCS.** 2018. *Field Indictors of Hydric Soils in the United States, Version 8.2. L.M. Vasialas, G.W. Hurt, and C.V. Noble (eds.).* USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.
Threatened and Endangered Species	Washington Natural Heritage Program	http://data-wadnr.opendata.arcgis.com/datasets/wnhp-current-element-occurrences	**Washington Natural Heritage Program**. Endangered, threatened, and sensitive plants of Washington. Washington State Department of Natural Resources, Washington Natural Heritage Program, Olympia, WA
	Washington Priority Habitats and Species	http://wdfw.wa.gov/hab/phspage.htm	**Priority Habitats and Species (PHS) Program** Map of priority habitats and species in project vicinity. Washington Department of Fish and Wildlife.
Species of Local Importance	WDFW GIS Data	http://wdfw.wa.gov/mapping/salmonscape/	Website
Report Preparation	Marysville Municipal Code	https://www.codepublishing.com/WA/Marysville#!/html/Marysville22E/Marysville22E010.html	MMC Chapter 22E.010 – Critical Areas Management

Appendix B — Background Information

This Appendix includes a Snohomish County Contours Map (B1); NRCS Soil Survey Map (B2); USFWS NWI Map (B3); Snohomish County Stream and Wetland Inventory (B4); City of Marysville Critical Areas Map (B5); WDFW PHS Map (B6); WDFW SalmonScape Map (B7); and DNR Stream Typing Map (B8).

Appendix B1 — Snohomish County Contours Map



Appendix B2 — NRCS Soil Survey Map

Appendix B3 — USFWS NWI

1/28/2021, 10:08:07 AM

Snohomish_Parcels _Query result

Wetlands

Estuarine and Marine Deepwater

Estuarine and Marine Wetland

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Other

1:4,514

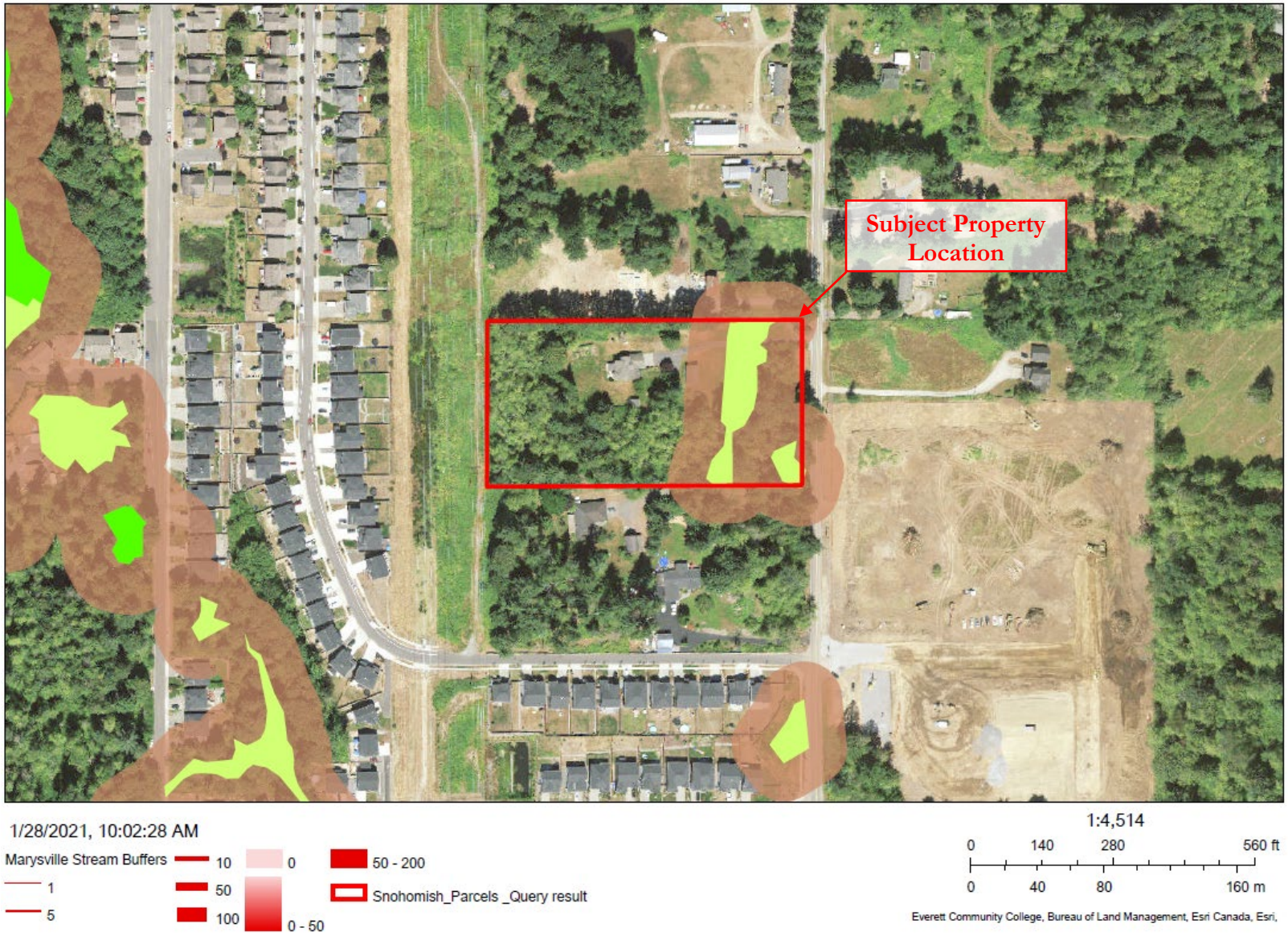
0 140 280 560 ft

0 40 80 160 m

U.S. Fish and Wildlife Service, National Standards and Support Team,

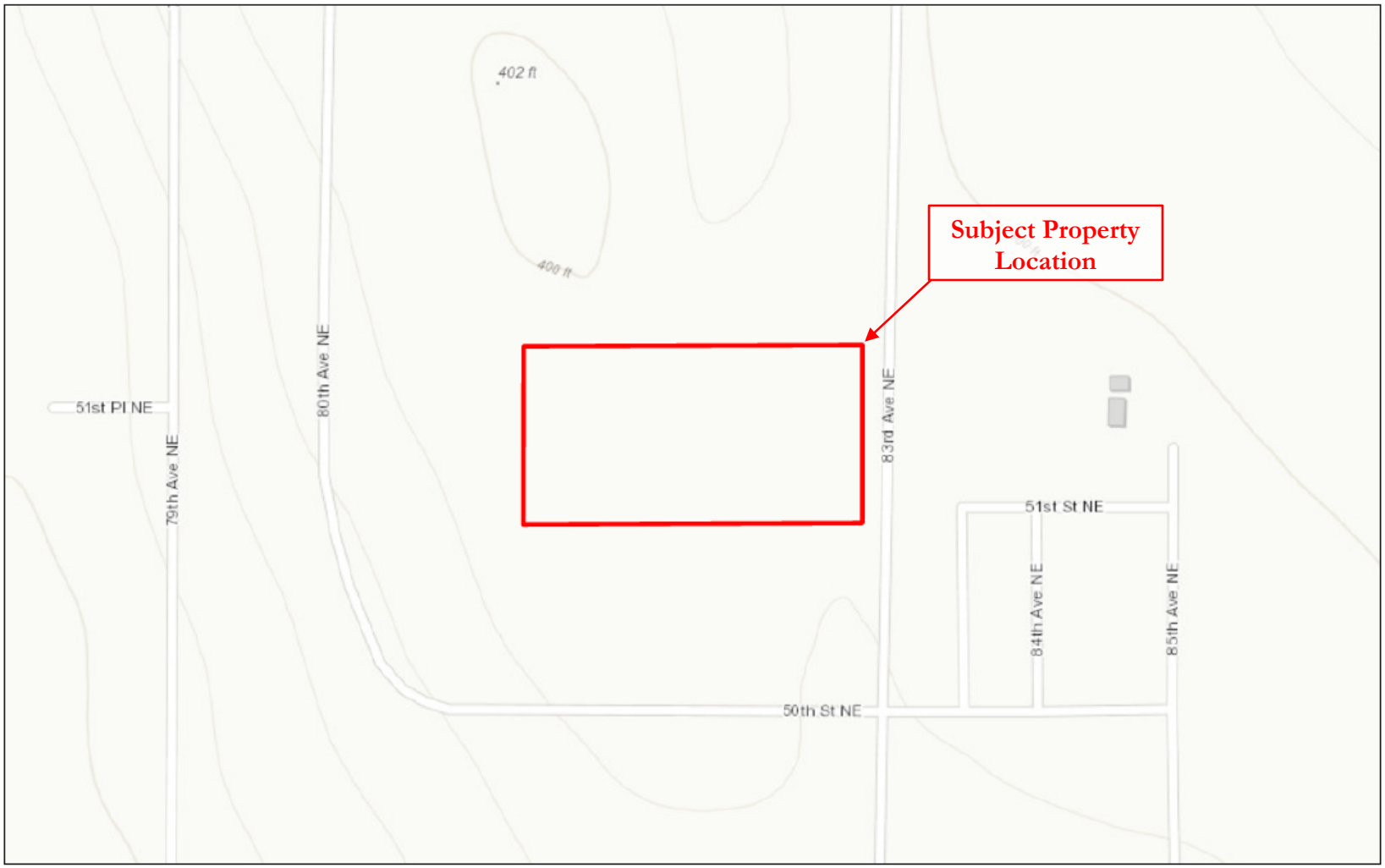
Appendix B4 — Snohomish County Stream and Wetland Inventory

Appendix B5 — City of Marysville Critical Areas Map



Appendix B6 — WDFW PHS Map

Appendix B7 — WDFW SalmonScape Map



Appendix B8 – DNR Stream Typing Map

Appendix C — Site Photographs

Photo 1: General upland conditions in the western portion of the subject property.

Photo 2: General upland conditions in the central portion of the subject property.

Photo 3: Utility corridor west of the subject property.

Photo 4: Soil Profile at DP-1W

Photo 5: Soil Profile at DP-2U

Photo 6: Soil Profile at DP-3U

Photo 7: Soil Profile at DP-4W

Photo 8: Soil Profile at DP-5U

Photo 9: Soil Profile at DP-6U

Photo 10: Soil Profile at DP-7U

Photo 11: Soil Profile at DP-8U

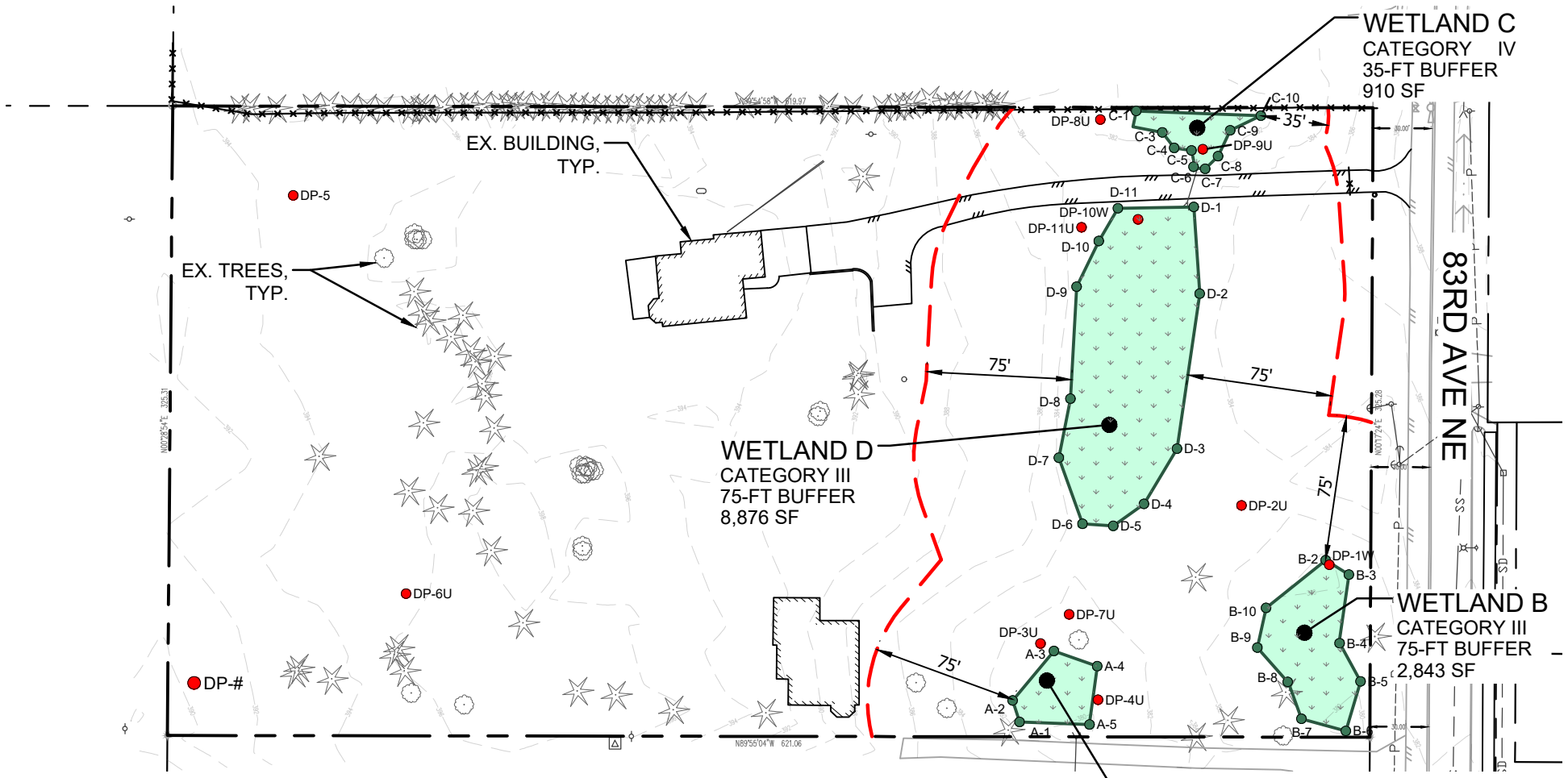
Photo 12: Wetland C, facing north.

Photo 13: Wetland D, facing south.

Photo 14: Soil Profile at DP-11U

Appendix D — Existing Conditions Exhibit

PROSPECTOR 6 - EXISTING CONDITIONS MAP



0 40' 80' 160

GRAPHIC SCALE
1"= 80'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- WETLAND BUFFER
- W-# WETLAND FLAG LOCATION
- DP-# DATA PLOT LOCATION
- EXISTING CONTOUR

5110 83RD AVE NE
MARRYSVILLE, WA 98270

THE SE ¼ OF SECTION 35,
TOWNSHIP 30N, RANGE 05E, W.M.

SNOHOMISH COUNTY PARCEL NUMBER: 00590700010500

LAT: 48°02'32.91" N LON: -122°04'15.38" W

REFERENCE # ----

APPLICANT:
GROUNDHOG LAND DEVELOPMENT, LLC

PROPOSED PROJECT:
PROPOSED RESIDENTIAL DEVELOPMENT

IN: MARYSVILLE NEAR: ----

Soundview Consultants LLC
Environmental Assessment • Planning • Land Use Solutions
2907 HARBORVIEW DRIVE
GIG HARBOR, WASHINGTON 98335
P. 253.514.8952
F. 253.514.8954
WWW.SOUNDVIEWCONSULTANTS.COM

DATE: 03/29/2022
JOB: 1908.0007
BY: DDS
SCALE: AS SHOWN
SHEET: 2

S:\CURRENT\1908 Ferrick\1908.0007 Prospector 6\Graphics & Maps\CAD\A - CURRENT SVC DRAWINGS\A - Current Base DWGs\1908.0007 (2022-03) base.dwg
Plotted March 31, 2022

Appendix E — Data Forms

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-10W

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Toe of Slope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A2 Lat: 48.042733 Long: -122.12021828 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: PUBHh

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 ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks:
All three wetland criteria met. Data collected in Wetland D.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Poa pratensis	55	Yes	FAC
2. Ranunculus repens	30	No	FAC
3. Schedonorus arundinaceus	15	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:
Hydrophytic vegetation criteria met through Dominance Test.

SOIL

Sampling Point: DP-10W

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 11	10YR 4/1	97	7.5YR 4/4	3	C	M/PL	GrLo	Gravelly loam
11 - 17	10YR 4/2	93	7.5YR 5/6	7	C	M	GrLo	Gravelly loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil criteria met through indicator F3.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☒ No ☐ Depth (inches): Surface

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicator A2 and A3.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-11U

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): A2 Lat: 48.042749 Long: -122.12027058 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:
Not all three wetland criteria met; lacking hydric soils. Data collected west of Wetland D.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Poa sp.*	40	Yes	FAC
2. Ranunculus repens	30	Yes	FAC
3. Agrostis capillaris	25	Yes	FAC
4. Schedonorus arundinaceus	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:
Hydrophytic vegetation criteria met through Dominance Test.
*Poa sp. considered facultative for scoring purposes.

SOIL

Sampling Point: DP-11U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 9	2.5YR 3/2	100	-	-	-	-	GrLo	Gravelly loam
9 - 14+	10YR 5/4	95	-	-	-	-	GrLo	Gravelly loam; mixed matrix
-	2.5Y 3/2	5	-	-	-	-	GrLo	Gravelly loam; mixed matrix

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☒ No ☐ Depth (inches): 11

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 9

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicators A2 and A3. However, it is important to note that observed hydrology appeared to be draining from the soil surface and is likely not a result of a perched water table, throughflow, or discharge groundwater/seeps.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-1W

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A2 Lat: 48.042243 Long: -122.11973078 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks:
All three wetland criteria met. Data collected in Wetland B.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	70	Yes	FAC
2.			
3.			
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabilis	85	Yes	FAC
2.			
3.			
4.			
5.			
	85	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Polystichum munitum	5	Yes	FACU
2. Rubus ursinus	1	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	6	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 94

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:
Hydrophytic vegetation met through Dominance Test.

SOIL

Sampling Point: DP-1W

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 2/2	100	-	-	-	-	SaLo	Sandy loam
7 - 14+	2.5Y 4/2	95	7.5YR 4/4	5	C	M	GrSaLo	Gravelly sandy loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil criteria met through indicators A11 and F3.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): Surface

Water Table Present? Yes ☒ No ☐ Depth (inches): Surface

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology met through primary indicators A1, A2, and A3.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-2U

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Top of slope Local relief (concave, convex, none): Concave Slope (%): 0

Subregion (LRR): A2 Lat: 48.042349 Long: -122.11994378 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☐ No ☒ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:
Not all three wetland criteria met; only hydric soils present. Data collected northwest of Wetland B and southeast of Wetland D.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer macrophyllum	50	Yes	FACU
2. Alnus rubra	35	Yes	FAC
3.			
4.			
	85	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabilis	10	Yes	FAC
2.			
3.			
4.			
5.			
	10	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Rubus ursinus	30	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 70

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:
No hydrophytic vegetation criteria met. Prevalence index not warranted due to lack of wetland hydrology.

SOIL

Sampling Point: DP-2U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 3/1	100	-	-	-	-	SaLo	Sandy loam
7 - 10	5GY 6/	60	7.5YR 4/6	40	C	M	Cl	Clay
10 - 16+	10YR 3/2	100	-	-	-	-	GrLo	Gravelly loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☒ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil criteria met through indicator F2. However, it is important to note that hydric soils observed are likely a result of high levels of disturbance within this area.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

No wetland hydrology criteria met.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-3U

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Toe of slope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A2 Lat: 48.042154 Long: -122.12033400 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:
Not all three wetland criteria met; lacking hydric soils. Data collected north of Wetland A and south of Wetland D.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	80	Yes	FAC
2.			
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabilis	100	Yes	FAC
2.			
3.			
4.			
5.			
	100	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Ranunculus repens	1	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	1	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 99

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:
Hydrophytic vegetation criteria met through Dominance Test.

SOIL

Sampling Point: DP-3U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 14+	10YR 3/1	100	-	-	-	-	SiLo	Silty loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): Surface

Water Table Present? Yes ☒ No ☐ Depth (inches): Surface

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicators A1, A2, and A3.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-4W

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A2 Lat: 48.042061 Long: -122.12028741 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks:
All three wetland criteria met. Data collected in Wetland A.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	70	Yes	FAC
2. Thuja plicata	5	No	FAC
3.			
4.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabilis	60	Yes	FAC
2.			
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Rubus ursinus	2	Yes	FACU
2. Ranunculus repens	1	Yes	FAC
3. Epilobium ciliatum	1	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	4	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 96

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:
Hydrophytic vegetation criteria met through Dominance Test.

SOIL

Sampling Point: DP-4W

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	10YR 3/2	100	-	-	-	-	GrSaLo	Gravelly sandy loam
6 - 14+	10YR 4/2	60	7.5YR 5/4	10	C	M	GrSaLo	Gravelly sandy loam; mixed matrix
-	10YR 3/2	30	-	-	-	-	GrSaLo	Gravelly sandy loam; mixed matrix

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil criteria met through indicators A11 and F3.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☒ No ☐ Depth (inches): Surface

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicators A2 and A3.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-5U

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Top of Slope Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): A2 Lat: 48.042771 Long: -122.12198487 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☐ No ☒ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:
Not all three wetland criteria met; only wetland hydrology present. Data collected in the northwest portion of the subject property.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	70	Yes	FAC
2. Acer macrophyllum	30	Yes	FACU
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabilis	80	Yes	FAC
2. Rubus armeniacus	1	No	FAC
3.			
4.			
5.			
	81	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Rubus ursinus	10	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 90

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:
No hydrophytic vegetation criteria met. Prevalence index not warranted due to lack of hydric soils.

SOIL

Sampling Point: DP-5U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 5	10YR 3/2	100	-	-	-	-	SaLo	Sandy loam
5 - 13+	10YR 3/4	95	10YR 5/8	5	C	M	GrLo	Gravelly loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☒ No ☐ Depth (inches): 5

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 3

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicators A2 and A3. However, it is important to note that observed hydrology appeared to be draining from the soil surface and is likely not a result of a perched water table, throughflow, or discharge groundwater/seeps.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-6U

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 1

Subregion (LRR): A2 Lat: 48.042169 Long: -122.12172969 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☐ No ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:
Not all three wetland criteria met; only hydrophytic vegetation present. Data collected in the southwestern portion of the subject property.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	85	Yes	FAC
2. Thuja plicata	15	No	FAC
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabilis	65	Yes	FAC
2.			
3.			
4.			
5.			
	65	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Rubus ursinus	30	Yes	FACU
2. Ilex aquifolium	1	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	31	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 69

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:
Hydrophytic vegetation criteria met through Dominance Test.

SOIL

Sampling Point: DP-6U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 13+	7.5YR 3/4	100	-	-	-	-	Lo	Loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☐ No ☒ Depth (inches): None

Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches): None

Wetland Hydrology Present? Yes ☐ No ☒

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

Remarks:

No wetland hydrology criteria met.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-7U

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): A2 Lat: 48.042180 Long: -122.12028214 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:
Not all three wetland criteria met; lacking hydric soils. Data collected in a drainage area located north of Wetland A and south of Wetland D.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus balsamifera	75	Yes	FAC
2. Alnus rubra	25	Yes	FAC
3.			
4.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabilis	85	Yes	FAC
2.			
3.			
4.			
5.			
	85	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Athyrium cyclosorum	15	Yes	FAC
2. Ranunculus repens	1	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	16	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 84

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:
Hydrophytic vegetation criteria met through Dominance Test.

SOIL

Sampling Point: DP-7U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	10YR 3/2	100	-	-	-	-	SaLo	Sandy loam
7 - 14+	10YR 3/3	95	7.5YR 4/4	5	C	M	GrLo	Gravelly loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☒ No ☐ Depth (inches): Surface

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicators A2 and A3. However, it is important to note that observed hydrology appeared to be draining from the soil surface and is likely not a result of a perched water table, throughflow, or discharge groundwater/seeps.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-8U

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR): A2 Lat: 48.042883 Long: -122.12026231 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☐ No ☒ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒

Remarks:
Not all three wetland criteria met; lacking hydric soils. Data collected west of Wetland C.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	40	Yes	FACU
2.		Yes	
3.			
4.			
	40	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus armeniacus	3	Yes	FAC
2.			
3.			
4.			
5.			
	3	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinaceae	100	Yes	FACW
2. Ranuculus repens	2	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	102	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ☐ Rapid Test for Hydrophytic Vegetation
- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:
Hydrophytic vegetation criteria met through Dominance Test.

SOIL

Sampling Point: DP-8U

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 14	2.5YR 3/2	100	-	-	-	-	GrLo	Gravelly loam
14 - 16+	2.5Y 3/2	95	7.5YR 4/6	5	C	M	GrLo	Gravelly loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☐ No ☒

Remarks:

No hydric soil criteria met.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☒ No ☐ Depth (inches): 5

Saturation Present? (includes capillary fringe) Yes ☒ No ☐ Depth (inches): 3

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicators A2 and A3.

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

Project/Site: 1908.0007 Prospector 6 City/County: Marysville/Snohomish Sampling Date: 2/22/21

Applicant/Owner: Groundhog Land Development Company, LLC State: WA Sampling Point: DP-9W

Investigator(s): Dustin Pringle, Harry Richardson, Rachael Hyland Section, Township, Range: 35, 30 North, 5 East

Landform (hillslope, terrace, etc.): Depressional Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): A2 Lat: 48.042733 Long: -122.12021828 Datum: WGS 84

Soil Map Unit Name: Tokul gravelly medial loam, 0 to 8 percent slopes NWI classification: N/A

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 ☒ No ☐ Hydric Soil Present? Yes ☒ No ☐ Wetland Hydrology Present? Yes ☒ No ☐	**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

Remarks:
All three wetland criteria met. Data collected in Wetland C.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Phalaris arundinacea	40	Yes	FACW
2. Ranunculus repens	10	No	FAC
3. Taraxacum officinale	10	No	FACU
4. Glechoma hederacea	8	No	FACU
5. Juncus effusus	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	73 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 27

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☒ Rapid Test for Hydrophytic Vegetation
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Wetland Non-Vascular Plants[1]
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ☒ No ☐**

Remarks:
Hydrophytic vegetation criteria met through the rapid test.

SOIL

Sampling Point: DP-9W

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 4	10YR 3/2	100	-	-	-	-	SaLo	Sandy loam
4 - 10	10YR 3/2	95	10YR 4/6	5	C	M	SaLo	Sandy loam
10 - 14+	2.5Y 4/2	95	10YR 4/6	5	C	M	SaLo	Sandy Loam

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☒ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

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

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

Restrictive Layer (if present):

Type: None

Depth (inches): --

Hydric Soil Present? Yes ☒ No ☐

Remarks:

Hydric soil criteria met through indicators A11 and F6.

HYDROLOGY

Wetland Hydrology Indicators:

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

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

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): None

Water Table Present? Yes ☒ No ☐ Depth (inches): 3

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

Wetland Hydrology Present? Yes ☒ No ☐

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

Remarks:

Wetland hydrology criteria met through primary indicator A2 and A3.

Appendix F — Wetland Rating Forms

Wetland name or number A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): A Date of site visit: 2/2/21

Rated by Lauren Templeton Trained by Ecology? ✔ Yes ___No Date of training 11/20

HGM Class used for rating Depressional 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 ArcGIS

OVERALL WETLAND CATEGORY III (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

__X__**Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	M	L	L	
Landscape Potential	M	M	L	
Value	H	M	M	TOTAL
Score Based on Ratings	7	5	4	16

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	N/A

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 (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	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 *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	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 *(can be added to another figure)*	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 (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	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	

Wetland name or number A

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

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	1
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	7

Rating of Site Potential If score is: ___ **12-16 = H** _X_ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	1
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ **3 or 4 = H** _X_ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 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? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: _X_ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number A

DEPRESSIONAL AND FLATS WETLANDS

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

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

D 4.1. Characteristics of surface water outflows from the wetland:

Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	2
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*

Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	0
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	

D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*

The area of the basin is less than 10 times the area of the unit	points = 5	0
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	

Total for D 4	Add the points in the boxes above	2

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** X **0-5 = L** *Record the rating on the first page*

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

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	0
Total for D 5	Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ **3 = H** X **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

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

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):

- Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2
- Surface flooding problems are in a sub-basin farther down-gradient. points = 1

Flooding from groundwater is an issue in the sub-basin. points = 1

The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0

_____

There are no problems with flooding downstream of the wetland. points = 0

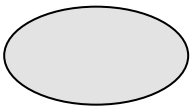
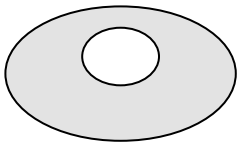
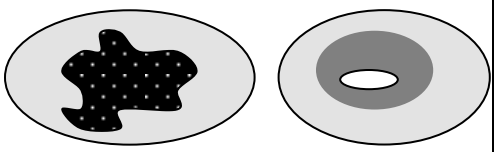
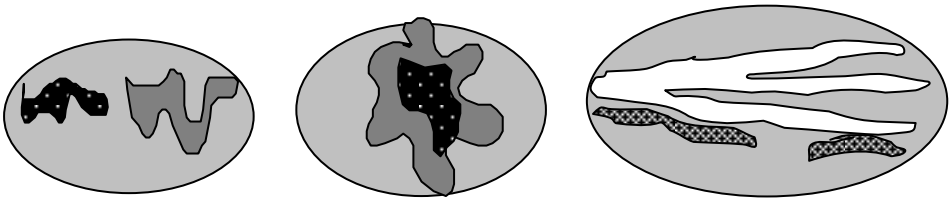
1

D 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 D 6	Add the points in the boxes above	1

Rating of Value If score is: ___ **2-4 = H** X **1 = M** ___ **0 = L** *Record the rating on the first page*

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.* ____Aquatic bed — 4 structures or more: points = 4 __x__Emergent — 3 structures: points = 2 __x__Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1 ____Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if:* ____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	1
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*). ____Permanently flooded or inundated — 4 or more types present: points = 3 __x__Seasonally flooded or inundated — 3 types present: points = 2 ____Occasionally flooded or inundated — 2 types present: points = 1 ____Saturated only — 1 type present: points = 0 ____Permanently flowing stream or river in, or adjacent to, the wetland ____Seasonally flowing stream in, or adjacent to, the wetland ____**Lake Fringe wetland** — **2 points** ____**Freshwater tidal wetland** — **2 points**	0
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *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 5 - 19 species — points = 1 < 5 species — points = 0	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion 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 All three diagrams in this row are **HIGH** = 3points 	1

Wetland name or number A

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ____Standing snags (dbh > 4 in) within the wetland ____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) ____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 *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __×__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	1
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** __X__**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?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* [0] % undisturbed habitat **+** [(% moderate and low intensity land uses) [4.13] /2] **=** 2.065 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* [9.00] % undisturbed habitat **+** [(% moderate and low intensity land uses) [43.17] /2] **=** 30.585 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	0
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-2

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** __X__**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — 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 × Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is:___**2 = H** __X__**1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number A

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.

X **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 *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ 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**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ 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 *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ 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**	
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**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** 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**	

Wetland name or number A

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

- **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.
- **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).

☐Yes **= Category I** ☒No **= Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

- 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
- 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 *(needs to be measured near the bottom)*

☐Yes – Go to **SC 5.1** ☒No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

- 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).
- At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

- Long Beach Peninsula: Lands west of SR 103
- Grayland-Westport: Lands west of SR 105
- Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐Yes – Go to **SC 6.1** ☒No = **not an interdunal wetland for rating**

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)? ☐Yes = **Category I** ☐No – Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐Yes = **Category II** ☐No – Go to **SC 6.3**

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?

☐Yes = **Category III** ☐No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

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Wetland name or number B

RATING SUMMARY – Western Washington

Name of wetland (or ID #): B Date of site visit: 2/2/21

Rated by Lauren Templeton Trained by Ecology? ✔ Yes ___No Date of training 11/20

HGM Class used for rating Depressional 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 ArcGIS

OVERALL WETLAND CATEGORY III (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

__X__**Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	M	M	L	
Landscape Potential	M	M	L	
Value	H	M	M	TOTAL
Score Based on Ratings	7	6	4	17

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	N/A

Wetland name or number B

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 (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	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 *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	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 *(can be added to another figure)*	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 (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	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	

Wetland name or number B

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 B

☒ 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 B

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	3
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	1
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	2
Total for D 1 Add the points in the boxes above	6

Rating of Site Potential If score is: ___ **12-16 = H** _X_ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ **3 or 4 = H** _X_ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 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? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: _X_ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number B

DEPRESSIONAL AND FLATS WETLANDS

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

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

D 4.1. Characteristics of surface water outflows from the wetland:

Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	4
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*

Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	3
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	

D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*

The area of the basin is less than 10 times the area of the unit	points = 5	0
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	

Total for D 4	Add the points in the boxes above	7

Rating of Site Potential If score is: ___ **12-16 = H** _X_ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

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

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	0
Total for D 5	Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ **3 = H** _X_ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

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

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):

- Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2
- Surface flooding problems are in a sub-basin farther down-gradient. points = 1

Flooding from groundwater is an issue in the sub-basin. points = 1

The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0

_____

There are no problems with flooding downstream of the wetland. points = 0

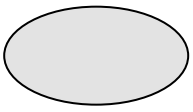
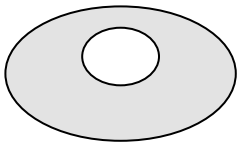
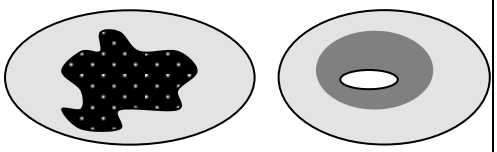
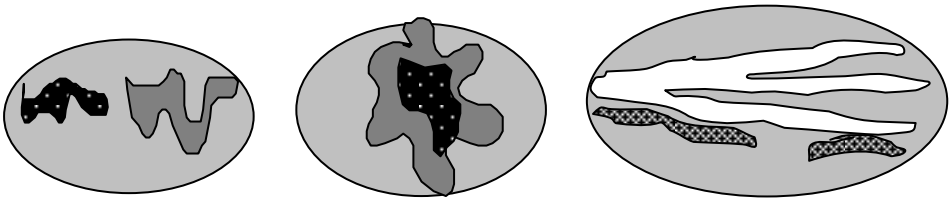
1

D 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 D 6	Add the points in the boxes above	1

Rating of Value If score is: ___ **2-4 = H** _X_ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number B

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.* ____Aquatic bed — 4 structures or more: points = 4 ____Emergent — 3 structures: points = 2 __x__Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1 __x__Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if:* ____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	1
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*). ____Permanently flooded or inundated — 4 or more types present: points = 3 __x__Seasonally flooded or inundated — 3 types present: points = 2 ____Occasionally flooded or inundated — 2 types present: points = 1 ____Saturated only — 1 type present: points = 0 ____Permanently flowing stream or river in, or adjacent to, the wetland ____Seasonally flowing stream in, or adjacent to, the wetland ____**Lake Fringe wetland** — **2 points** ____**Freshwater tidal wetland** — **2 points**	0
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *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 5 - 19 species — points = 1 < 5 species — points = 0	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion 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 All three diagrams in this row are **HIGH** = 3points 	1

Wetland name or number B

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* __×__Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). __×__Standing snags (dbh > 4 in) within the wetland ____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) ____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 *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __×__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	3
Total for H 1 Add the points in the boxes above	6

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** __X__**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?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* [0] % undisturbed habitat **+** [(% moderate and low intensity land uses) [4.13] /2] **=** 2.065 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* [9] % undisturbed habitat **+** [(% moderate and low intensity land uses) [39.77] /2] **=** 28.885 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	0
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-2

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** __X__**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — 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 × Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is:___**2 = H** __X__**1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number B

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.

X **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 B

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ 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**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ 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 *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ 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**	
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**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** 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**	

Wetland name or number B

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

- **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.
- **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).

☐Yes **= Category I** ☒No **= Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

- 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
- 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 *(needs to be measured near the bottom)*

☐Yes – Go to **SC 5.1** ☒No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

- 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).
- At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

- Long Beach Peninsula: Lands west of SR 103
- Grayland-Westport: Lands west of SR 105
- Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐Yes – Go to **SC 6.1** ☒No = **not an interdunal wetland for rating**

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)? ☐Yes = **Category I** ☐No – Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐Yes = **Category II** ☐No – Go to **SC 6.3**

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?

☐Yes = **Category III** ☐No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

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Wetland name or number C

RATING SUMMARY – Western Washington

Name of wetland (or ID #): C Date of site visit: 2/2/21

Rated by Lauren Templeton Trained by Ecology? ✔ Yes ___No Date of training 11/20

HGM Class used for rating Depressional 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 ArcGIS

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

__X__**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	L	L	L	
Landscape Potential	M	M	L	
Value	H	M	L	**TOTAL**
Score Based on Ratings	6	5	3	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	N/A

Wetland name or number C

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 (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	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 *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	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 *(can be added to another figure)*	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 (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	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	

Wetland name or number C

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 C

☒ 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 C

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	0
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	0
Total for D 1 Add the points in the boxes above	2

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** X **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	0
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ **3 or 4 = H** X **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 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? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: X **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number C

DEPRESSIONAL AND FLATS WETLANDS

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

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

D 4.1. Characteristics of surface water outflows from the wetland:

Wetland is a depression or flat depression with no surface water leaving it (no outlet)	points = 4	2
Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet	points = 2	
Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch	points = 1	
Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing	points = 0	

D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.*

Marks of ponding are 3 ft or more above the surface or bottom of outlet	points = 7	0
Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet	points = 5	
Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet	points = 3	
The wetland is a "headwater" wetland	points = 3	
Wetland is flat but has small depressions on the surface that trap water	points = 1	
Marks of ponding less than 0.5 ft (6 in)	points = 0	

D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.*

The area of the basin is less than 10 times the area of the unit	points = 5	0
The area of the basin is 10 to 100 times the area of the unit	points = 3	
The area of the basin is more than 100 times the area of the unit	points = 0	
Entire wetland is in the Flats class	points = 5	

Total for D 4	Add the points in the boxes above	2

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** X **0-5 = L** *Record the rating on the first page*

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

D 5.1. Does the wetland receive stormwater discharges?	Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff?	Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)?	Yes = 1 No = 0	0
Total for D 5	Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ **3 = H** X **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

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

D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.*

The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds):

- Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2
- Surface flooding problems are in a sub-basin farther down-gradient. points = 1

Flooding from groundwater is an issue in the sub-basin. points = 1

The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0

_____

There are no problems with flooding downstream of the wetland. points = 0

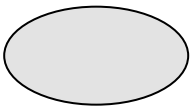
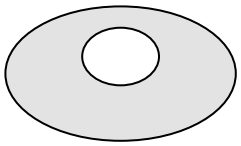
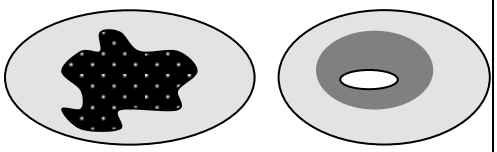
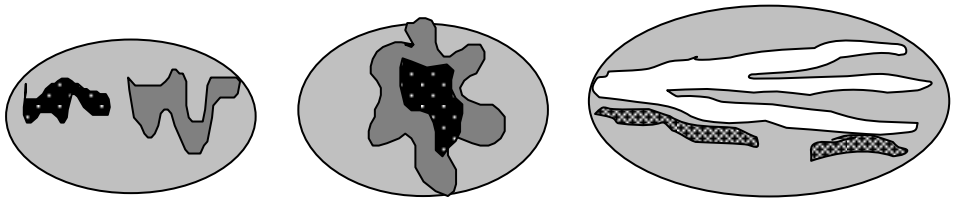
1

D 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 D 6	Add the points in the boxes above	1

Rating of Value If score is: ___ **2-4 = H** X **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number C

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.* ____Aquatic bed — 4 structures or more: points = 4 __x__Emergent — 3 structures: points = 2 ____Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1 ____Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if:* ____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	0
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*). ____Permanently flooded or inundated — 4 or more types present: points = 3 ____Seasonally flooded or inundated — 3 types present: points = 2 __x__Occasionally flooded or inundated — 2 types present: points = 1 ____Saturated only — 1 type present: points = 0 ____Permanently flowing stream or river in, or adjacent to, the wetland ____Seasonally flowing stream in, or adjacent to, the wetland ____**Lake Fringe wetland** — **2 points** ____**Freshwater tidal wetland** — **2 points**	0
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *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 5 - 19 species — points = 1 < 5 species — points = 0	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion 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 All three diagrams in this row are **HIGH** = 3points 	0

Wetland name or number C

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ____Standing snags (dbh > 4 in) within the wetland ____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) ____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 *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	1

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** X **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?

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* [0] % undisturbed habitat **+** [(% moderate and low intensity land uses) [4.13] /2] **=** 2.065 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* [9] % undisturbed habitat **+** [(% moderate and low intensity land uses) [39.77] /2] **=** 28.885 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	0
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-2

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** X **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?

H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — 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 Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 × Site does not meet any of the criteria above points = 0	0

Rating of Value If score is:___**2 = H** ___**1 = M** X **0 = L** *Record the rating on the first page*

Wetland name or number C

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 C

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ 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**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ 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 *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ 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**	
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**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** 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**	

Wetland name or number C

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

- **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.
- **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).

☐Yes **= Category I** ☒No **= Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

- 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
- 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 *(needs to be measured near the bottom)*

☐Yes – Go to **SC 5.1** ☒No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

- 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).
- At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

- Long Beach Peninsula: Lands west of SR 103
- Grayland-Westport: Lands west of SR 105
- Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐Yes – Go to **SC 6.1** ☒No = **not an interdunal wetland for rating**

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)? ☐Yes = **Category I** ☐No – Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐Yes = **Category II** ☐No – Go to **SC 6.3**

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?

☐Yes = **Category III** ☐No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

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Wetland name or number D

RATING SUMMARY – Western Washington

Name of wetland (or ID #): D Date of site visit: 2/2/21

Rated by Dustin Pringle Trained by Ecology? ✔ Yes ___No Date of training 11/20

HGM Class used for rating Depressional 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 ArcGIS

OVERALL WETLAND CATEGORY III (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

__X__**Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	L	M	L	
Landscape Potential	M	M	L	
Value	H	M	M	**TOTAL**
Score Based on Ratings	6	6	4	16

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	N/A

Wetland name or number D

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 (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	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 *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	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 *(can be added to another figure)*	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 (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	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	

Wetland name or number D

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 D

☒ 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 D

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	1
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	0
Total for D 1 Add the points in the boxes above	3

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** X **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	1
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ **3 or 4 = H** X **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 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? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: X **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number D

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	5
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	0
Total for D 4 Add the points in the boxes above	7

Rating of Site Potential If score is: ___ **12-16 = H** _X_ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	0
Total for D 5 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ **3 = H** _X_ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0 _____ There are no problems with flooding downstream of the wetland. points = 0	1
D 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 D 6 Add the points in the boxes above	1

Rating of Value If score is: ___ **2-4 = H** _X_ **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number D

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.*

____Aquatic bed	4 structures or more: points = 4
__×__Emergent	3 structures: points = 2
____Scrub-shrub (areas where shrubs have > 30% cover)	2 structures: points = 1
__×__Forested (areas where trees have > 30% cover)	1 structure: points = 0

If the unit has a Forested class, check if:

____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

1

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*).

__×__Permanently flooded or inundated	4 or more types present: points = 3
____Seasonally flooded or inundated	3 types present: points = 2
__×__Occasionally flooded or inundated	2 types present: points = 1
____Saturated only	1 type present: points = 0
____Permanently flowing stream or river in, or adjacent to, the wetland	
____Seasonally flowing stream in, or adjacent to, the wetland	
____**Lake Fringe wetland**	**2 points**
____**Freshwater tidal wetland**	**2 points**

1

H 1.3. Richness of plant species

Count the number of plant species in the wetland that cover at least 10 ft^2.

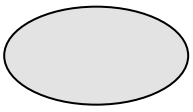
Different patches of the same species can be combined to meet the size threshold and you do not have to name the species. ***Do not include Eurasian milfoil, reed canarygrass, purple loosestrife, Canadian thistle***

If you counted: > 19 species	points = 2
5 - 19 species	points = 1
< 5 species	points = 0

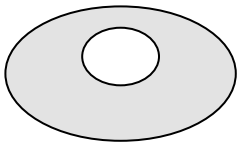
1

H 1.4. Interspersion of habitats

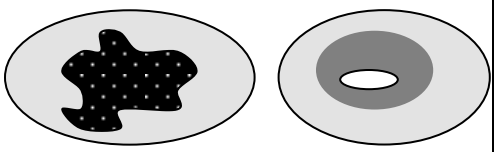
Decide from the diagrams below whether interspersion among Cowardin plants classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, moderate, low, or none. *If you have four or more plant classes or three classes and open water, the rating is always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



None = 0 points

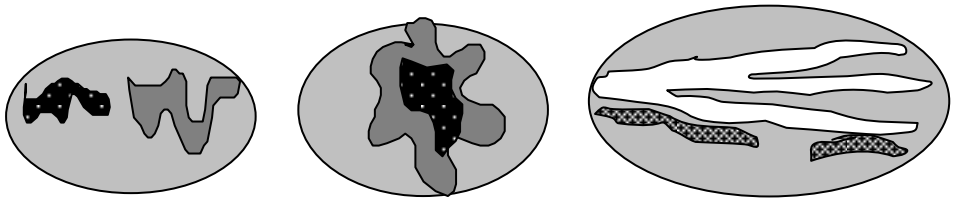


Low = 1 point



Moderate = 2 points

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



1

Wetland name or number D

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). __×__Standing snags (dbh > 4 in) within the wetland ____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) ____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 *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* __×__Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	2
Total for H 1 Add the points in the boxes above	6

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** __X__**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?	
H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* [0] % undisturbed habitat **+** [(% moderate and low intensity land uses) [4.13] /2] **=** 2.065 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* [9] % undisturbed habitat **+** [(% moderate and low intensity land uses) [39.77] /2] **=** 28.885 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	1
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-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** __X__**< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?	
H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — 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 × Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 Site does not meet any of the criteria above points = 0	1

Rating of Value If score is:___**2 = H** __X__**1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number D

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.

X **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 D

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ 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**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ 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 *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ 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**	
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**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** 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**	

Wetland name or number D

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

- **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.
- **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).

☐Yes **= Category I** ☒No **= Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

- 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
- 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 *(needs to be measured near the bottom)*

☐Yes – Go to **SC 5.1** ☒No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

- 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).
- At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

- Long Beach Peninsula: Lands west of SR 103
- Grayland-Westport: Lands west of SR 105
- Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐Yes – Go to **SC 6.1** ☒No = **not an interdunal wetland for rating**

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)? ☐Yes = **Category I** ☐No – Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐Yes = **Category II** ☐No – Go to **SC 6.3**

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?

☐Yes = **Category III** ☐No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

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Wetland name or number E

RATING SUMMARY – Western Washington

Name of wetland (or ID #): E Date of site visit: 2/2/21

Rated by Dustin Pringle Trained by Ecology? ✔ Yes ___No Date of training 11/20

HGM Class used for rating Depressional 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 ArcGIS

OVERALL WETLAND CATEGORY III (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

__X__**Category III** – Total score = 16 - 19

_____**Category IV** – Total score = 9 - 15

FUNCTION	Improving Water Quality	Hydrologic	Habitat	
		Circle the appropriate ratings		
Site Potential	M	L	L	
Landscape Potential	M	M	L	
Value	H	M	M	TOTAL
Score Based on Ratings	7	5	4	16

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	N/A

Wetland name or number E

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 (*can be added to map of hydroperiods)*	D 1.1, D 4.1	
Boundary of area within 150 ft of the wetland *(can be added to another figure)*	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 *(can be added to another figure)*	R 2.4	
Plant cover of trees, shrubs, and herbaceous plants	R 1.2, R 4.2	
Width of unit vs. width of stream *(can be added to another figure)*	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 *(can be added to another figure)*	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 (*can be added to figure above)*	S 4.1	
Boundary of 150 ft buffer (can be added to another figure)	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	

Wetland name or number E

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 E

☒ 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 E

DEPRESSIONAL AND FLATS WETLANDS

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

D 1.0. Does the site have the potential to improve water quality?	
D 1.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression (QUESTION 7 on key) with no surface water leaving it (no outlet). points = 3 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet. points = 2 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 1 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch. points = 1	2
D 1.2. The soil 2 in below the surface (or duff layer) is true clay or true organic *(use NRCS definitions).* Yes = 4 No = 0	0
D 1.3. Characteristics and distribution of persistent plants (Emergent, Scrub-shrub, and/or Forested Cowardin classes): Wetland has persistent, ungrazed, plants > 95% of area points = 5 Wetland has persistent, ungrazed, plants > ½ of area points = 3 Wetland has persistent, ungrazed plants > $^1/_{10}$ of area points = 1 Wetland has persistent, ungrazed plants < $^1/_{10}$ of area points = 0	0
D 1.4. Characteristics of seasonal ponding or inundation: *This is the area that is ponded for at least 2 months. See description in manual.* Area seasonally ponded is > ½ total area of wetland points = 4 Area seasonally ponded is > ¼ total area of wetland points = 2 Area seasonally ponded is < ¼ total area of wetland points = 0	4
Total for D 1 Add the points in the boxes above	6

Rating of Site Potential If score is: ___ **12-16 = H** _X_ **6-11 = M** ___ **0-5 = L** *Record the rating on the first page*

D 2.0. Does the landscape have the potential to support the water quality function of the site?	
D 2.1. Does the wetland unit receive stormwater discharges? Yes = 1 No = 0	0
D 2.2. Is > 10% of the area within 150 ft of the wetland in land uses that generate pollutants? Yes = 1 No = 0	1
D 2.3. Are there septic systems within 250 ft of the wetland? Yes = 1 No = 0	1
D 2.4. Are there other sources of pollutants coming into the wetland that are not listed in questions D 2.1-D 2.3? Source_____ Yes = 1 No = 0	0
Total for D 2 Add the points in the boxes above	2

Rating of Landscape Potential If score is: ___ **3 or 4 = H** _X_ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 3.0. Is the water quality improvement provided by the site valuable to society?	
D 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? Yes = 1 No = 0	0
D 3.2. Is the wetland in a basin or sub-basin where an aquatic resource is on the 303(d) list? Yes = 1 No = 0	1
D 3.3. Has the site been identified in a watershed or local plan as important for maintaining water quality (*answer YES if there is a TMDL for the basin in which the unit is found*)? Yes = 2 No = 0	2
Total for D 3 Add the points in the boxes above	3

Rating of Value If score is: _X_ **2-4 = H** ___ **1 = M** ___ **0 = L** *Record the rating on the first page*

NOTES and FIELD OBSERVATIONS:

Wetland name or number E

DEPRESSIONAL AND FLATS WETLANDS

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

D 4.0. Does the site have the potential to reduce flooding and erosion?	
D 4.1. Characteristics of surface water outflows from the wetland: Wetland is a depression or flat depression with no surface water leaving it (no outlet) points = 4 Wetland has an intermittently flowing stream or ditch, OR highly constricted permanently flowing outlet points = 2 Wetland is a flat depression (QUESTION 7 on key), whose outlet is a permanently flowing ditch points = 1 Wetland has an unconstricted, or slightly constricted, surface outlet that is permanently flowing points = 0	2
D 4.2. Depth of storage during wet periods: *Estimate the height of ponding above the bottom of the outlet. For wetlands with no outlet, measure from the surface of permanent water or if dry, the deepest part.* Marks of ponding are 3 ft or more above the surface or bottom of outlet points = 7 Marks of ponding between 2 ft to < 3 ft from surface or bottom of outlet points = 5 Marks are at least 0.5 ft to < 2 ft from surface or bottom of outlet points = 3 The wetland is a "headwater" wetland points = 3 Wetland is flat but has small depressions on the surface that trap water points = 1 Marks of ponding less than 0.5 ft (6 in) points = 0	3
D 4.3. Contribution of the wetland to storage in the watershed: *Estimate the ratio of the area of upstream basin contributing surface water to the wetland to the area of the wetland unit itself.* The area of the basin is less than 10 times the area of the unit points = 5 The area of the basin is 10 to 100 times the area of the unit points = 3 The area of the basin is more than 100 times the area of the unit points = 0 Entire wetland is in the Flats class points = 5	0
Total for D 4 Add the points in the boxes above	5

Rating of Site Potential If score is: ___ **12-16 = H** ___ **6-11 = M** X **0-5 = L** *Record the rating on the first page*

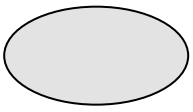
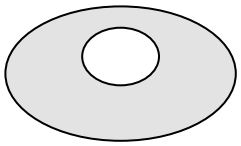
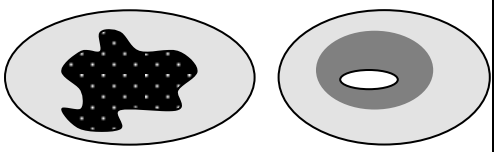
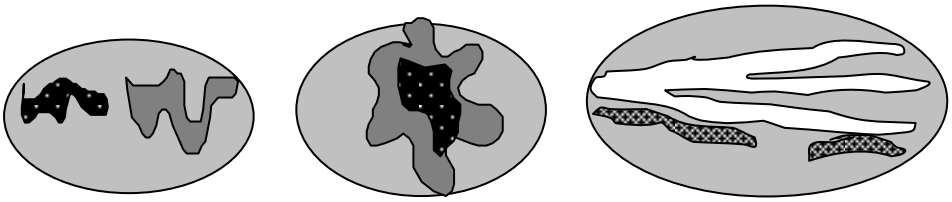
D 5.0. Does the landscape have the potential to support hydrologic functions of the site?	
D 5.1. Does the wetland receive stormwater discharges? Yes = 1 No = 0	0
D 5.2. Is >10% of the area within 150 ft of the wetland in land uses that generate excess runoff? Yes = 1 No = 0	1
D 5.3. Is more than 25% of the contributing basin of the wetland covered with intensive human land uses (residential at >1 residence/ac, urban, commercial, agriculture, etc.)? Yes = 1 No = 0	0
Total for D 5 Add the points in the boxes above	1

Rating of Landscape Potential If score is: ___ **3 = H** X **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

D 6.0. Are the hydrologic functions provided by the site valuable to society?	
D 6.1. The unit is in a landscape that has flooding problems. *Choose the description that best matches conditions around the wetland unit being rated. Do not add points. Choose the highest score if more than one condition is met.* The wetland captures surface water that would otherwise flow down-gradient into areas where flooding has damaged human or natural resources (e.g., houses or salmon redds): • Flooding occurs in a sub-basin that is immediately down-gradient of unit. points = 2 • Surface flooding problems are in a sub-basin farther down-gradient. points = 1 Flooding from groundwater is an issue in the sub-basin. points = 1 The existing or potential outflow from the wetland is so constrained by human or natural conditions that the water stored by the wetland cannot reach areas that flood. *Explain why* _____ points = 0 _____ There are no problems with flooding downstream of the wetland. points = 0	1
D 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 D 6 Add the points in the boxes above	1

Rating of Value If score is: ___ **2-4 = H** X **1 = M** ___ **0 = L** *Record the rating on the first page*

Wetland name or number E

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.* ____Aquatic bed — 4 structures or more: points = 4 __x__Emergent — 3 structures: points = 2 ____Scrub-shrub (areas where shrubs have > 30% cover) — 2 structures: points = 1 ____Forested (areas where trees have > 30% cover) — 1 structure: points = 0 *If the unit has a Forested class, check if:* ____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	0
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*). ____Permanently flooded or inundated — 4 or more types present: points = 3 __x__Seasonally flooded or inundated — 3 types present: points = 2 ____Occasionally flooded or inundated — 2 types present: points = 1 ____Saturated only — 1 type present: points = 0 ____Permanently flowing stream or river in, or adjacent to, the wetland ____Seasonally flowing stream in, or adjacent to, the wetland ____**Lake Fringe wetland** — **2 points** ____**Freshwater tidal wetland** — **2 points**	0
H 1.3. Richness of plant species Count the number of plant species in the wetland that cover at least 10 ft^2. *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 5 - 19 species — points = 1 < 5 species — points = 0	1
H 1.4. Interspersion of habitats Decide from the diagrams below whether interspersion 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 All three diagrams in this row are **HIGH** = 3points 	0

Wetland name or number E

H 1.5. Special habitat features: Check the habitat features that are present in the wetland. *The number of checks is the number of points.* ____Large, downed, woody debris within the wetland (> 4 in diameter and 6 ft long). ____Standing snags (dbh > 4 in) within the wetland ____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) ____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 *(cut shrubs or trees that have not yet weathered where wood is exposed)* ____At least ¼ ac of thin-stemmed persistent plants or woody branches are present in areas that are permanently or seasonally inundated *(structures for egg-laying by amphibians)* ____Invasive plants cover less than 25% of the wetland area in every stratum of plants (*see H 1.1 for list of strata*)	0
Total for H 1 Add the points in the boxes above	1

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** X **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?

H 2.1. Accessible habitat (include *only habitat that directly abuts wetland unit*). *Calculate:* [0] % undisturbed habitat **+** [(% moderate and low intensity land uses) [4.13] /2] **=** 2.065 % If total accessible habitat is: > 1/3 (33.3%) of 1 km Polygon points = 3 20-33% of 1 km Polygon points = 2 10-19% of 1 km Polygon points = 1 < 10% of 1 km Polygon points = 0	0
H 2.2. Undisturbed habitat in 1 km Polygon around the wetland. *Calculate:* [9] % undisturbed habitat **+** [(% moderate and low intensity land uses) [39.77] /2] **=** 28.885 % Undisturbed habitat > 50% of Polygon points = 3 Undisturbed habitat 10-50% and in 1-3 patches points = 2 Undisturbed habitat 10-50% and > 3 patches points = 1 Undisturbed habitat < 10% of 1 km Polygon points = 0	0
H 2.3. Land use intensity in 1 km Polygon: If > 50% of 1 km Polygon is high intensity land use points = (- 2) ≤ 50% of 1 km Polygon is high intensity points = 0	-2
Total for H 2 Add the points in the boxes above	-2

Rating of Landscape Potential If score is:___**4-6 = H** ___**1-3 = M** X **< 1 = L** *Record the rating on the first page*

H 3.0. Is the habitat provided by the site valuable to society?

H 3.1. Does the site provide habitat for species valued in laws, regulations, or policies? *Choose only the highest score that applies to the wetland being rated.* Site meets ANY of the following criteria: points = 2 — It has 3 or more priority habitats within 100 m (see next page) — It provides habitat for Threatened or Endangered species (any plant or animal on the state or federal lists) — It is mapped as a location for an individual WDFW priority species — It is a Wetland of High Conservation Value as determined by the Department of Natural Resources — 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 × Site has 1 or 2 priority habitats (listed on next page) within 100 m points = 1 × Site does not meet any of the criteria above points = 0	1

Rating of Value If score is:___**2 = H** X **1 = M** ___**0 = L** *Record the rating on the first page*

Wetland name or number E

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.

X **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 E

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Wetland Type *Check off any criteria that apply to the wetland. Circle the category when the appropriate criteria are met.*	**Category**
SC 1.0. Estuarine wetlands Does the wetland meet the following criteria for Estuarine wetlands? ☐ The dominant water regime is tidal, ☐ Vegetated, and ☐ 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**	
SC 1.2. Is the wetland unit at least 1 ac in size and meets at least two of the following three conditions? ☐ 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 *Spartina*, see page 25) ☐ At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. ☐ 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**	
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**	
SC 3.0. Bogs Does the wetland (or any part of the unit) meet both the criteria for soils and vegetation in bogs? *Use the key below.* ***If you answer YES you will still need to rate the wetland based on its functions.*** 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**	

Wetland name or number E

SC 4.0. Forested Wetlands

Does the wetland have at least 1 contiguous acre of forest that meets one of these criteria for the WA Department of Fish and Wildlife's forests as priority habitats? ***If you answer YES you will still need to rate the wetland based on its functions.***

- **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.
- **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).

☐Yes **= Category I** ☒No **= Not a forested wetland for this section**

SC 5.0. Wetlands in Coastal Lagoons

Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?

- 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
- 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 *(needs to be measured near the bottom)*

☐Yes – Go to **SC 5.1** ☒No = **Not a wetland in a coastal lagoon**

SC 5.1. Does the wetland meet all of the following three conditions?

- 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).
- At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland.
- The wetland is larger than $^{1}/_{10}$ ac (4350 ft^2)

☐Yes = **Category I** ☐No = **Category II**

SC 6.0. Interdunal Wetlands

Is the wetland west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? ***If you answer yes you will still need to rate the wetland based on its habitat functions.***

In practical terms that means the following geographic areas:

- Long Beach Peninsula: Lands west of SR 103
- Grayland-Westport: Lands west of SR 105
- Ocean Shores-Copalis: Lands west of SR 115 and SR 109

☐Yes – Go to **SC 6.1** ☒No = **not an interdunal wetland for rating**

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)? ☐Yes = **Category I** ☐No – Go to **SC 6.2**

SC 6.2. Is the wetland 1 ac or larger, or is it in a mosaic of wetlands that is 1 ac or larger?

☐Yes = **Category II** ☐No – Go to **SC 6.3**

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?

☐Yes = **Category III** ☐No = **Category IV**

Category of wetland based on Special Characteristics

If you answered No for all types, enter "Not Applicable" on Summary Form

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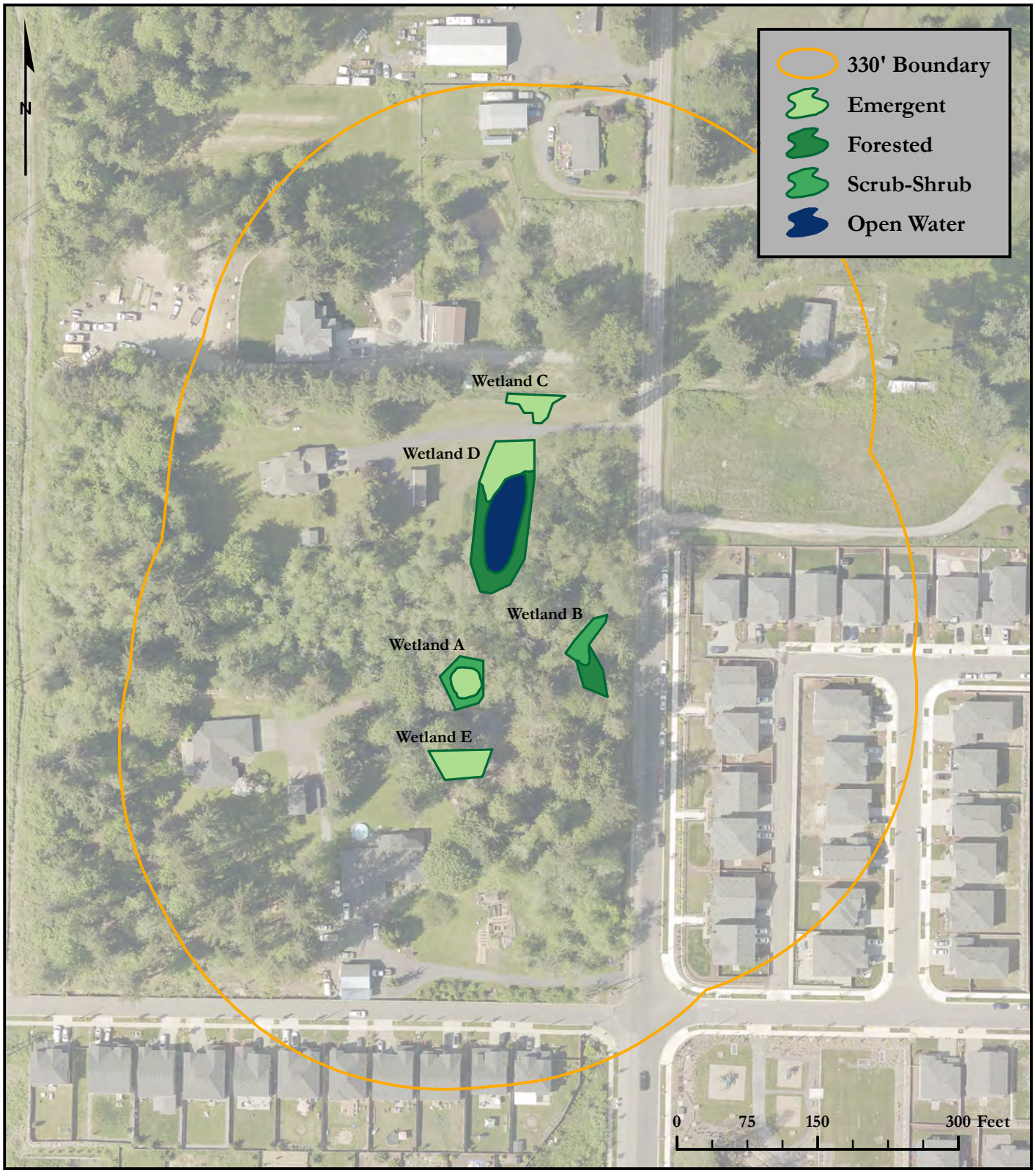
Appendix G — Wetland Rating Maps

COWARDIN MAP



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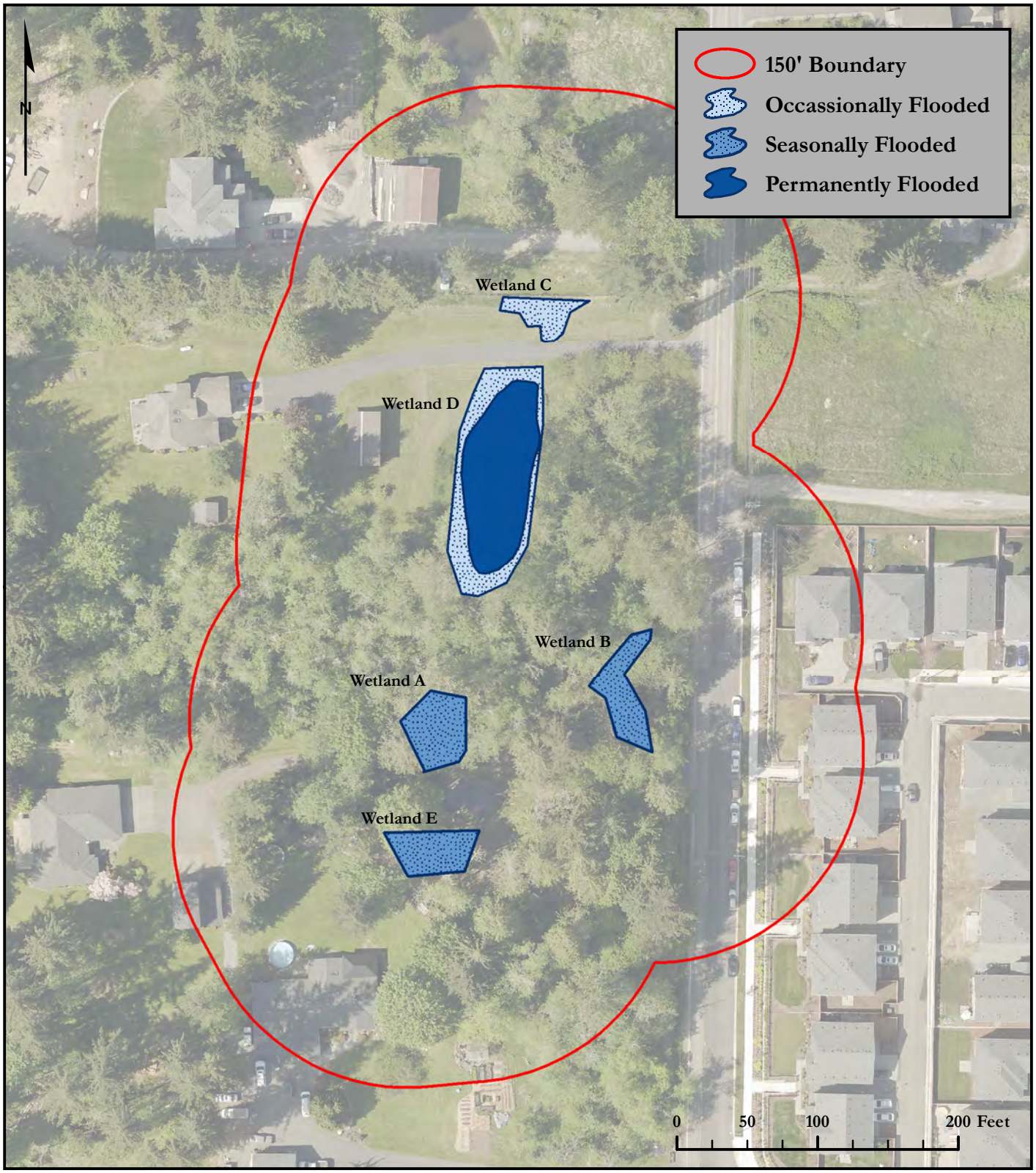
PROSPECTOR 6

5110 83RD AVE NE
MARYSVILLE, WA 98270

SNOHOMISH COUNTY PARCEL NUMBER:
00590700010500

DATE:	5/6/2022
JOB:	1908.0007
BY:	DDS
SCALE:	1 " = 150 '
FIGURE NO.	1 of 5

HYDROPERIOD MAP



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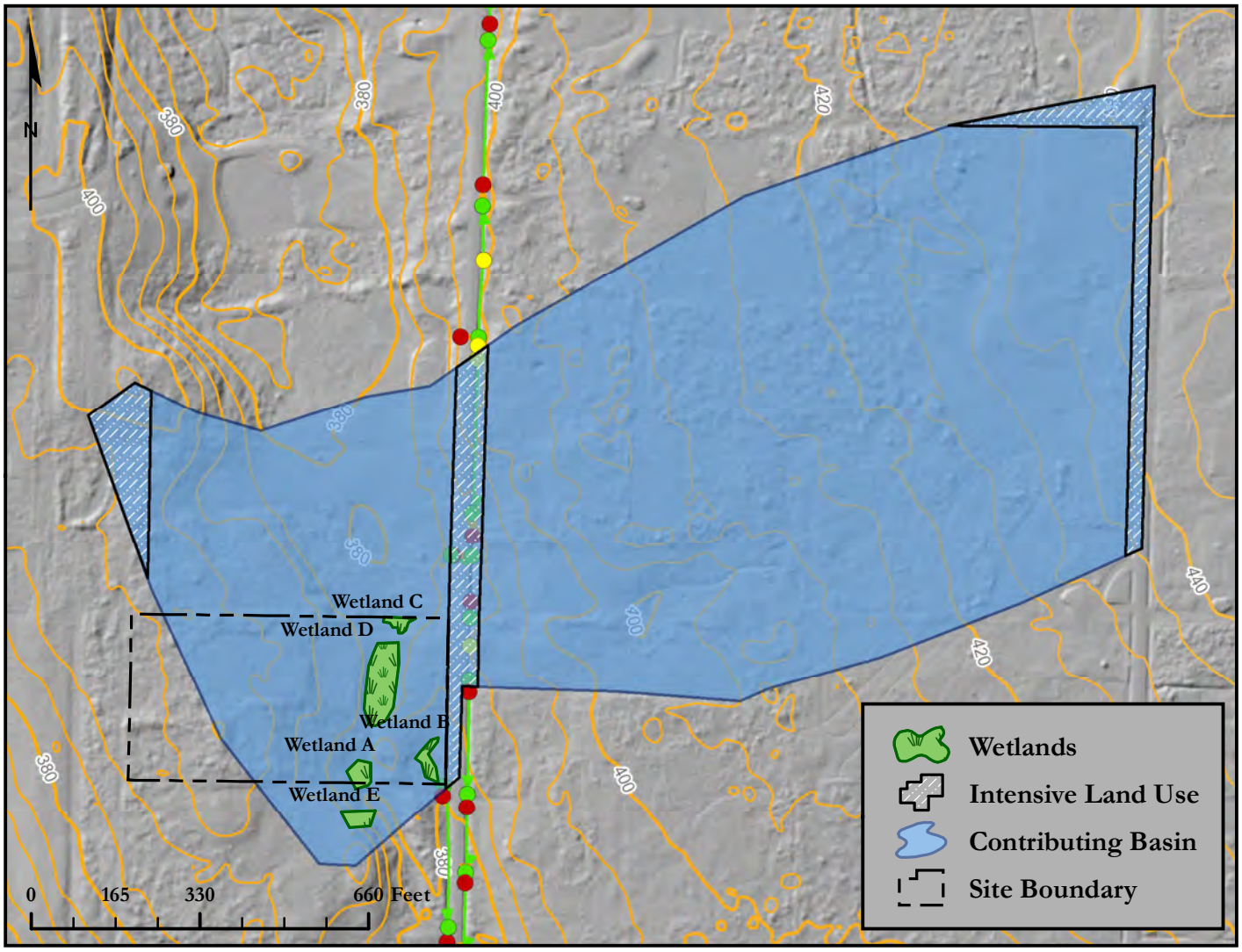
PROSPECTOR 6

5110 83RD AVE NE
MARYSVILLE, WA 98270

SNOHOMISH COUNTY PARCEL NUMBER:
00590700010500

DATE:	5/6/2022
JOB:	1908.0007
BY:	DDS
SCALE:	1 " = 100 '
FIGURE NO.	2 of 5

CONTRIBUTING BASIN MAP



D.4.0		
D.4.3		
	Area of Contributing Basin (SF)	1,690,804
	Area of Wetland A (SF)	1,912
	Percent of Wetland A within Contributing Basin	**0.113%**
	Area of Wetland B (SF)	1755.65
	Percent of Wetland B within Contributing Basin	**0.104%**
	Area of Wetland C (SF)	1002.16
	Percent of Wetland C within Contributing Basin	**0.059%**
	Area of Wetland D (SF)	8435.79
	Percent of Wetland D within Contributing Basin	**0.499%**
	Area of Wetland E (SF)	1631.82
	Percent of Wetland E within Contributing Basin	**0.097%**
D.5.0		
D.5.3		
	Area of Contributing Basin	1,690,804
	Area of Intensive Human Land Uses	110,631
	Percent of Intensive Human Land Use within Contributing Basin	**7%**

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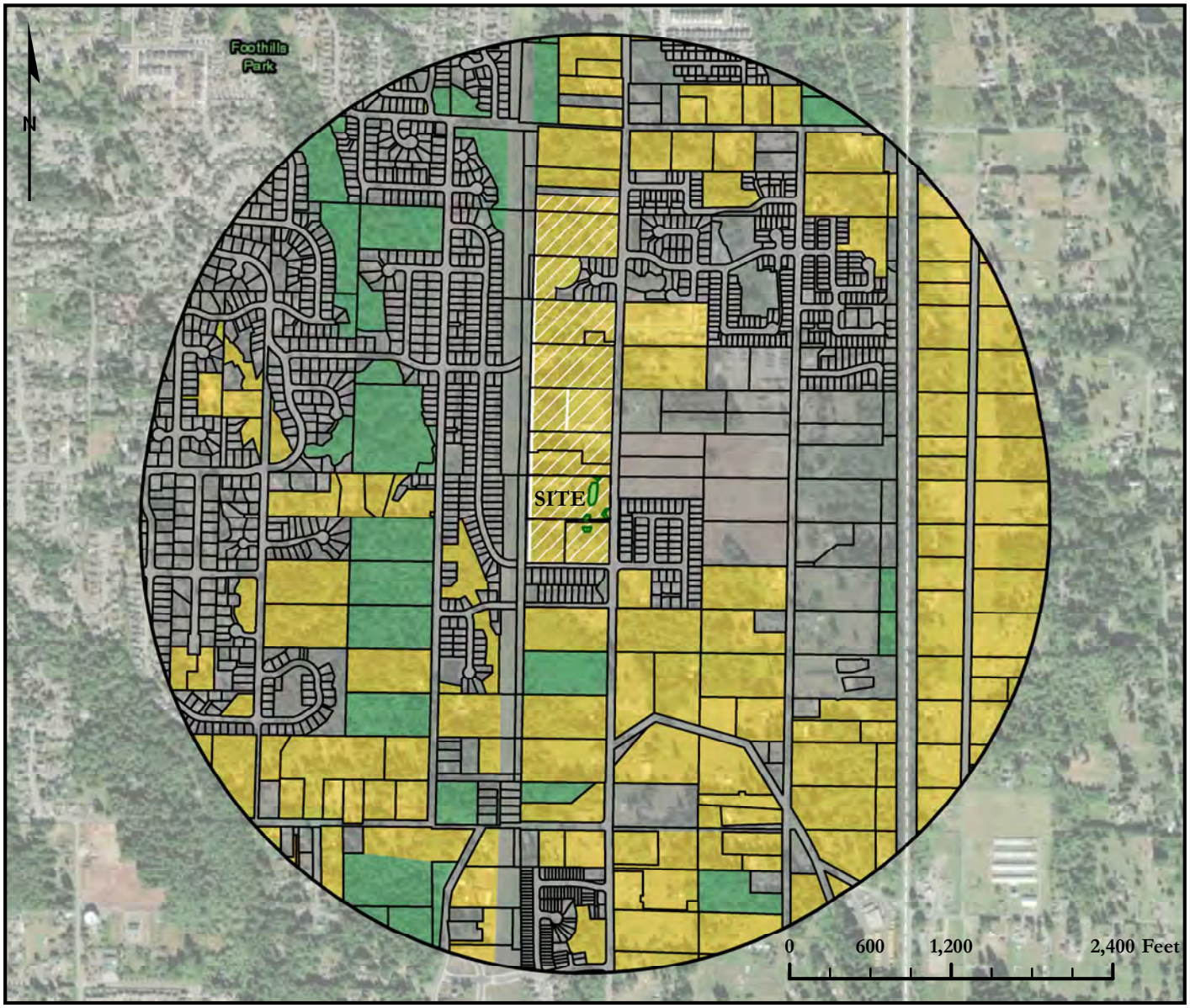
PROSPECTOR 6

5110 83RD AVE NE
MARYSVILLE, WA 98270

SNOHOMISH COUNTY PARCEL NUMBER:
00590700010500

DATE: 5/6/2022
JOB: 1908.0007
BY: DDS
SCALE: 1 " = 330 '
FIGURE NO. 3 of 5

HABITAT MAP



H.2.0 Wetlands A, B, C, D, & E		
H.2.1		
	Abutting Undisturbed Habitat	0.00%
	Abutting Moderate & Low Intensity Land Uses	4.13%
	Accessible Habitat	**2.07%**
H.2.2		
	Undisturbed Habitat	9.00%
	Moderate & Low Intensity Land Uses	39.77%
	Undisturbed Habitat in 1 KM Polygon	**28.88%**
H.2.3		
	High Intensity Land Use in 1 KM Polygon	**51.23%**

- 1 KM Polygon
- Accessible Habitat
- Moderate & Low Intensity
- Relatively Undisturbed
- High Intensity

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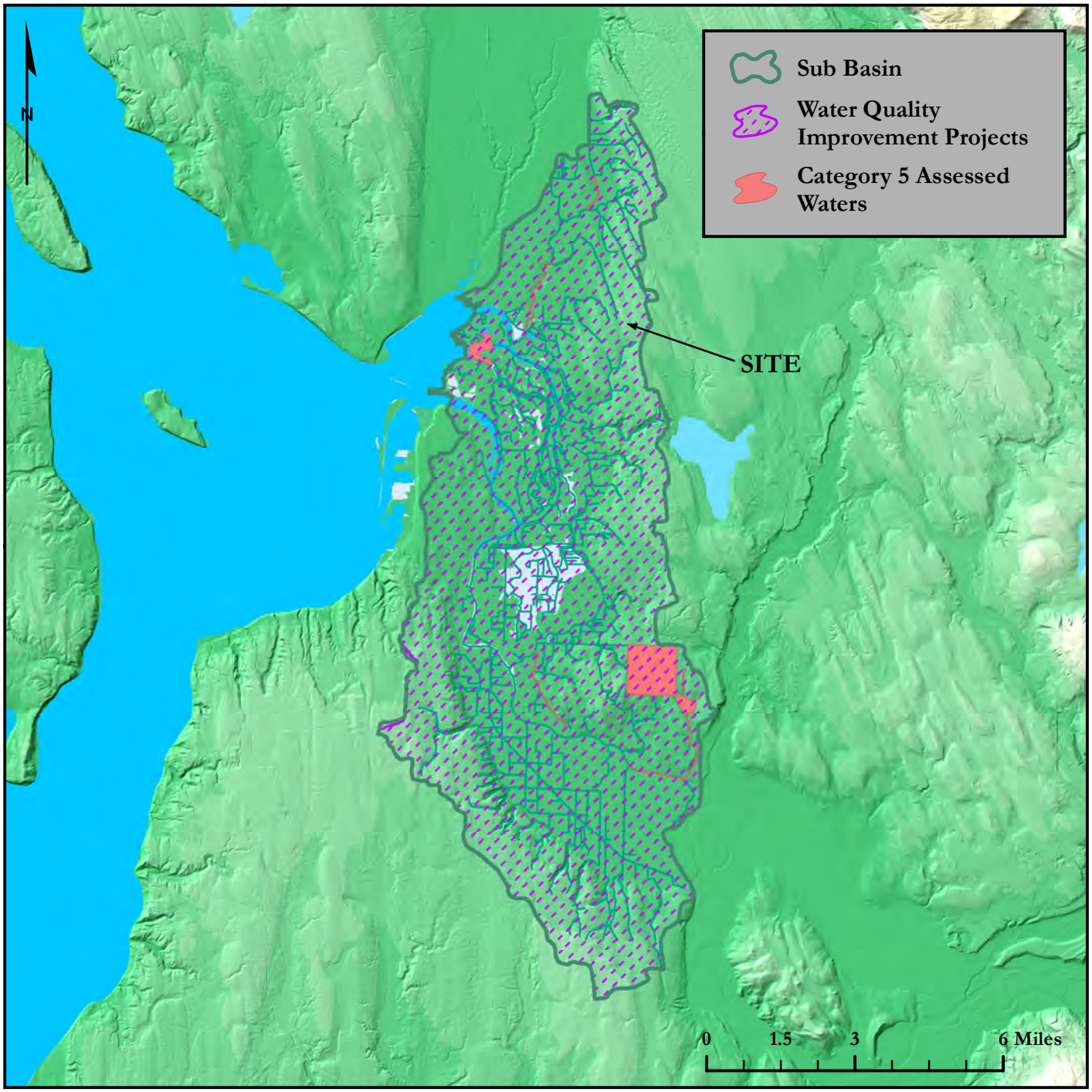
PROSPECTOR 6

5110 83RD AVE NE
MARYSVILLE, WA 98270

SNOHOMISH COUNTY PARCEL NUMBER:
00590700010500

DATE: 5/6/2022
JOB: 1908.0007
BY: DDS
SCALE: 1 " = 1,200 '
FIGURE NO. 4 of 5

303(D) MAP



Name	Pollutants	TMDL ID	WRIA	Year Approved
Snohomish River Tributaries Bacteria TMDL	Bacteria	34	7	2001
Little Bear Creek Bacteria TMDL	Bacteria	62	8	2005
North Creek Bacteria TMDL	Bacteria	43	8	2002
Snohomish River Estuary Multiparameter TMDL	Ammonia-N, CBOD, Dissolved Oxygen	48	7	2002

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PROSPECTOR 6

5110 83RD AVE NE
MARYSVILLE, WA 98270

SNOHOMISH COUNTY PARCEL NUMBER:
00590700010500

DATE: 5/6/2022
JOB: 1908.0007
BY: DDS
SCALE: 1 " = 3 mi
FIGURE NO. 5 of 5

Appendix H — Qualifications

All field inspections, wetland delineations, habitat assessments, and supporting documentation, including this ***Wetland and Fish and Wildlife Habitat Assessment Report*** prepared for ***Prospector 6*** site were prepared by, or under the direction of, Jon Picket of SVC. In addition, the site investigations were performed by Rachael Hyland, report preparation was completed by Mae Ancheta, and additional project oversight and final report review by Kyla Caddey.

Jon Pickett

Associate Principal
Professional Experience: 10+ years

Jon Pickett is an Associate Principal and Senior Scientist with a diverse background in environmental and shoreline compliance and permitting, wetland and stream ecology, fish and wildlife biology, mitigation compliance and design, and environmental planning and land use due diligence. Jon oversees a wide range of large-scale industrial, commercial, and multi-family residential projects throughout Western Washington, providing environmental permitting and regulatory compliance assistance for land use entitlement projects from feasibility through mitigation compliance. Jon performs wetland, stream, and shoreline delineations and fish & wildlife habitat assessments; conducts code and regulation analysis and review; prepares reports and permit applications and documents; provides environmental compliance recommendation; and provides restoration and mitigation design.

Jon earned a Bachelor of Science degree in Natural Resource Sciences from Washington State University and Bachelor of Science and Minor in Forestry from Washington State University. Jon has received 40-hour wetland delineation training (Western Mountains, Valleys, & Coast and Arid West Regional Supplements) and regularly performs wetland, stream, and shoreline delineations. Jon is a Whatcom County Qualified Wetland Specialist and Wildlife Biologist and is a Pierce County Qualified Wetland Specialist. He has been formally trained by WSDOE in the use of the Washington State Wetland Rating System 2014, How to Determine the Ordinary High-Water Mark (Freshwater and Marine), Using Field Indicators for Hydric Soils, and the Using the Credit-Debit Method for Estimating Mitigation Needs.

Rachael Hyland, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 9 years

Rachael Hyland is a Senior Environmental Scientist with extensive wetland and stream delineation and regulatory coordination experience. Rachael has a background in wetland and ecological habitat assessments in various states, most notably Washington, Connecticut, Massachusetts, Rhode Island, and Ohio. She has experience in assessing wetland, stream, riparian, and tidal systems, as well as complicated agricultural and disturbed sites. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports, biological evaluations, and permit applications to support clients through the regulatory and planning process for various land use projects. She also has extensive knowledge of bats and their associated habitats and white nose syndrome (*Pseudogymnoascus destructans*), a fungal disease affecting bats which was recently documented in Washington.

Rachael earned a Bachelor of Science degree in Ecology and Evolutionary Biology from the University of Connecticut, with additional ecology studies at the graduate level. Rachael is a Professional Wetland Scientist (PWS #3480) through the Society of Wetland Scientists as well as a Certified Ecologist through the Ecological Society of America. She has completed 40-hour wetland delineation training for Western Mountains, Valleys, & Coast and Arid West Regional Supplement, in addition to formal training for the Northcentral and Northeast supplement, and experience with the Midwest, Eastern Mountains and Piedmont, and Atlantic and Gulf Coast supplements. She has also received formal training from the Washington State Department of Ecology in the Using the Revised 2014 Wetland Rating System for Western Washington, How to Determine the Ordinary High Water Mark, Navigating SEPA, Selecting Wetland Mitigation Sites Using a Watershed Approach, and Wetland Classification. Rachael has also received training from the Washington State Department of Transportation in Biological Assessment Preparation for Transportation Projects and is listed by WSDOT as a junior author for preparing Biological Assessments.

Kyla Caddey, PWS, Certified Ecologist

Senior Environmental Scientist
Professional Experience: 7 years

Kyla Caddey is a Senior Environmental Scientist with a diverse background in stream and wetland ecology, wildlife ecology and conservation, wildlife and natural resource assessments and monitoring, and riparian habitat restoration at various public and private entities. Kyla has field experience performing in-depth studies in both the Pacific Northwest and Central American ecosystems which included various environmental science research and statistical analysis. Kyla has advanced expertise in federal- and state-listed endangered, threatened, and sensitive species surveys and assessment of aquatic and terrestrial systems throughout the Puget Sound region. She has completed hundreds of wetland delineations and has extensive knowledge and interest in hydric soil identification. As the senior writer, she provides informed project oversight and performs final quality assurance / quality control on various types of scientific reports for agency submittal, including: Biological Assessments/Evaluations; Wetland, Shoreline, and Fish and Wildlife Habitat Assessments; Mitigation Plans, and Mitigation Monitoring Reports. She currently performs wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; prepares scientific reports; and provides environmental permitting and regulatory compliance assistance to support a wide range of commercial, industrial, and multi-family residential land use projects.

Kyla earned a Bachelor of Science degree in Environmental Science and Resource Management from the University of Washington, Seattle with a focus in Wildlife Conservation and a minor in Quantitative Science. She has also completed additional coursework in Comprehensive Bird Biology from Cornell University. Ms. Caddey is a Certified Professional Wetland Scientist (PWS #3479) through the Society of Wetland Scientists and Certified Ecologist through the Ecological Society of America. She has received 40-hour wetland delineation training (Western Mtns, Valleys, & Coast and Arid West Regional Supplement), is a Pierce County Qualified Wetland Specialist and Wildlife Biologist, and is a USFWS-approved Mazama pocket gopher survey biologist. Kyla has been formally trained through the Washington State Department of Ecology, Coastal Training Program, and the Washington Native Plant Society in winter twig and grass, sedge, and rush identification for Western WA; Using the Credit-Debit Method in Estimating Wetland Mitigation Needs; How to Determine the Ordinary High Water Mark; Using Field Indicators for Hydric Soils; How to Administer Development Permits in Washington Shorelines; Puget Sound Coastal Processes; and Forage Fish Survey

Techniques. Additionally, she has received formal training in preparing WSDOT Biological Assessments.

APPENDIX 3

Land Use Area Summary

WWHM Project Reports

Land Use Area Summary - Basin 1

Groundhog PRD Preliminary Plat

		sf	acres
Basin 1 (West)		137,415	**3.155**
Pre-Developed Condition			
Impervious			
		0	**0.000**
	Impervious Sub-total:	**0**	**0.000**
Pervious			
	Forest (Per WSDOE)	137,415	**3.155**
	Pervious Sub-total:	**137,415**	**3.155**
	Basin Total:	**137,415**	**3.155**
Devloped Condition			
Impervious			
	ROW Hardscape - (80% Imperv)	23,250	**0.534**
	Autocourt Hardscape - (100% Imperv)	4,605	**0.106**
	SFR Lots Hardscape - (70% Imperv)	62,493	**1.435**
	Storm Tract Hardscape - (15% Imperv)	1,736	**0.040**
	Impervious Sub-total:	**92,084**	**2.114**
Pervious			
	ROW Landscape - (20% Pervious)	5,813	**0.133**
	SFR Lots Landscape - (30% Pervious)	26,783	**0.615**
	Storm Tract Landscape - (85% Pervious)	9,838	**0.226**
	Open Space (Forest)	2,898	**0.067**
	Pervious Sub-total:	**45,331**	**1.041**
	Basin Total:	**137,415**	**3.155**

Land Use Area Summary - Basin 2

Groundhog PRD Preliminary Plat

		sf	acres
Basin 2 (East)		74,188	**1.703**
Pre-Developed Condition			
Impervious			
	Ex Asphalt (83 Ave Overlay)	3,527	**0.081**
	Impervious Sub-total:	**3,527**	**0.081**
Pervious			
	Forest (Per WSDOE)	56,765	**1.303**
	Forest, (Saturated Wetland)	13,896	**0.319**
	Pervious Sub-total:	**70,661**	**1.622**
	Basin Total:	**74,188**	**1.703**
Devloped Condition			
Impervious			
	Pavement	12,881	**0.296**
	Sidewalk	3,229	**0.074**
	Storm Tract Hardscape - (15% Imperv)	1,264	**0.029**
	Impervious Sub-total:	**17,374**	**0.399**
Pervious			
	Forest (Open Space)	34,984	**0.803**
	Forest, (Saturated Wetland)	11,031	**0.253**
	Landscape	3,636	**0.083**
	Storm Tract Landscape - (85% Pervious)	7,163	**0.164**
	Pervious Sub-total:	**56,814**	**1.304**
	Basin Total:	**74,188**	**1.703**

WWHM2012
PROJECT REPORT

Project Name: PRD5-PP-West
Site Name: Groundhog PRD
Site Address: 5110 83 Ave NE
City : Marysville
Report Date: 5/6/2022
Gage : Everett
Data Start : 1948/10/01
Data End : 2009/09/30
Precip Scale: 1.20
Version : 2014/11/12

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

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C, Forest, Flat	3.155
Pervious Total	3.155

Impervious Land Use	Acres
Impervious Total	0.000
Basin Total	3.155

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres

C, Forest, Flat	**0.067**
C, Lawn, Flat	**0.974**
Pervious Total	**1.041**

Impervious Land Use	**Acres**
ROADS FLAT	**0.534**
ROOF TOPS FLAT	**1.434**
DRIVEWAYS FLAT	**0.106**
SIDEWALKS FLAT	**0.040**
Impervious Total	**2.114**
Basin Total	**3.155**

Element Flows To:

Surface	**Interflow**	**Groundwater**
Vault 1	Vault 1	

Name : Vault 1
Width : 40 ft.
Length : 162.770003659183 ft.
Depth: 9 ft.

Discharge Structure

Riser Height: 8 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 1.04 in. **Elevation:** 0 ft.
Orifice 2 Diameter: 1.62 in. **Elevation:** 4.426 ft.
Orifice 3 Diameter: 0.98 in. **Elevation:** 5.09 ft.

Element Flows To:

Outlet 1	**Outlet 2**

Vault Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.149	0.000	0.000	0.000
0.1000	0.149	0.014	0.009	0.000
0.2000	0.149	0.029	0.012	0.000
0.3000	0.149	0.044	0.015	0.000
0.4000	0.149	0.059	0.018	0.000
0.5000	0.149	0.074	0.020	0.000
0.6000	0.149	0.089	0.022	0.000
0.7000	0.149	0.104	0.023	0.000
0.8000	0.149	0.119	0.025	0.000
0.9000	0.149	0.134	0.026	0.000
1.0000	0.149	0.149	0.028	0.000
1.1000	0.149	0.164	0.029	0.000
1.2000	0.149	0.179	0.031	0.000

1.3000	0.149	0.194	0.032	0.000
1.4000	0.149	0.209	0.033	0.000
1.5000	0.149	0.224	0.034	0.000
1.6000	0.149	0.239	0.035	0.000
1.7000	0.149	0.254	0.037	0.000
1.8000	0.149	0.269	0.038	0.000
1.9000	0.149	0.284	0.039	0.000
2.0000	0.149	0.298	0.040	0.000
2.1000	0.149	0.313	0.041	0.000
2.2000	0.149	0.328	0.042	0.000
2.3000	0.149	0.343	0.043	0.000
2.4000	0.149	0.358	0.044	0.000
2.5000	0.149	0.373	0.044	0.000
2.6000	0.149	0.388	0.045	0.000
2.7000	0.149	0.403	0.046	0.000
2.8000	0.149	0.418	0.047	0.000
2.9000	0.149	0.433	0.048	0.000
3.0000	0.149	0.448	0.049	0.000
3.1000	0.149	0.463	0.050	0.000
3.2000	0.149	0.478	0.050	0.000
3.3000	0.149	0.493	0.051	0.000
3.4000	0.149	0.508	0.052	0.000
3.5000	0.149	0.523	0.053	0.000
3.6000	0.149	0.538	0.053	0.000
3.7000	0.149	0.553	0.054	0.000
3.8000	0.149	0.568	0.055	0.000
3.9000	0.149	0.582	0.056	0.000
4.0000	0.149	0.597	0.056	0.000
4.1000	0.149	0.612	0.057	0.000
4.2000	0.149	0.627	0.058	0.000
4.3000	0.149	0.642	0.058	0.000
4.4000	0.149	0.657	0.059	0.000
4.5000	0.149	0.672	0.079	0.000
4.6000	0.149	0.687	0.089	0.000
4.7000	0.149	0.702	0.097	0.000
4.8000	0.149	0.717	0.104	0.000
4.9000	0.149	0.732	0.110	0.000
5.0000	0.149	0.747	0.115	0.000
5.1000	0.149	0.762	0.123	0.000
5.2000	0.149	0.777	0.133	0.000
5.3000	0.149	0.792	0.141	0.000
5.4000	0.149	0.807	0.148	0.000
5.5000	0.149	0.822	0.154	0.000
5.6000	0.149	0.837	0.159	0.000
5.7000	0.149	0.852	0.165	0.000
5.8000	0.149	0.866	0.170	0.000
5.9000	0.149	0.881	0.175	0.000
6.0000	0.149	0.896	0.180	0.000
6.1000	0.149	0.911	0.184	0.000
6.2000	0.149	0.926	0.189	0.000
6.3000	0.149	0.941	0.193	0.000
6.4000	0.149	0.956	0.197	0.000
6.5000	0.149	0.971	0.201	0.000
6.6000	0.149	0.986	0.205	0.000
6.7000	0.149	1.001	0.209	0.000
6.8000	0.149	1.016	0.213	0.000
6.9000	0.149	1.031	0.217	0.000

7.0000	0.149	1.046	0.220	0.000
7.1000	0.149	1.061	0.224	0.000
7.2000	0.149	1.076	0.227	0.000
7.3000	0.149	1.091	0.231	0.000
7.4000	0.149	1.106	0.234	0.000
7.5000	0.149	1.121	0.237	0.000
7.6000	0.149	1.136	0.241	0.000
7.7000	0.149	1.150	0.244	0.000
7.8000	0.149	1.165	0.247	0.000
7.9000	0.149	1.180	0.250	0.000
8.0000	0.149	1.195	0.253	0.000
8.1000	0.149	1.210	0.718	0.000
8.2000	0.149	1.225	1.566	0.000
8.3000	0.149	1.240	2.663	0.000
8.4000	0.149	1.255	3.961	0.000
8.5000	0.149	1.270	5.433	0.000
8.6000	0.149	1.285	7.060	0.000
8.7000	0.149	1.300	8.829	0.000
8.8000	0.149	1.315	10.73	0.000
8.9000	0.149	1.330	12.75	0.000
9.0000	0.149	1.345	14.89	0.000
9.1000	0.149	1.360	17.13	0.000
9.2000	0.000	0.000	19.49	0.000

ANALYSIS RESULTS

Stream Protection Duration

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 3.155
Total Impervious Area: 0.000

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.041
Total Impervious Area: 2.114

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.106009
5 year	0.162621
10 year	0.206282
25 year	0.268749
50 year	0.320774
100 year	0.377670

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.063184
5 year	0.096062
10 year	0.123483

25 year	0.165536
50 year	0.202906
100 year	0.246056

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

Year	Predeveloped	Mitigated
1949	0.106	0.050
1950	0.108	0.056
1951	0.097	0.048
1952	0.076	0.045
1953	0.064	0.045
1954	0.346	0.054
1955	0.136	0.104
1956	0.120	0.117
1957	0.149	0.083
1958	0.108	0.051
1959	0.107	0.054
1960	0.100	0.057
1961	0.188	0.100
1962	0.093	0.047
1963	0.153	0.050
1964	0.110	0.041
1965	0.092	0.057
1966	0.054	0.047
1967	0.109	0.048
1968	0.133	0.058
1969	0.323	0.051
1970	0.076	0.049
1971	0.120	0.132
1972	0.089	0.053
1973	0.084	0.056
1974	0.182	0.054
1975	0.074	0.045
1976	0.076	0.053
1977	0.064	0.049
1978	0.076	0.045
1979	0.212	0.050
1980	0.099	0.045
1981	0.078	0.046
1982	0.101	0.093
1983	0.172	0.048
1984	0.104	0.150
1985	0.126	0.105
1986	0.296	0.204
1987	0.141	0.171
1988	0.073	0.099
1989	0.075	0.044
1990	0.099	0.075
1991	0.102	0.056
1992	0.078	0.058
1993	0.064	0.042
1994	0.071	0.057
1995	0.103	0.110
1996	0.177	0.093
1997	0.351	0.315

1998	0.065	0.048
1999	0.084	0.058
2000	0.063	0.122
2001	0.025	0.037
2002	0.096	0.059
2003	0.075	0.055
2004	0.127	0.108
2005	0.088	0.055
2006	0.235	0.093
2007	0.186	0.065
2008	0.261	0.201
2009	0.080	0.057

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

Rank	Predeveloped	Mitigated
1	0.3512	0.3147
2	0.3463	0.2038
3	0.3231	0.2009
4	0.2961	0.1708
5	0.2610	0.1496
6	0.2350	0.1321
7	0.2121	0.1220
8	0.1883	0.1174
9	0.1860	0.1104
10	0.1818	0.1082
11	0.1766	0.1048
12	0.1722	0.1043
13	0.1532	0.1005
14	0.1492	0.0995
15	0.1413	0.0932
16	0.1364	0.0931
17	0.1329	0.0928
18	0.1268	0.0831
19	0.1259	0.0746
20	0.1205	0.0647
21	0.1203	0.0589
22	0.1102	0.0584
23	0.1093	0.0582
24	0.1083	0.0578
25	0.1078	0.0573
26	0.1069	0.0573
27	0.1059	0.0571
28	0.1040	0.0567
29	0.1035	0.0565
30	0.1018	0.0564
31	0.1010	0.0562
32	0.0996	0.0552
33	0.0994	0.0551
34	0.0988	0.0544
35	0.0968	0.0543
36	0.0962	0.0538
37	0.0930	0.0533
38	0.0920	0.0531
39	0.0888	0.0512
40	0.0883	0.0511

41	0.0844	0.0502
42	0.0840	0.0498
43	0.0795	0.0497
44	0.0779	0.0491
45	0.0776	0.0491
46	0.0764	0.0483
47	0.0762	0.0483
48	0.0762	0.0477
49	0.0761	0.0475
50	0.0754	0.0470
51	0.0745	0.0469
52	0.0740	0.0461
53	0.0732	0.0454
54	0.0706	0.0454
55	0.0646	0.0454
56	0.0642	0.0450
57	0.0642	0.0448
58	0.0640	0.0443
59	0.0634	0.0423
60	0.0539	0.0412
61	0.0254	0.0371

Stream Protection Duration
POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0530	19601	17979	91	Pass
0.0557	17612	12656	71	Pass
0.0584	15002	6269	41	Pass
0.0611	12799	3606	28	Pass
0.0638	11443	3501	30	Pass
0.0665	9693	3354	34	Pass
0.0692	8267	3221	38	Pass
0.0719	7437	3123	41	Pass
0.0746	6348	2977	46	Pass
0.0773	5392	2836	52	Pass
0.0801	4665	2678	57	Pass
0.0828	4231	2539	60	Pass
0.0855	3638	2363	64	Pass
0.0882	3148	2216	70	Pass
0.0909	2864	2099	73	Pass
0.0936	2515	1867	74	Pass
0.0963	2184	1678	76	Pass
0.0990	1987	1586	79	Pass
0.1017	1710	1436	83	Pass
0.1044	1521	1304	85	Pass
0.1071	1374	1153	83	Pass
0.1098	1280	1082	84	Pass
0.1125	1169	1010	86	Pass
0.1152	1074	942	87	Pass
0.1179	1027	897	87	Pass
0.1206	962	848	88	Pass
0.1233	895	808	90	Pass

0.1260	825	783	94	Pass
0.1287	786	768	97	Pass
0.1314	739	743	100	Pass
0.1341	688	716	104	Pass
0.1369	661	702	106	Pass
0.1396	625	679	108	Pass
0.1423	603	656	108	Pass
0.1450	590	634	107	Pass
0.1477	567	601	105	Pass
0.1504	541	572	105	Pass
0.1531	508	552	108	Pass
0.1558	491	539	109	Pass
0.1585	474	519	109	Pass
0.1612	457	500	109	Pass
0.1639	444	486	109	Pass
0.1666	427	463	108	Pass
0.1693	414	436	105	Pass
0.1720	394	408	103	Pass
0.1747	383	393	102	Pass
0.1774	369	363	98	Pass
0.1801	354	346	97	Pass
0.1828	343	335	97	Pass
0.1855	335	320	95	Pass
0.1882	322	294	91	Pass
0.1909	314	280	89	Pass
0.1937	308	264	85	Pass
0.1964	293	242	82	Pass
0.1991	284	216	76	Pass
0.2018	277	179	64	Pass
0.2045	269	165	61	Pass
0.2072	257	161	62	Pass
0.2099	247	157	63	Pass
0.2126	235	150	63	Pass
0.2153	227	130	57	Pass
0.2180	216	127	58	Pass
0.2207	206	107	51	Pass
0.2234	195	96	49	Pass
0.2261	187	89	47	Pass
0.2288	181	85	46	Pass
0.2315	166	78	46	Pass
0.2342	160	70	43	Pass
0.2369	153	65	42	Pass
0.2396	147	59	40	Pass
0.2423	135	50	37	Pass
0.2450	128	43	33	Pass
0.2477	124	39	31	Pass
0.2505	111	24	21	Pass
0.2532	100	13	13	Pass
0.2559	88	8	9	Pass
0.2586	75	8	10	Pass
0.2613	64	8	12	Pass
0.2640	60	7	11	Pass
0.2667	57	6	10	Pass
0.2694	51	5	9	Pass
0.2721	42	5	11	Pass
0.2748	40	4	10	Pass
0.2775	37	4	10	Pass

0.2802	36	4	11	Pass
0.2829	33	4	12	Pass
0.2856	28	3	10	Pass
0.2883	26	3	11	Pass
0.2910	19	3	15	Pass
0.2937	16	3	18	Pass
0.2964	15	2	13	Pass
0.2991	8	1	12	Pass
0.3018	7	1	14	Pass
0.3045	5	1	20	Pass
0.3073	4	1	25	Pass
0.3100	4	1	25	Pass
0.3127	3	1	33	Pass
0.3154	3	0	0	Pass
0.3181	3	0	0	Pass
0.3208	3	0	0	Pass

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0.0933 **acre-feet**
On-line facility target flow: 0.0471 **cfs.**
Adjusted for 15 min: 0.0471 **cfs.**
Off-line facility target flow: 0.031 **cfs.**
Adjusted for 15 min: 0.031 **cfs.**

LID Report

LID Technique	Used for Water Quality?	Total Volumn Needs Treatment (ac-ft)	Volumn Through Facility (ac-ft)	Infiltration Volumn (ac-ft)	Cumulative Volumn Infiltration Credit	Percent Infiltrated	Comment
Vault 1 POC	N	472.01			N	0.00	
Total Volume Infiltrated		472.01	0.00	0.00			
0.00	0.00	No Treat. Credit					

Compliance with LID Standard 8
Duration Analysis Result = Passed

Perlnd and Implnd Changes

No changes have been made.

WWHM2012
PROJECT REPORT

Project Name: PRD5-PP-East
Site Name: Groundhog PRD
Site Address: 5110 83 Ave NE
City : Marysville
Report Date: 5/6/2022
Gage : Everett
Data Start : 1948/10/01
Data End : 2009/09/30
Precip Scale: 1.20
Version : 2014/11/12

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

High Flow Threshold for POC 1: 50 year

PREDEVELOPED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C, Forest, Flat	1.303
SAT, Forest, Flat	0.319
Pervious Total	1.622

Impervious Land Use	Acres
ROADS FLAT	0.081
Impervious Total	0.081
Basin Total	1.703

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : Basin 1
Bypass: No

GroundWater: No

Pervious Land Use	Acres
C, Forest, Flat	0.803
SAT, Forest, Flat	0.253
C, Lawn, Flat	0.248
Pervious Total	1.304

Impervious Land Use	Acres
ROADS FLAT	0.296
DRIVEWAYS FLAT	0.029
SIDEWALKS FLAT	0.074
Impervious Total	0.399
Basin Total	1.703

Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

Name : Vault 1
Width : 30 ft.
Length : 95.0511298580462 ft.
Depth: 4 ft.

Discharge Structure

Riser Height: 3 ft.
Riser Diameter: 18 in.
Orifice 1 Diameter: 1.2 in. **Elevation:** 0 ft.
Orifice 2 Diameter: 1.75 in. **Elevation:** 2.001 ft.
Orifice 3 Diameter: 1.04 in. **Elevation:** 2.25 ft.

Element Flows To:

Outlet 1	Outlet 2

Vault Hydraulic Table

Stage(ft)	Area(ac)	Volume(ac-ft)	Discharge(cfs)	Infilt(cfs)
0.0000	0.065	0.000	0.000	0.000
0.0444	0.065	0.002	0.008	0.000
0.0889	0.065	0.005	0.011	0.000
0.1333	0.065	0.008	0.013	0.000
0.1778	0.065	0.011	0.015	0.000
0.2222	0.065	0.014	0.017	0.000
0.2667	0.065	0.017	0.019	0.000
0.3111	0.065	0.020	0.021	0.000
0.3556	0.065	0.023	0.022	0.000
0.4000	0.065	0.026	0.023	0.000
0.4444	0.065	0.029	0.025	0.000

0.4889	0.065	0.032	0.026	0.000
0.5333	0.065	0.034	0.027	0.000
0.5778	0.065	0.037	0.028	0.000
0.6222	0.065	0.040	0.029	0.000
0.6667	0.065	0.043	0.030	0.000
0.7111	0.065	0.046	0.031	0.000
0.7556	0.065	0.049	0.032	0.000
0.8000	0.065	0.052	0.033	0.000
0.8444	0.065	0.055	0.034	0.000
0.8889	0.065	0.058	0.035	0.000
0.9333	0.065	0.061	0.036	0.000
0.9778	0.065	0.064	0.037	0.000
1.0222	0.065	0.066	0.038	0.000
1.0667	0.065	0.069	0.039	0.000
1.1111	0.065	0.072	0.039	0.000
1.1556	0.065	0.075	0.040	0.000
1.2000	0.065	0.078	0.041	0.000
1.2444	0.065	0.081	0.042	0.000
1.2889	0.065	0.084	0.042	0.000
1.3333	0.065	0.087	0.043	0.000
1.3778	0.065	0.090	0.044	0.000
1.4222	0.065	0.093	0.045	0.000
1.4667	0.065	0.096	0.045	0.000
1.5111	0.065	0.098	0.046	0.000
1.5556	0.065	0.101	0.047	0.000
1.6000	0.065	0.104	0.047	0.000
1.6444	0.065	0.107	0.048	0.000
1.6889	0.065	0.110	0.049	0.000
1.7333	0.065	0.113	0.049	0.000
1.7778	0.065	0.116	0.050	0.000
1.8222	0.065	0.119	0.051	0.000
1.8667	0.065	0.122	0.051	0.000
1.9111	0.065	0.125	0.052	0.000
1.9556	0.065	0.128	0.052	0.000
2.0000	0.065	0.130	0.053	0.000
2.0444	0.065	0.133	0.070	0.000
2.0889	0.065	0.136	0.078	0.000
2.1333	0.065	0.139	0.084	0.000
2.1778	0.065	0.142	0.089	0.000
2.2222	0.065	0.145	0.094	0.000
2.2667	0.065	0.148	0.102	0.000
2.3111	0.065	0.151	0.109	0.000
2.3556	0.065	0.154	0.115	0.000
2.4000	0.065	0.157	0.120	0.000
2.4444	0.065	0.160	0.125	0.000
2.4889	0.065	0.162	0.129	0.000
2.5333	0.065	0.165	0.134	0.000
2.5778	0.065	0.168	0.138	0.000
2.6222	0.065	0.171	0.142	0.000
2.6667	0.065	0.174	0.145	0.000
2.7111	0.065	0.177	0.149	0.000
2.7556	0.065	0.180	0.152	0.000
2.8000	0.065	0.183	0.156	0.000
2.8444	0.065	0.186	0.159	0.000
2.8889	0.065	0.189	0.162	0.000
2.9333	0.065	0.192	0.165	0.000
2.9778	0.065	0.194	0.169	0.000

3.0222	0.065	0.197	0.220	0.000
3.0667	0.065	0.200	0.426	0.000
3.1111	0.065	0.203	0.718	0.000
3.1556	0.065	0.206	1.076	0.000
3.2000	0.065	0.209	1.490	0.000
3.2444	0.065	0.212	1.951	0.000
3.2889	0.065	0.215	2.457	0.000
3.3333	0.065	0.218	3.002	0.000
3.3778	0.065	0.221	3.586	0.000
3.4222	0.065	0.224	4.204	0.000
3.4667	0.065	0.226	4.856	0.000
3.5111	0.065	0.229	5.539	0.000
3.5556	0.065	0.232	6.253	0.000
3.6000	0.065	0.235	6.995	0.000
3.6444	0.065	0.238	7.766	0.000
3.6889	0.065	0.241	8.564	0.000
3.7333	0.065	0.244	9.387	0.000
3.7778	0.065	0.247	10.23	0.000
3.8222	0.065	0.250	11.11	0.000
3.8667	0.065	0.253	12.00	0.000
3.9111	0.065	0.256	12.92	0.000
3.9556	0.065	0.258	13.87	0.000
4.0000	0.065	0.261	14.83	0.000
4.0444	0.065	0.264	15.82	0.000
4.0889	0.000	0.000	16.83	0.000

ANALYSIS RESULTS

Stream Protection Duration

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 1.622
Total Impervious Area: 0.081

Mitigated Landuse Totals for POC #1
Total Pervious Area: 1.304
Total Impervious Area: 0.399

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.099599
5 year	0.146710
10 year	0.182718
25 year	0.233977
50 year	0.276533
100 year	0.322999

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.040233

5 year	0.057807
10 year	0.072118
25 year	0.093627
50 year	0.112404
100 year	0.133780

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

Year	Predeveloped	Mitigated
1949	0.091	0.034
1950	0.100	0.040
1951	0.081	0.034
1952	0.077	0.030
1953	0.082	0.027
1954	0.253	0.042
1955	0.168	0.047
1956	0.102	0.050
1957	0.167	0.051
1958	0.153	0.037
1959	0.088	0.042
1960	0.105	0.044
1961	0.233	0.043
1962	0.102	0.039
1963	0.169	0.037
1964	0.084	0.036
1965	0.071	0.042
1966	0.055	0.028
1967	0.116	0.041
1968	0.091	0.047
1969	0.237	0.031
1970	0.075	0.034
1971	0.117	0.044
1972	0.140	0.038
1973	0.102	0.037
1974	0.152	0.039
1975	0.109	0.035
1976	0.067	0.036
1977	0.082	0.032
1978	0.081	0.030
1979	0.227	0.045
1980	0.083	0.034
1981	0.081	0.038
1982	0.105	0.049
1983	0.118	0.034
1984	0.090	0.047
1985	0.147	0.047
1986	0.206	0.155
1987	0.099	0.071
1988	0.064	0.036
1989	0.085	0.026
1990	0.060	0.042
1991	0.082	0.045
1992	0.082	0.038
1993	0.070	0.031
1994	0.056	0.038
1995	0.064	0.046

1996	0.172	0.051
1997	0.298	0.245
1998	0.072	0.034
1999	0.091	0.039
2000	0.090	0.044
2001	0.037	0.024
2002	0.076	0.043
2003	0.053	0.037
2004	0.076	0.051
2005	0.068	0.039
2006	0.180	0.078
2007	0.167	0.042
2008	0.172	0.164
2009	0.092	0.037

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

Rank	Predeveloped	Mitigated
1	0.2983	0.2451
2	0.2530	0.1643
3	0.2374	0.1549
4	0.2331	0.0784
5	0.2270	0.0707
6	0.2063	0.0515
7	0.1803	0.0508
8	0.1724	0.0507
9	0.1721	0.0502
10	0.1694	0.0486
11	0.1680	0.0473
12	0.1667	0.0469
13	0.1666	0.0469
14	0.1526	0.0469
15	0.1522	0.0463
16	0.1475	0.0451
17	0.1398	0.0446
18	0.1182	0.0444
19	0.1175	0.0438
20	0.1157	0.0436
21	0.1093	0.0433
22	0.1054	0.0426
23	0.1054	0.0424
24	0.1023	0.0418
25	0.1023	0.0417
26	0.1022	0.0417
27	0.0996	0.0417
28	0.0985	0.0405
29	0.0915	0.0402
30	0.0909	0.0394
31	0.0906	0.0392
32	0.0906	0.0391
33	0.0902	0.0385
34	0.0901	0.0380
35	0.0884	0.0380
36	0.0852	0.0378
37	0.0838	0.0377
38	0.0829	0.0372

39	0.0825	0.0371
40	0.0824	0.0370
41	0.0822	0.0366
42	0.0817	0.0366
43	0.0814	0.0363
44	0.0813	0.0362
45	0.0807	0.0361
46	0.0767	0.0349
47	0.0762	0.0343
48	0.0762	0.0343
49	0.0754	0.0343
50	0.0715	0.0342
51	0.0710	0.0341
52	0.0701	0.0337
53	0.0682	0.0316
54	0.0665	0.0309
55	0.0645	0.0307
56	0.0638	0.0303
57	0.0601	0.0298
58	0.0556	0.0285
59	0.0552	0.0273
60	0.0528	0.0260
61	0.0372	0.0237

Stream Protection Duration
POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0498	4425	1449	32	Pass
0.0521	3668	790	21	Pass
0.0544	3251	600	18	Pass
0.0567	2875	577	20	Pass
0.0590	2573	558	21	Pass
0.0613	2171	530	24	Pass
0.0635	1936	511	26	Pass
0.0658	1742	502	28	Pass
0.0681	1509	488	32	Pass
0.0704	1389	477	34	Pass
0.0727	1243	454	36	Pass
0.0750	1152	443	38	Pass
0.0773	1017	427	41	Pass
0.0796	926	410	44	Pass
0.0819	855	397	46	Pass
0.0842	751	380	50	Pass
0.0864	689	366	53	Pass
0.0887	639	350	54	Pass
0.0910	583	327	56	Pass
0.0933	538	317	58	Pass
0.0956	511	306	59	Pass
0.0979	484	299	61	Pass
0.1002	445	290	65	Pass
0.1025	427	285	66	Pass
0.1048	400	280	70	Pass

0.1071	365	271	74	Pass
0.1093	348	265	76	Pass
0.1116	340	261	76	Pass
0.1139	320	254	79	Pass
0.1162	302	246	81	Pass
0.1185	280	239	85	Pass
0.1208	268	231	86	Pass
0.1231	250	218	87	Pass
0.1254	231	211	91	Pass
0.1277	220	203	92	Pass
0.1300	212	197	92	Pass
0.1322	194	184	94	Pass
0.1345	180	176	97	Pass
0.1368	170	164	96	Pass
0.1391	157	153	97	Pass
0.1414	144	146	101	Pass
0.1437	133	141	106	Pass
0.1460	125	134	107	Pass
0.1483	111	122	109	Pass
0.1506	104	110	105	Pass
0.1529	98	101	103	Pass
0.1552	89	88	98	Pass
0.1574	81	78	96	Pass
0.1597	75	71	94	Pass
0.1620	65	48	73	Pass
0.1643	61	39	63	Pass
0.1666	57	28	49	Pass
0.1689	49	22	44	Pass
0.1712	44	21	47	Pass
0.1735	38	19	50	Pass
0.1758	35	17	48	Pass
0.1781	31	17	54	Pass
0.1803	30	16	53	Pass
0.1826	26	15	57	Pass
0.1849	23	14	60	Pass
0.1872	21	13	61	Pass
0.1895	19	13	68	Pass
0.1918	16	13	81	Pass
0.1941	14	12	85	Pass
0.1964	13	12	92	Pass
0.1987	12	12	100	Pass
0.2010	11	11	100	Pass
0.2032	11	10	90	Pass
0.2055	10	10	100	Pass
0.2078	9	9	100	Pass
0.2101	9	9	100	Pass
0.2124	9	9	100	Pass
0.2147	9	9	100	Pass
0.2170	9	8	88	Pass
0.2193	8	8	100	Pass
0.2216	6	6	100	Pass
0.2239	6	5	83	Pass
0.2261	6	4	66	Pass
0.2284	5	4	80	Pass
0.2307	5	3	60	Pass
0.2330	5	2	40	Pass
0.2353	4	2	50	Pass

0.2376	4	1	25	Pass
0.2399	3	1	33	Pass
0.2422	3	1	33	Pass
0.2445	3	1	33	Pass
0.2468	3	0	0	Pass
0.2491	3	0	0	Pass
0.2513	3	0	0	Pass
0.2536	3	0	0	Pass
0.2559	2	0	0	Pass
0.2582	2	0	0	Pass
0.2605	2	0	0	Pass
0.2628	2	0	0	Pass
0.2651	1	0	0	Pass
0.2674	1	0	0	Pass
0.2697	1	0	0	Pass
0.2720	1	0	0	Pass
0.2742	1	0	0	Pass
0.2765	1	0	0	Pass

Water Quality BMP Flow and Volume for POC #1
On-line facility volume: 0.0629 **acre-feet**
On-line facility target flow: 0.0329 **cfs.**
Adjusted for 15 min: 0.0329 **cfs.**
Off-line facility target flow: 0.0202 **cfs.**
Adjusted for 15 min: 0.0202 **cfs.**

LID Report

LID Technique	Used for Water Quality	Percent Treatment?	Total Volumn Needs Treatment (ac-ft)	Volumn Through Facility (ac-ft)	Infiltration Volumn (ac-ft)	Cumulative Volumn Infiltration Credit	Percent	Comment
Vault 1 POC	N		147.70			N	0.00	
Total Volume Infiltrated			147.70	0.00	0.00			
0.00	0.00	0%	No Treat. Credit					

Compliance with LID Standard 8
Duration Analysis Result = Passed

Perlnd and Implnd Changes

No changes have been made.
