Attachment N

Preliminary Stormwater Site Plan

4241 Northwest Drive
Bellingham, Washington

TPN: 380211 435186

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February 2024

FREELAND & ASSOCIATES
CIVIL ENGINEERS

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ENGINEER'S DECLARATION

"I, Jean-Paul Slagle, a Professional Engineer registered in the State of Washington as a Civil Engineer, do hereby declare that the 4241 Northwest Drive Preliminary Stormwater Site Plan dated February 2024 was prepared by, or under my personal supervision, and 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 full compliance with the 2019 Washington State Department of Ecology Stormwater Management Manual for Western Washington (2019 DOE SWMM), City of Bellingham Municipal Code 15.42.060, and all Technical Standards adopted there under.

Jean-Paul Salomé Slagle
WA P.E. #43224

This report is not intended to be a final site plan for this project or any individual proposed improvements, and is not intended for use as part of any review of critical area. Existing drainage and site conditions or improvements not mentioned are beyond the scope of this report.

STORMWATER SITE PLAN

The Stormwater Site Plan (SSP) is the comprehensive report containing all of the technical information and analysis necessary for regulatory agencies to evaluate the proposed development for compliance with stormwater requirements.

Existing Conditions Summary

The subject parcel is located at 4241 Northwest Drive in Bellingham, Washington. The parcel occupies approximately 3.94 acres of land and is bordered by Northwest Drive to the east, undeveloped land to the north and south, and the Aurora Court development to the west. Situated in the Cordata Neighborhood Area 20, the properties are designated as Residential Multi. Adjacent properties include single family residences and the Aurora Court development. Refer to *Figure 1 - Vicinity Map* for a depiction of the site location.

The existing property is currently developed with a single-family residence and two shed structures. An existing asphalt driveway is located on site to provide access to Northwest Drive. Additional hard surfaces onsite include small concrete walkways and parking areas. Large trees are located along the perimeter of the property, and small trees and grasses are located surrounding the existing residence in the center of the property. Refer to *Figure 2 - Site Aerial Photo 2022* for a depiction of the existing conditions of the property.

BMC section 15.42.050 specifies that the scope of a project site shall include both the areas subject to land disturbance from development and the existing surfaces on the property that have been disturbed after September 1, 1995. Historic aerial imagery located through the City of Bellingham CityIQ shows that the parcel has not changed since 1997. Although the 1997 aerial imagery is not directly from 1995, it is the best information available to determine the development status of the site in 1995 and will be used for this analysis. Refer to *Figure 3 - Site Aerial Photo 1997* for photographic documentation of the conditions of the property in 1997.

The topography onsite varies. Most of the stormwater runoff flows overland to the west and results in the existing ditch along the west property line. The runoff that does not result in the ditch is diverted by topographic grade brakes to different onsite wetlands. Specifically, north, southwest, and southeast portions of the site convey runoff to existing wetlands located in each respective portion of the parcel. The existing slopes onsite range from approximately 0.5 to 20 percent. No

flow control or treatment facilities have been identified onsite. See the *Offsite Analysis* section of this report for a detailed description of the downstream drainage system.

Project Overview

Proposed development at 4241 Northwest Drive includes construction of two 6-unit townhomes, two 5-unit townhomes, and three 4-unit townhomes. This development will meet the infill toolkit requirements for townhouses. Each proposed unit will have two tandem parking stalls within a private garage to provide 68 parking stalls, and an additional 30 surface parking stalls will be installed onsite. Supporting infrastructure, private driveways, a private roadway, and required utilities will all be installed as well. Access to the site will be provided from the Northwest Drive right-of-way.

Frontage improvements include the installation of a five-foot-wide concrete sidewalk, curb and gutter, and a type two driveway. A sewer main extension will be installed along the entire roadway fronted by the property. However, this sewer main does not connect to any existing sewer mains since the municipal sewer system does not yet connect through Northwest Drive. Stormwater catch basins and conveyance pipes will be installed to manage stormwater runoff from the frontage improvements. A water main exists within the Northwest Drive right-of-way, so an additional water main extension is not required along the frontage.

Stormwater flow control and treatment will be satisfied for the development using the North End Regional Pond (NERP). Dispersion and infiltration systems were analyzed for use with this project. Full dispersion is infeasible due to the proximity of onsite wetlands that restrict the downstream flow path. However, runoff from the roof surface of a 6-unit townhouse will be dispersed into the downstream wetland using roof downspout dispersion. Since wetland hydrology is the paramount consideration, dispersion of the runoff is necessary to support Wetland A hydration. Refer to the *Minimum Requirement #8* section below for further discussion. Existing soil on adjacent projects and within the site provide limited infiltration capabilities. A dense glaciomarine layer is present throughout the region and limits vertical runoff travel and supports a perched groundwater condition. Therefore, infiltration systems we also deemed infeasible. Refer to the *Minimum Requirement #5*, *Minimum Requirement #6*, and *Minimum Requirement #7* sections of this report for further discussion of the stormwater management design for this development.

Onsite Soils Analysis

According to the Natural Resource Conservation System (NRCS) Online Soil Survey, soils on the sire are mapped as Whatcom-Labounty silt loams (0 to 8 percent slopes). Whatcom soils are described as volcanic ash and loess over glaciomarine deposits and belong to the Hydrologic soil group 'C'. Labounty soils are also described as volcanic ash and loess over glaciomarine deposits and belong to the Hydrologic soil group 'C/D'. Hydrologic group 'C' soils have a restricted infiltration rate when thoroughly wetted and contain a fine texture. Refer to *Figure 4 - Soils Map* for a depiction of the NRCS soil map results.

Offsite Analysis

Stormwater runoff from the existing site either flows into onsite wetlands or flows into the existing ditch on the west side of the property. The ditch conveys the runoff to the north for approximately 500 feet. The ditch is diverted to the west and flows for approximately 650 feet prior to intersecting with a stormwater detention pond. This pond was recently installed with the project PFC2022-0009. The existing ditch was rerouted around the perimeter of the pond fill slopes to maintain existing drainage patterns. The runoff travels within the ditch around the perimeter of the pond and then directly west through an 18-inch culvert. The culvert discharges runoff into a ditch that flows directly west for approximately 200 feet and then connects into Bear Creek. Overall, the stormwater runoff stays completely channelized as it flows from the project site to Bear Creek.

Stormwater runoff from a portion of the proposed development will be diverted to the existing wetlands to ensure hydrology and natural drainage patterns are maintained. This runoff will be sourced from non-pollution generating hard surfaces and will directly disperse into the adjacent wetlands. Stormwater runoff from the remaining proposed improvements will drain to a City of Bellingham designed and maintained stormwater management facility, specifically, the North End Regional Pond (NERP). This facility will provide stormwater flow control and treatment for all areas within its contributing basin. The NERP outfalls into Bear Creek.

Although the stormwater runoff from the proposed improvements will not be diverted to the existing ditches and conveyed north, the natural drainage patterns will be maintained by discharging runoff into Bear Creek. Specifically, the NERP outfall into Bear Creek is approximately 0.17 miles south of the existing ditch outfall. Since the stormwater runoff is completely channelized in the existing offsite flow path, the runoff does not hydrate or interact with the

surfaces outside of the ditch. Therefore, diverting runoff away from the ditches will not impact the hydration or condition of downstream environments. Overall, the natural drainage patterns will be maintained by conveying a portion of the runoff to the existing wetlands for hydration and by outfalling the remaining runoff into Bear Creek through the NERP outfall. Refer to *Figure 5 - Downstream Analysis* for a depiction of the downstream flow paths described above.

DOE AND CITY OF BELLINGHAM MINIMUM REQUIREMENTS

Minimum stormwater management requirements for the proposed project have been determined using BMC 15.42.060 and the 2019 Department of Ecology Stormwater Management Manual for Western Washington (2019 DOE SWMM or DOE Manual). With more than 5,000 square feet new and replaced hard surfaces, this project is subject to Minimum Requirements 1 through 9 in BMC 15.42.060.

MINIMUM REQUIREMENT SUMMARY NEW DEVELOPMENT					
Minimum Requirement		**Not Applicable**	**Variance Requested**	**Standard Requirements Incorporated**	**Comments (Report Section Reference or BMP Identifier)**
#	Description				
1	Preparation of Stormwater Site Plans			✓	
2	Construction Stormwater Pollution Prevention Plan			✓	See “Additional Comments”
3	Source Control of Pollution			✓	
4	Preservation of Natural Drainage Systems and Outfalls			✓	
5	On-Site Stormwater Management			✓	
6	Runoff Treatment			✓	
7	Flow Control			✓	
8	Wetlands Protection			✓	
9	Operation and Maintenance			✓	
#	**Additional Comments**				
2	The Construction SWPPP is included in the civil construction drawings.				

Minimum Requirement #1 - Preparation of Stormwater Site Plans ("SSP")

This report serves as a preliminary Stormwater Site Plan (SSP). All stormwater management systems have been designed according to Department of Ecology (DOE) and City of Bellingham standards. A construction Stormwater Pollution Prevention Plan (SWPPP) will also be prepared and incorporated in the civil construction documents.

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

A SWPPP narrative will be provided within the civil site plan drawings to ensure that the SWPPP is on site during construction. Each of the thirteen elements of a SWPPP (as identified in BMC 15.42.060(F)(2)(e)) must be considered and included in a Construction SWPPP unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the narrative of the SWPPP. The SWPPP shall include, at a minimum, the narrative, the Stormwater Site Plan and copies of Best Management Practice detail sheets that will be utilized as a part of the SWPPP.

During construction, the contractor shall maintain a copy of the SWPPP on site and shall update or modify the SWPPP as necessary for the current conditions on site. The contractor's schedule and available crew, equipment, and materials will be determined prior to construction. Accordingly, some BMPs that have been specified may not be necessary, while other additional BMPs may be required.

This project will disturb more than one acre of soil and will require an NPDES permit from Washington State Department of Ecology. As such, a Certified Erosion and Sediment Control Lead (CESCL) is required to determine which BMPs are necessary as site conditions change during construction. The contractor and/or CESCL shall add any BMP specifications that have not already been included in the SWPPP to be prepared by Freeland & Associates, Inc and included in the civil construction documents.

Minimum Requirement #3 - Source Control of Pollution

Pollutant sources for residential developments include vehicular traffic, fertilizers, and other detergents or chemicals typical to building maintenance activities. Pollution will be controlled at

the source to the maximum extent possible. All known, available, and reasonable source control BMPs have been considered in the design and layout of the site and stormwater plans.

Vehicular traffic is anticipated to be the primary source of potential pollution. Parking and driving areas will be located outside of the proposed building footprints and are pollution-generating hard surfaces. Garbage and recycling enclosures present a secondary source of pollutants. All these surfaces will receive stormwater treatment to mitigate the pollution from the site. Additionally, to minimize landscaping maintenance and to reduce potential erosion, BMP T5.13 will be applied to all landscaped areas to promote healthy plants and appropriate ground cover.

The following source control BMPs have been reviewed for this project:

- S406 BMPs for Streets and Highways
- S410 BMPs for Correcting Illicit Discharges to Storm Drains
- S411 BMPs for Landscaping and Lawn/Vegetation Management
- S415 BMPs for Maintenance of Public and Private Utility Corridors and Facilities
- S417 BMPs for Maintenance of Stormwater Drainage and Treatment Systems
- S421 BMPs for Parking and Storage of Vehicles and Equipment
- S453 BMPs for Formation of a Pollution Prevention Team
- S454 BMPs for Preventative Maintenance / Good Housekeeping
- S455 BMPs for Spill Protection and Cleanup
- S456 BMPs for Employee/Resident Training
- S457 BMPs for Inspections
- S458 BMPs for Record Keeping

See additional details in the project's operations and maintenance manual, to be submitted with the future construction documents, and in the 2019 Department of Ecology Stormwater Management Manual for Western Washington.

https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm

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

Stormwater runoff generated by this development will be conveyed to the North End Regional Pond (NERP) for stormwater detention and treatment. The NERP outfalls to Bear Creek. Thus, no significant stormwater diversions are anticipated as part of the project and natural drainage patterns will be maintained by conveying stormwater runoff to Bear Creek. Refer to the *Offsite*

Analysis section above for further discussion regarding the natural drainage paths and *Figure 5* below for a depiction of the proposed and existing drainage paths.

Minimum Requirement #5 - On-site Stormwater Management

BMC 15.42.060(F)(5) states that projects are required to construct on-site stormwater 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 shall be designed and provided in accordance with the DOE Manual. As this project triggers Minimum Requirements #1 through #9 and is inside the City of Bellingham Urban Growth Area (UGA), this project shall consider the use of On-site Stormwater Management BMPs from List #2 for all types of surfaces or demonstrate compliance with the LID Performance Standards. This project will meet the requirements outlined in List #2 to the maximum extent feasible.

Projects choosing to utilize List #2 of the 2019 DOE Manual to meet the requirements for Minimum Requirement #5 - On-site Stormwater Management must consider the BMPs in the order listed for each type of surface. The first BMP that is considered feasible must be used on the site. No other On-site Stormwater Management BMPs are necessary for that surface. The following table identifies all the required BMPs in List #2 and if they are feasible or infeasible. Additional discussion of the feasibility criteria is outlined after the table.

TABLE 3 - MINIMUM REQUIREMENT #5 LIST #2				
Minimum Requirement		**Feasible**	**Infeasible**	**Criteria Comments**
#	**Lawn & Landscaped Area**			
1	Post-Construction Soil Quality and Depth - BMP T5.13	✓		This BMP will be applied to all areas outside of hard surfaces disturbed during construction.
#	**Roofs**			
1	Full Dispersion - BMP T5.30 Full Infiltration - BMP T5.10A		✓	Full dispersion is infeasible due to the lack of sufficient flow path due to the proximity of adjacent wetlands. Full infiltration is infeasible due to the presence of dense glaciomarine soil layers.
2	Bioretention – BMP T7.30		✓	Infeasible due to presence of dense glaciomarine soil layers.
3	Downspout Dispersion - BMP T5.10B	✓		Infeasible for most of the site due to the lack of sufficient flow path because of the proximity of adjacent wetlands. A portion of the proposed roof surfaces will experience downspout dispersion to hydrate existing Wetland A.
4	Perforated Stub-out Connection - BMP T5.10C		✓	Infeasible due to presence of dense glaciomarine soil layers.
#	**Other Hard Surfaces**			
1	Full Dispersion BMP T5.30		✓	Infeasible due to the lack of sufficient flow path due to the proximity of adjacent wetlands.
2	Permeable Pavement - BMP T5.15		✓	Infeasible due to presence of dense glaciomarine soil layers.
3	Bioretention – BMP T7.30		✓	Infeasible due to presence of dense glaciomarine soil layers.
4	Sheet Flow Dispersion BMP T5.12 Concentrated Flow Dispersion BMP T5.11		✓	Infeasible due to the lack of sufficient flow path due to the proximity of adjacent wetlands.

Proposed Stormwater Management:

The proximity of adjacent wetlands and the presence of dense glaciomarine soils preclude the use of typical LID features, such as dispersion and infiltration systems. When analyzing downspout dispersion specifically, the proximity of the wetland buffers precludes the use of this BMP for most of the site. However, wetland hydrology is paramount and must be maintained with this project development. Thus, runoff from a proposed 6-unit townhouse roof surface will be dispersed using downspout dispersion and conveyed to Wetland A to ensure wetland hydration is maintained. Refer to the *Minimum Requirement #8* section for further discussion regarding wetland hydration. Runoff from the remaining proposed hard surfaces will be collected onsite through a series of catch basins and conveyed to the NERP to meet flow control and treatment requirements. All lawn and landscaped areas disturbed during construction will meet topsoil quality and depth in accordance with BMP T5.13 in Chapter 11 of Volume V of the 2019 DOE SWMM.

Minimum Requirement #6 - Runoff Treatment

The proposed project will create or replace more than 5,000 square feet of effective pollution generating hard surface and will require stormwater runoff treatment. Pollution generating hard surfaces (PGHS) include all portions of the proposed driving surfaces, parking areas, and garbage collection areas. This project will convey stormwater runoff to the North End Regional Pond (NERP), which will provide stormwater treatment. Refer to the *Calculations* section of this report for further discussion regarding the NERP capacity, availability, and function for this project.

Minimum Requirement #7 - Flow Control

The proposed project will create or replace more than 10,000 square feet of effective hard surface and, therefore, must provide stormwater flow control in accordance with BMC 15.42.060(F)(7). As noted earlier in this report, stormwater dispersion and infiltration systems are infeasible for use on most of the site. However, maintaining wetland hydrology is imperative for the project, so downspout dispersion will be applied to divert a portion of the proposed roof runoff to the adjacent wetlands. The remaining surfaces from the proposed site will experience flow control within the NERP to satisfy Minimum Requirement #7. Refer to the *Calculations* section of this report for further discussion regarding the NERP capacity, availability, and function for this project.

Minimum Requirement #8 - Wetlands Protection

Two wetlands have been identified onsite. A field investigation of the existing wetlands was performed by Soundview Consultants, LLC (Soundview) in 2022, and their findings were summarized in the report titled “Wetland and Fish and Wildlife Habitat Assessment Report,” dated February 13, 2024 (Wetland Report). Refer to the *Appendix* of this report for the Soundview Wetland Report.

Soundview delineated both Wetland A and Wetland B within the parcel. Wetland A is located to the north and was classified as a category III wetland with 2,240 square feet of area located within the project boundaries. Wetland B is located to the south and was classified as a category III wetland with 13,291 square feet of area located within the project boundaries. Both wetlands have a required 80-foot buffer and a habitat score of four.

Wetland A and Wetland B will both experience buffer impacts from the project development. Soundview has developed a mitigation plan for the site that includes buffer restoration and buffer enhancement areas. This report is titled “Conceptual Wetland Buffer Mitigation Plan” and id dated February 13, 2024 (Wetland Mitigation Report). Refer to the *Appendix* of this report for the Soundview Mitigation Plan Report.

A portion of the onsite stormwater runoff currently sheet flows overland into Wetland A. The basin flowing into Wetland A will be impacted by the project development. Therefore, the development will divert a portion of the stormwater runoff from the post-developed surfaces to Wetland A to ensure hydration is preserved. Specifically, runoff from a portion of the roof surfaces will be diverted to the wetlands using BMP T5.10B: Downspout Dispersion. In order to ensure wetland hydrology is sufficiently maintained, a wetland hydroperiod analysis was performed for Wetland A. This analysis is not required in Minimum Requirement #8 because Wetland A has a habitat score below five. However, the modeling is beneficial to quantify the development impacts on the wetland. Refer to the *Calculations* section of this report for the Wetland Hydroperiod Analysis for Wetland A.

A portion of the existing onsite stormwater runoff also sheet flows overland into Wetland B. However, the existing basin flowing to Wetland B will not be heavily impacted by the proposed development. The basin will be maintained to the maximum extent feasible and buffer mitigation/enhancement will be provided to ensure Wetland B is protected and hydrated.

Therefore, additional modeling will not be required to analyze post-developed hydration. Refer to the *Figures* section below depicting the basin flowing to Wetland B.

Onsite stormwater runoff that does not currently flow into either wetland results in a ditch along the west property line. This ditch diverts the runoff north around a detention pond, through a culvert, and directly into Bear Creek. This runoff does not interact with any downstream wetlands as it is conveyed to Bear Creek. Thus, no additional downstream wetlands require hydration since the runoff is completely contained downstream within conveyance ditches and pipes.

To reduce the impacts of the development on Wetlands A and B, Figure I-3.5 in Volume I-3.4.8 of the 2019 SWMM was referenced. Since Wetlands A and B are category III wetlands and Minimum Requirement #7: Flow Control is triggered, the General Protection and Protection from Pollutants wetland protection levels will be applied to both wetlands. The two wetland protection levels are outlined below:

I-C.2 General Protection

All wetlands (Categories I, II, III and IV) must receive the following general protection:

1. *Consult regulations issued under federal and state laws that regulate the discharge of pollutants to surface waters, including the Construction Stormwater General NPDES Permit.*

   This project requires a Construction Stormwater General NPDES Permit. Additionally, a temporary erosion and sediment control plan and a stormwater pollution prevention plan will be prepared at time of construction documents to address discharge of pollutants from the site. Refer to the future project construction documents for both plans.

2. *Maintain the wetland buffer required by local and/or state regulations.*

   Buffers will be mitigated by indirectly impacting the buffer and providing mitigation to maintain new buffers. This mitigation is provided by Soundview and further detailed in their report (Wetland Report) included in the *Appendix* below.

3. *Retain areas of native vegetation connecting the wetland and its buffer with nearby wetlands and other contiguous areas of native vegetation.*

   Areas of native vegetation surrounding Wetlands A and B will be retained to the maximum extent possible. Buffer enhancement planting will be installed with this project and will be native vegetation as directed by Soundview.

4. *Avoid compaction of soil and introduction of invasive plant or animal species in the wetland and its buffer.*

   Soil within preserved areas will avoid compaction by installing appropriate temporary erosion and sedimentation controls preventing access. Specifically, a silt fence will be installed along the south and north edges of the developable area to prevent access. Native vegetation will be planted within most of the property outside of the proposed development area.

5. *Take measures to avoid general physical impacts (e.g., littering and vegetation destruction). Examples are protecting existing buffer zones; discouraging access, especially by vehicles, by planting outside the wetland, and encouragement of stewardship and signage by landowners.*

   Physical impacts will be minimized by maintaining construction within the proposed clearing limits. Dense plantings of native vegetation within the buffer and split rail fencing surrounding the buffer will be installed for this project to discourage critical areas access. Signage will also be installed to educate the public not to enter the sensitive areas.

6. *Any stormwater management practices, such as Runoff Treatment or Flow Control BMP implementation, must be done outside of the wetland buffer boundary, except limited circumstances where the wetland and/or buffer may be used for additional Runoff Treatment and/or Flow Control of stormwater (See I-C.6 Compensatory Mitigation of Wetlands)*

   Proposed stormwater detention and treatment will occur outside of the wetland buffer.

7. *Discharge from a BMP or project site should be dispersed using a method to diffuse the flow before entering the wetland buffer.*

   Stormwater runoff from most of the site will not be entering the wetland buffer. However, to maintain wetland hydrology, stormwater runoff from a portion of the roof surfaces will be diverted to Wetland A. This runoff will experience Downspout Dispersion and will be diffused prior to entering the wetland buffer.

8. *Consider fences to restrict human access, but make sure it doesn't interfere with wildlife movement. They should be used when wildlife passage is not a major issue and the potential for intrusive impacts is high. When wildlife movement and intrusion are both issues, the circumstances will have to be weighed to make a decision about fencing. Check with the local and/or state agencies to determine if fencing would be allowed.*

   Split rail fencing will be installed along the edge of the buffer enhancement and restoration area to restrict human access and confine the development impacts. Critical area signage will also be installed along the perimeter of the buffer to further prohibit human access.

I-C.3 Protection from Pollutants

All wetlands (Categories I, II, III and IV) must receive the following protection from pollutants:

1. *Provide Construction Stormwater BMPs as directed in I-3.4.2 MR2: Construction Stormwater Pollution Prevention Plan (SWPPP) to prevent sediment and other pollutants from entering the wetland.*

   A construction stormwater pollution prevention will be included within the construction documents associated with this project.

2. *Provide Source Control BMPs as directed in I-3.4.3 MR3: Source Control of Pollution. Refer to Volume IV and local jurisdiction requirements.*

   Source controls for this project are discussed in detail under Minimum Requirement #3 Source Control of Pollution.

3. *Provide On-Site Stormwater Management and use LID principles as much as practicable for the site, as directed in I-3.4.5 MR5: On-Site Stormwater Management. LID principles and practices will help meet other wetland hydroperiod protection criteria and provide additional habitat.*

   Due to the lack of area for a sufficient flow path and dense onsite soils, LID principles are infeasible for most of the proposed project. Downspout dispersion will be applied to a portion of the roof surfaces to ensure wetland hydrology is maintained. However, the proximity of the adjacent wetlands precludes the use of dispersion for the remaining site. Stormwater not being dispersed to the wetlands will be conveyed downstream to the NERP for treatment and flow control.

4. *Provide Runoff Treatment BMPs as directed in I-3.4.6 MR6: Runoff Treatment to treat runoff prior to entering the wetland and its buffer.*

   Note: If the thresholds for I-3.4.6 MR6: Runoff Treatment are not met for a TDA, then it is not required to provide Runoff Treatment BMPs for that TDA to comply with I-3.4.8 MR8: Wetlands Protection.

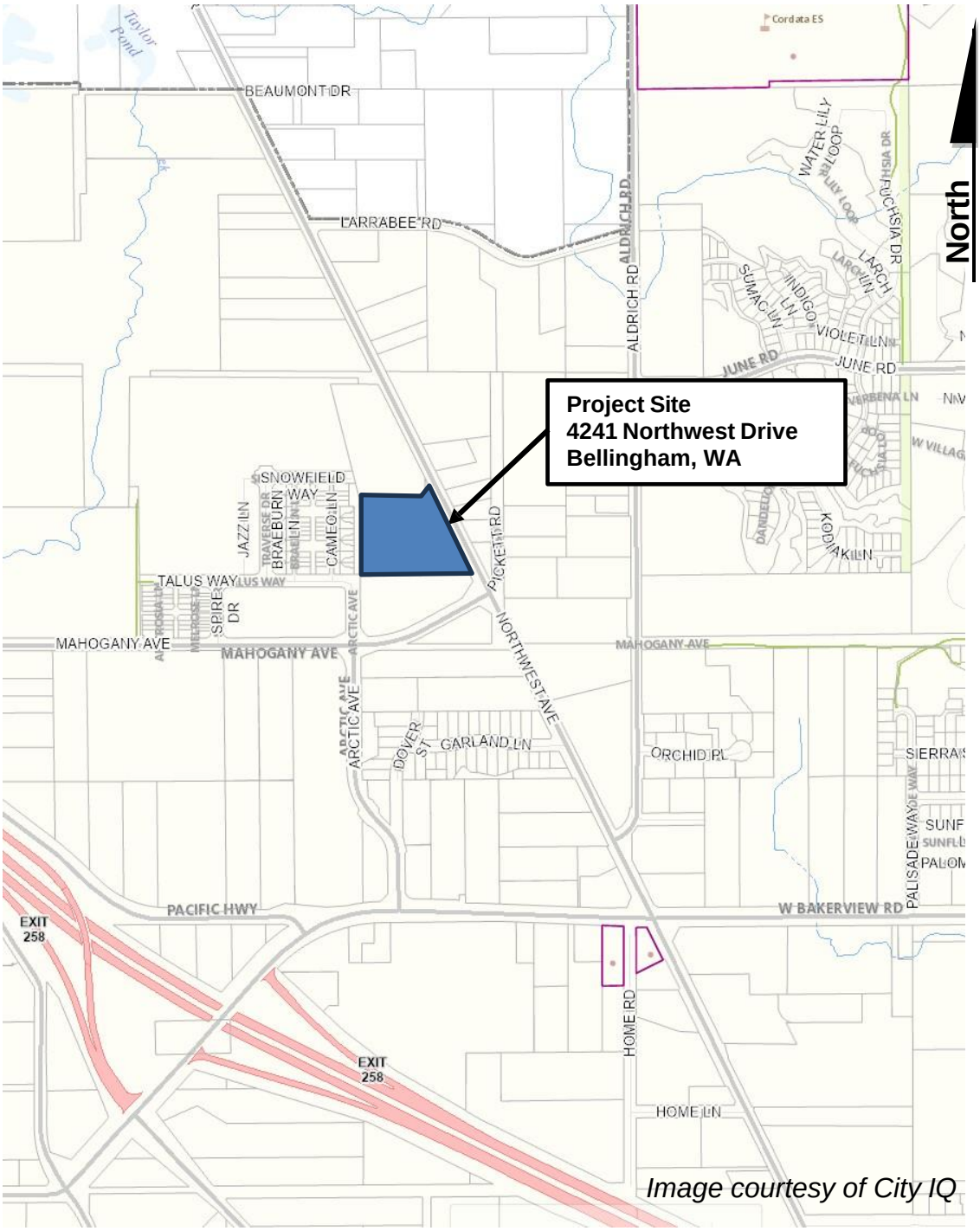
   Stormwater runoff from roof surfaces will enter the wetland and its buffer. This is a non-pollution generating hard surface and will not require treatment. No other proposed surfaces will divert runoff into the wetlands or buffers.

Minimum Requirement #9 - Operation & Maintenance

Proposed storm drainage improvements consist of a series of catch basins and pipes. A separate operations and maintenance manual will be prepared for the proposed storm drainage improvements. The manual contains a description of the facilities, what the facilities do, and how they work. The manual also identifies and describes maintenance tasks for each component of

the facilities and the required frequency of each task. The Stormwater Operations and Maintenance Manual will be prepared by Freeland & Associates, Inc. at the time of construction documents and will provide further detail regarding maintenance tasks and frequencies.

FIGURES



	Vicinity Map	**Figure 1**

Site Aerial Photo 2022

Figure 2

	Site Aerial Photo 1997	**Figure 3**

	Soils Map	**Figure 4**

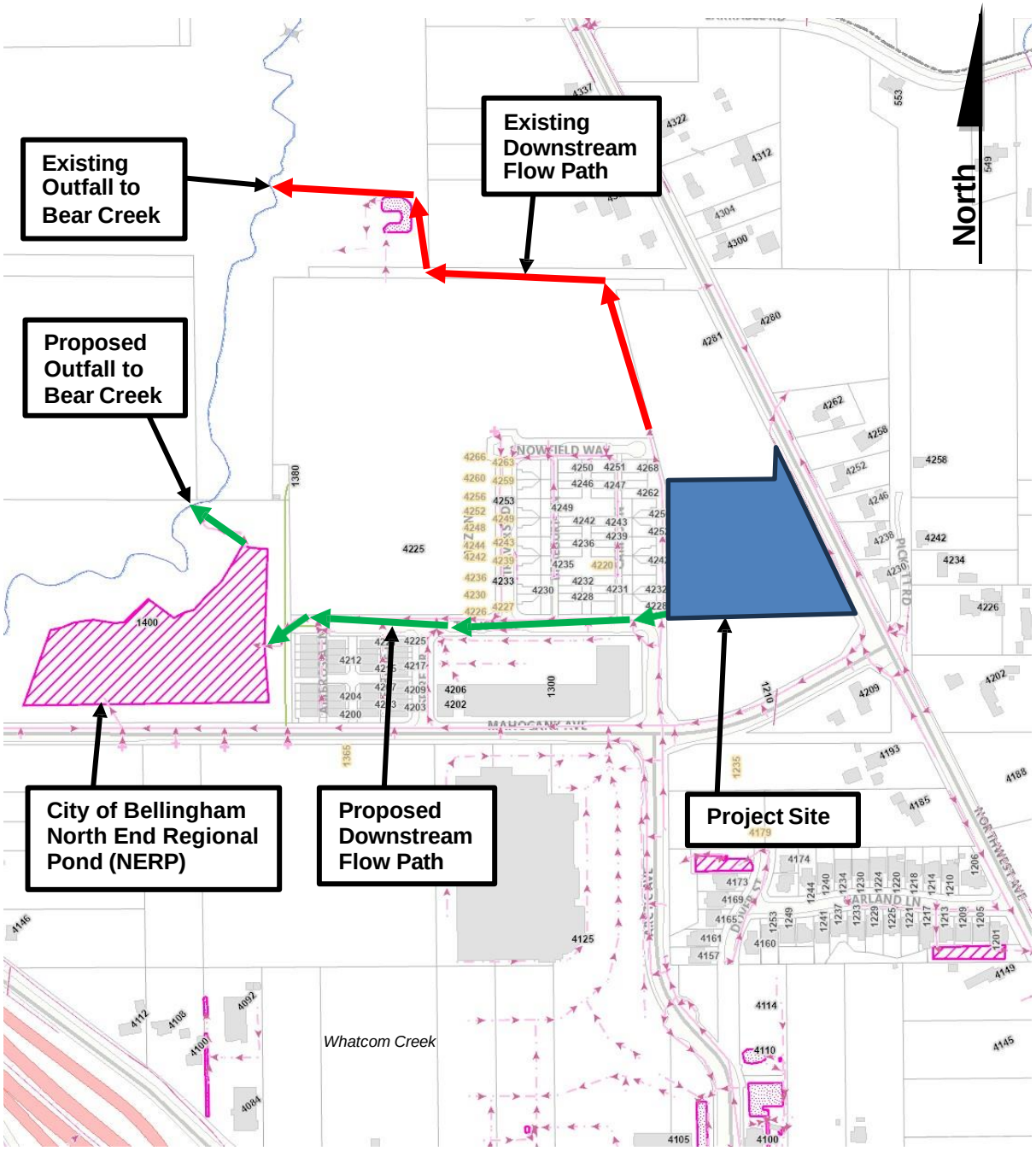


Image courtesy of City of Bellingham City IQ

	Downstream Analysis	**Figure 5**

Figure 8 - Preliminary Post-Development Drainage Basin

STORMWATER RUNOFF FROM ROOF TO BE DIVERTED TO ADJACENT WETLAND USING ROOF DOWNSPOUT DISPERSION. THUS, RUNOFF FROM ROOF SURFACE WILL NOT BE CONVEYED TO THE NERP AND IS NOT INCLUDED IN THIS BASIN.

N
W E
S

0 20 40
1 inch = 40 ft.

DRAINAGE LEGEND

- PGHS 0.440 AC
- NON–PGHS 0.176 AC
- ROOF SURFACE 0.601 AC
- LANDSCAPE SURFACE 0.438 AC

DATE FEB 2024
SHEET NAME **FIG 8**
JOB # 23053
DRAWING # 23053SP7.DWG

PRELIMINARY POST-DEVELOPED DRAINAGE BASIN

SHEET CONTENTS

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Figure 9 - Wetland A Pre-Development Drainage Basin

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SHEET CONTENTS

WETLAND A PRE-DEVELOPED DRAINAGE BASIN

JOB #	DATE
23053	FEB 2024
DRAWING #	SHEET NAME
23053SP7.DWG	FIG 9

Figure 10 - Wetland A Post-Development Drainage Basin

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SHEET CONTENTS

WETLAND A POST-DEVELOPED DRAINAGE BASIN

JOB #	DATE
23053	FEB 2024
DRAWING #	SHEET NAME
23053SP7.DWG	**FIG 10**

Figure 11 - Wetland B Drainage Basin

DRAINAGE LEGEND

FOREST AREA
17,641 SF (0.405 AC)

1 inch = 60 ft.

0 30 60

W S N E

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SHEET CONTENTS

WETLAND B DRAINAGE BASIN

JOB #	DATE
23053	FEB 2024
DRAWING #	SHEET NAME
23053SP7.DWG	FIG 11

CALCULATIONS

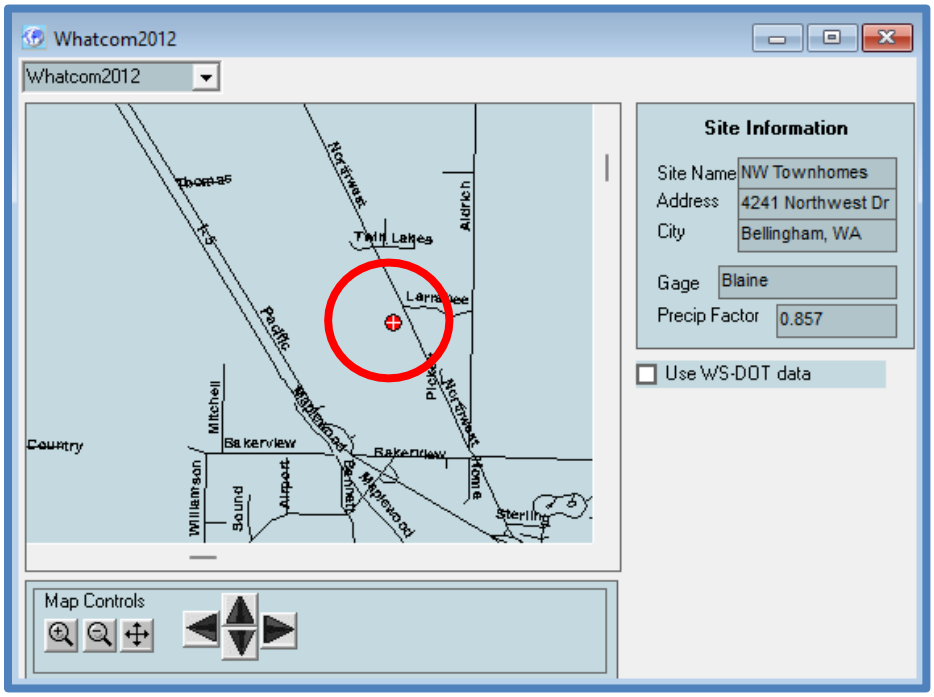
Stormwater Modeling Overview

In accordance with BMC 15.42.060(F)(7)(c), Western Washington Hydrology Model v2012 (WWHM2012) software is used to model the anticipated stormwater flows and durations from the site. WWHM2012 software uses HSPF continuous simulation methodology to compare predevelopment discharge rates to post-development discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow.

WWHM2012 has three categories for slopes: 0-5% flat, 5%-15% moderate, 15%+ steep. Slopes on the site vary from approximately 2% to 20% and are modeled as both flat and moderate. Soils on the site belong to hydrologic group 'C', as mapped by the Natural Resources Conservation Service (NRCS) and are modeled as such.

A fifteen-minute timestep is used for this analysis, as required by City of Bellingham Municipal Code 15.42.060(F)(7). Precipitation data for the design uses the rain gage from the City of Blaine. *Figure C1* below identifies the location of the project and WWHM2012 calculates the difference in rainfall with a precipitation scaling factor of 0.857.

Figure C1 – Project Location & Rain Gauge Scaling



This project is considered to be new development in accordance with the definition for "new development" in Bellingham Municipal Code 15.42.060. Therefore, this project is required to provide flow control for the ***new and replaced*** impervious and ***converted*** pervious surfaces.

North End Regional Pond (NERP) Discussion

The North End Regional Pond (NERP) is a municipal stormwater system located north of Mahogany Avenue and east of Interstate 5 in Bellingham, WA. The project owner has been in contact with Silver Springs, Inc. and Mersey, LLC regarding available volume within the NERP to satisfy both stormwater treatment and flow control requirements for this project. Siver Springs and Mersey own and have developed on parcels adjacent to the project site. During the construction of the NERP, The City of Bellingham was contractually bound to provide capacity for both Silver Springs and Mersey in the design of the NERP. Overall, a total of 15 acres of impervious surface was allocated for both groups.

Since the time of the capacity allocation, the Silver Springs and Mersey developments with runoff conveyed to the NERP have been completed, but the 15-acre allocation was not fully utilized. Silver Springs and Mercy have agreed to relinquish their NERP volume allocation and transfer the available capacity to the project owner. Thus, this project is permitted to use the remaining allocation to meet stormwater treatment and flow control requirements. Refer to the *Appendix* of this report for the NERP Memorandum discussing the transfer of stormwater capacity to this project.

The Silver Springs and Mersey developments utilizing a portion of the NERP allocation are Aurora Court and Mahogany Manor. The volumes being used by these developments are outlined in the Aurora Court Phase 2 SPP (page 25), which is included in the *Appendix* of this report for reference. Refer to *Table C1* below showing the volume of the NERP that has been used by the above noted developments. Refer to *Table C2* below for the capacity remaining for use by this project.

Table C1 Existing Volume to the NERP	
Development	**Treatment Volume (acre-feet)**
Aurora Court Phase 1	0.2182
Mahogany Manor	0.3509
Aurora Court Phase 2	0.3945
Total Volume Used	**0.9636**

Table C2 Remaining Volume to the NERP for Project	
Source	**Treatment Volume (acre-feet)**
Allotted 15 Acres Impervious	1.5349
Total Volume used by Silver Springs and Mersey	0.9636
Total Volume Available	**0.5713**

Overall, 0.5713 acre-feet of volume within the NERP is available for use by this project. WWHM2012 software is used to determine the anticipated volume of runoff produced from the project development.

Stormwater Modeling Input & Output: NERP

Screenshots of the software model are provided below. The left half of each screenshot shows the entire post-development stormwater model layout with a single component selected. The right half of each screenshot provides input information for the selected component of the model.

Figure C2 - Post-Development Basin

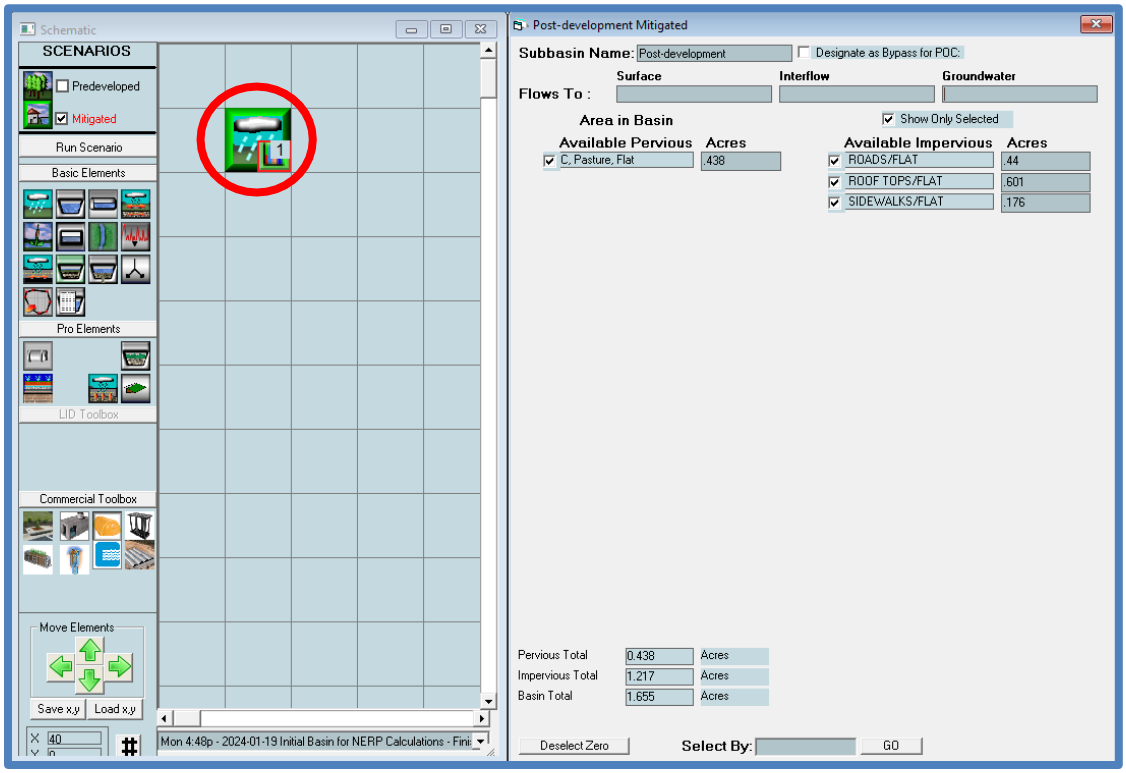
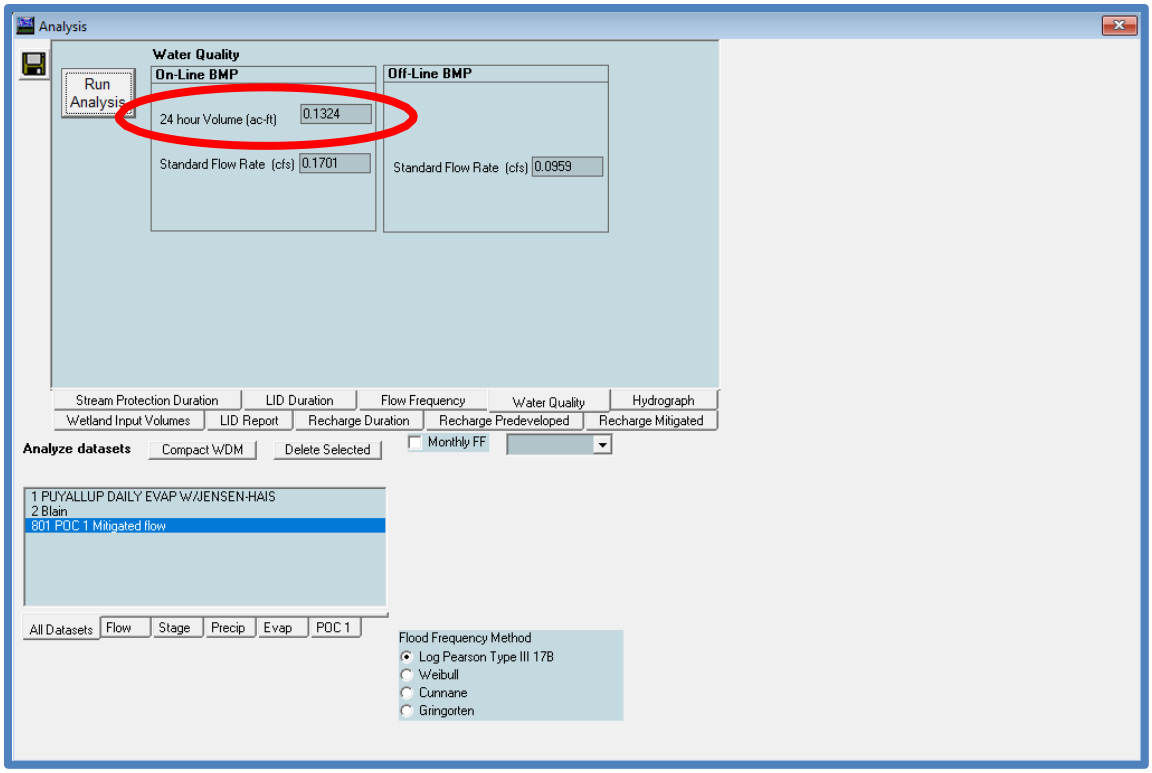


Figure C3 - Water Quality Volume Result



According to the WWHM2012 modeling, the existing site is anticipated to produce 0.1324 acre-feet of runoff. As discussed above, the NERP has the capacity to manage 0.5713 acre-feet of runoff from the project development. Thus, the stormwater runoff from the project site will be conveyed to the municipal NERP, which will satisfy both stormwater treatment and flow control requirements for the development.

Wetland Hydroperiod Analysis Overview

The model discussed below will be used to predict the impacts of stormwater discharge from the project development on the wetland. Specifically, the model monitors the average daily and monthly total discharge volumes from the site to determine the overall effects of the site development.

The boundaries for the pre- and post-developed basins used for this analysis include all the surfaces with runoff that results in the wetland. In other words, the depicted basin encompasses the entire area that concentrates into the wetland in both pre- and post-developed conditions. The existing topography located on the project survey was used to delineate the boundaries for Wetland A for this analysis.

Pre-Developed Modeling

The pre-development surfaces flowing to Wetland A will be modeled in their "current/existing" condition. This ensures that the pre-developed average annual and daily runoff volumes are representative of the conditions that currently exist on the site. Stormwater runoff from forest, roof, and road surfaces flow to Wetland A. The runoff from surface flow, interflow, and groundwater are all included in the total runoff considerations for this model. Refer to *Table C3* below for a summary of the pre-developed modeling conditions and to *Figure 9* for a depiction of the pre-developed drainage basin for the wetland hydroperiod modeling.

Table C3
Pre-development Model for Wetland A
Hydroperiod Analysis

Type	Area (Acres)
Road Area	0.241
Roof Area	0.061
Forest Area	2.096
TOTAL	**2.398**

Post-Developed Modeling

The post-developed basin for Wetland A used for this model encompasses the entire area that concentrates into Wetland A after development. These proposed conditions are used to determine the total change in annual and daily runoff volume being discharged into the adjacent wetlands after project development. Therefore, the mitigated conditions shown in the model shall be representative of the final conditions onsite after development.

Stormwater runoff from the Northwest Drive frontage surface, from a portion of the proposed landscape areas, and from a proposed 6-unit townhouse roof surface will be diverted to Wetland A in the post-developed condition. The runoff from surface flow, interflow, and groundwater are all included in the total runoff considerations for this model. Refer to *Table C4* below for a summary of the post-developed modeling conditions and *Figure 10* for a graphical depiction of the contributing basin used for the wetland hydroperiod modeling.

Table C4
Post-development Model for Wetland D
Hydroperiod Analysis

Type	Area (Acres)
Road Area	0.337
Roof Area	0.124
*Landscape Area	1.102
TOTAL	**1.563**

* Note: Landscape is modeled as pasture per modeling credit associated with BMP T5.13.

Stormwater Modeling Input & Output: Wetland A Hydroperiod Model

Screenshots of the software model are provided below. The left half of each screenshot shows the entire pre- or post-development stormwater model layout with a single component selected. The right half of each screenshot provides input information for the selected component of the model.

Figure C7 - Pre-development Basin

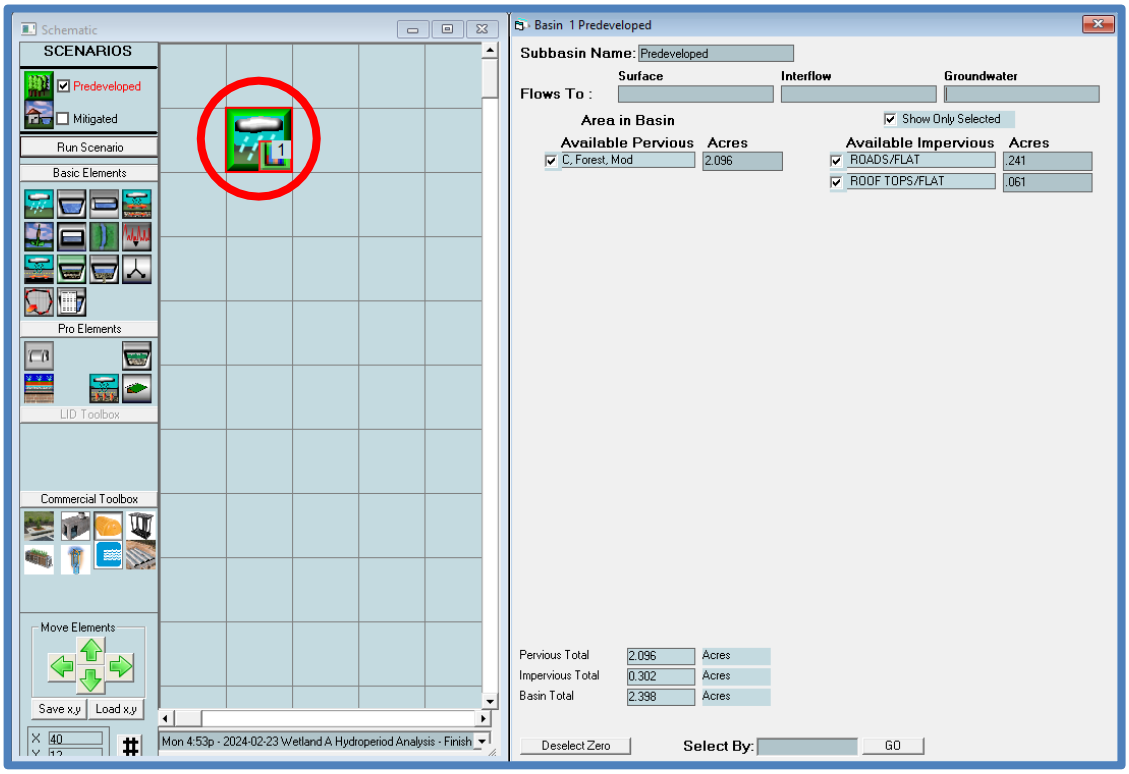


Figure C8 - Post-development Basin

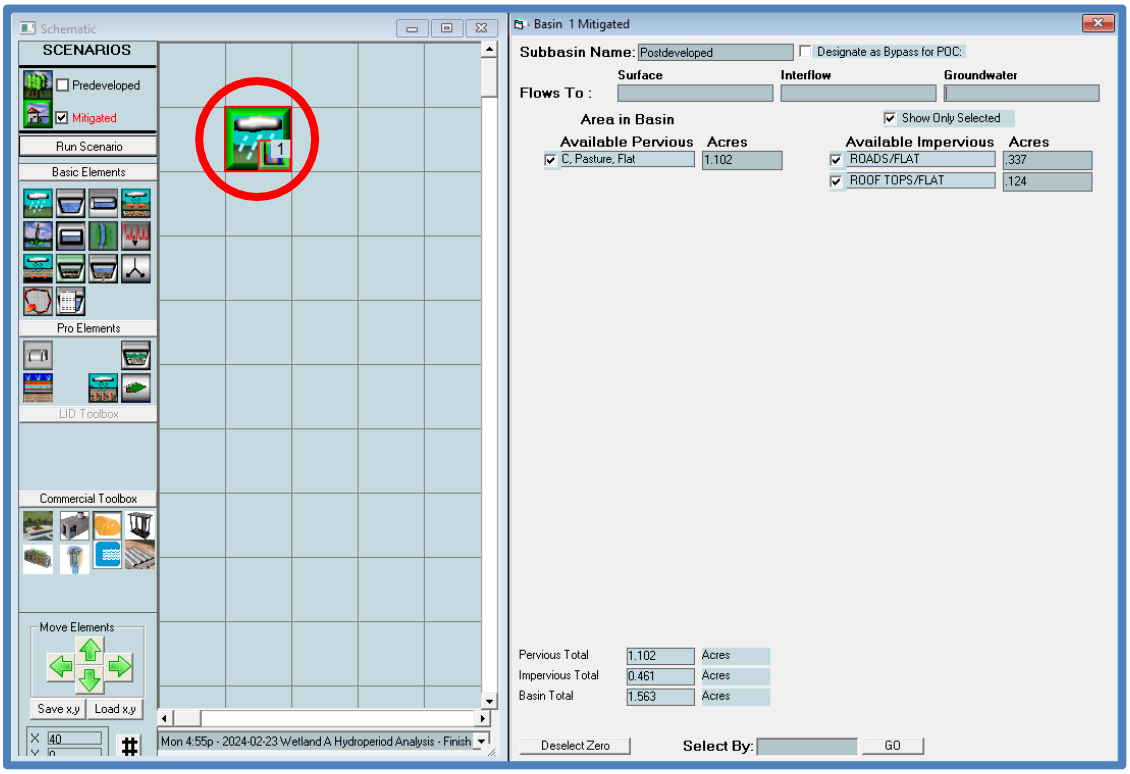
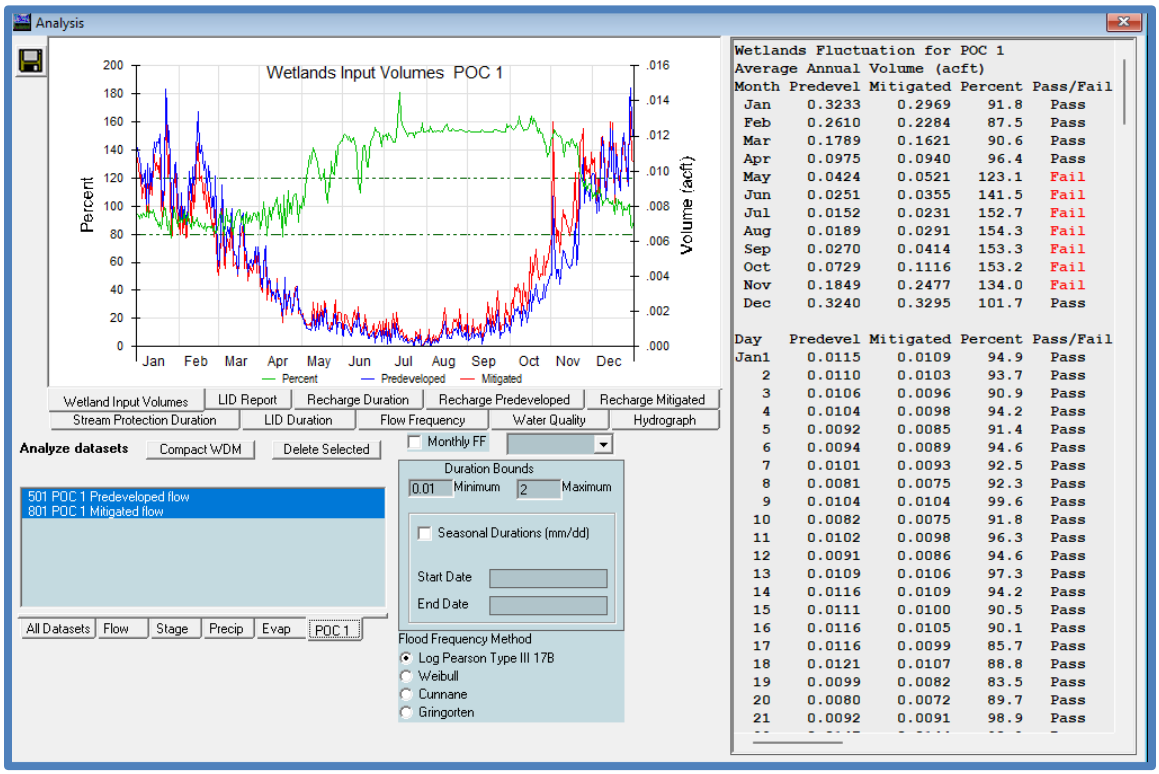


Figure C9 - Wetland A Hydroperiod Analysis Results



Wetlands Fluctuation for POC 1
Average Annual Volume (acft)

Month	Predevel	Mitigated	Percent	Pass/Fail
Jan	0.3233	0.2969	91.8	Pass
Feb	0.2610	0.2284	87.5	Pass
Mar	0.1789	0.1621	90.6	Pass
Apr	0.0975	0.0940	96.4	Pass
May	0.0424	0.0521	123.1	Fail
Jun	0.0251	0.0355	141.5	Fail
Jul	0.0152	0.0231	152.7	Fail
Aug	0.0189	0.0291	154.3	Fail
Sep	0.0270	0.0414	153.3	Fail
Oct	0.0729	0.1116	153.2	Fail
Nov	0.1849	0.2477	134.0	Fail
Dec	0.3240	0.3295	101.7	Pass

Day	Predevel	Mitigated	Percent	Pass/Fail
Jan1	0.0115	0.0109	94.9	Pass
2	0.0110	0.0103	93.7	Pass
3	0.0106	0.0096	90.9	Pass
4	0.0104	0.0098	94.2	Pass
5	0.0092	0.0085	91.4	Pass
6	0.0094	0.0089	94.6	Pass
7	0.0101	0.0093	92.5	Pass
8	0.0081	0.0075	92.3	Pass
9	0.0104	0.0104	99.6	Pass
10	0.0082	0.0075	91.8	Pass
11	0.0102	0.0098	96.3	Pass
12	0.0091	0.0086	94.6	Pass
13	0.0109	0.0106	97.3	Pass
14	0.0116	0.0109	94.2	Pass
15	0.0111	0.0100	90.5	Pass
16	0.0116	0.0105	90.1	Pass
17	0.0116	0.0099	85.7	Pass
18	0.0121	0.0107	88.8	Pass
19	0.0099	0.0082	83.5	Pass
20	0.0080	0.0072	89.7	Pass
21	0.0092	0.0091	98.9	Pass

The Wetland Hydroperiod Protection requirements stated in the 2019 DOE SWMM specify that "total volume of water into a wetland on daily basis should not be more than 20% higher or lower than pre-project volumes" and "total volume of water into a wetland on a monthly basis should not be more than 15% higher or lower than pre-project volumes." This range is specified for a project that is required to meet the Wetland Hydroperiod Protection Level with Minimum Requirement #8. Since this project does not trigger the Hydroperiod Protection Level, these ranges will be used as a guideline instead of a requirement.

The results shown in *Figure C9* indicate that the average volume change for each month of the year is within the tolerance from December through April but not within tolerance from May through November. Both May and November are outside of tolerance by less than 20%. When analyzing the volume results, it is important to note that the storm volumes in the summer months are insignificant compared to the winter months. For example, the total pre-developed volume recorded in July is 0.0152 acre-feet while the volume recorded in December is 0.3240 acre-feet. Thus, any slight increase in runoff volume in the summer months will generate a larger change in percentage, while the actual acre-foot measurement increase is insignificant.

Through discussions with local wetland biologists, it has been specified that the winter months provide the most opportunity for breeding and plant growth within the wetland. The larger storm events generate a more saturated environment that supports the wetland habitat. The intent of applying the Wetland Hydroperiod Modeling to this project is to ensure the post-developed site maintains the hydrology of Wetland A during the critical winter months. The model results demonstrate that the winter months pass within the tolerance. Thus, the condition of Wetland A will be maintained through the most valuable habitat survival period. Since the Wetland Hydroperiod Protection is not triggered for Wetland A, this analysis was performed as a guideline and demonstrates that the hydrology of Wetland A will be supported with project development.

APPENDIX

WETLAND AND FISH AND WILDLIFE HABITAT ASSESSMENT REPORT

NORTHWEST DRIVE

FEBRUARY 2024

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

WETLAND AND FISH AND WILDLIFE HABITAT ASSESSMENT REPORT

NORTHWEST DRIVE

FEBRUARY 13, 2024

PROJECT LOCATION

4241 Northwest Drive
Bellingham, Washington 98225

PREPARED FOR

ETHAN POTTS
220 West Champion Street, Suite 240
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PREPARED BY

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Environmental Assessment
Planning + Land Use Solutions

Executive Summary

Soundview Consultants LLC (SVC) has been assisting Ethan Potts and Chay Tan with a Wetland and Fish and Wildlife Habitat Assessment for a potential residential redevelopment of a 3.99-acre site located at 4241 Northwest Drive in the City of Bellingham, Washington. The subject property is situated in the Southwest ¼ of Section 11, Township 38 North, Range 02 East, W.M. (Whatcom County Tax Parcel Number 3802114351860000).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, and fish and wildlife habitat in the fall of 2022. The site investigations identified two potentially regulated wetlands on the subject property (Wetlands A and B). Per Bellingham Municipal Code (BMC) 16.55.280, Wetlands A and B are classified as Category III wetlands with low habitat scores of 4. Per BMC 16.55.340.B.2., Wetlands A and B are subject to 80-foot buffers based on proposed high land use intensity. An additional 15-foot building setback is required from the edge of all wetland buffers per BMC 16.55.340.G. No other potentially regulated wetlands or fish and wildlife habitat conservation areas were identified on or within 300 feet of the subject property.

The table below identifies the onsite critical areas and summarizes the potential regulatory status by local, state, and federal agencies.

Waterbody Name	Size (Onsite)	Category[1]	Regulated Under BMC[2]	Regulated Under RCW 90.48	Regulated Under Clean Water Act
Wetland A	15,186 SF	III	Yes	Yes	Likely
Wetland B	40,968 SF	III	Yes	Yes	Likely

1. Current WSDOE and BMC 16.55.280 wetland definitions.
2. Critical area definitions as defined in BMC Chapter 16.55

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Appendices

Chapter 1. Introduction

Soundview Consultants LLC (SVC) has been assisting Ethan Potts and Chay Tan (Applicant) with a wetland and fish and wildlife habitat assessment for the potential residential redevelopment of a 3.99-acre site located at 4241 Northwest Drive in the City of Bellingham, Washington. The subject property is situated in the Southwest ¼ of Section 11, Township 38 North, Range 02 East, W.M. (Whatcom County Tax Parcel Number 3802114351860000).

The purpose of this wetland, fish, and wildlife habitat assessment report is to identify the presence of potentially-regulated wetlands, waterbodies, fish and wildlife habitat, and/or priority species on or near the subject property.

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.

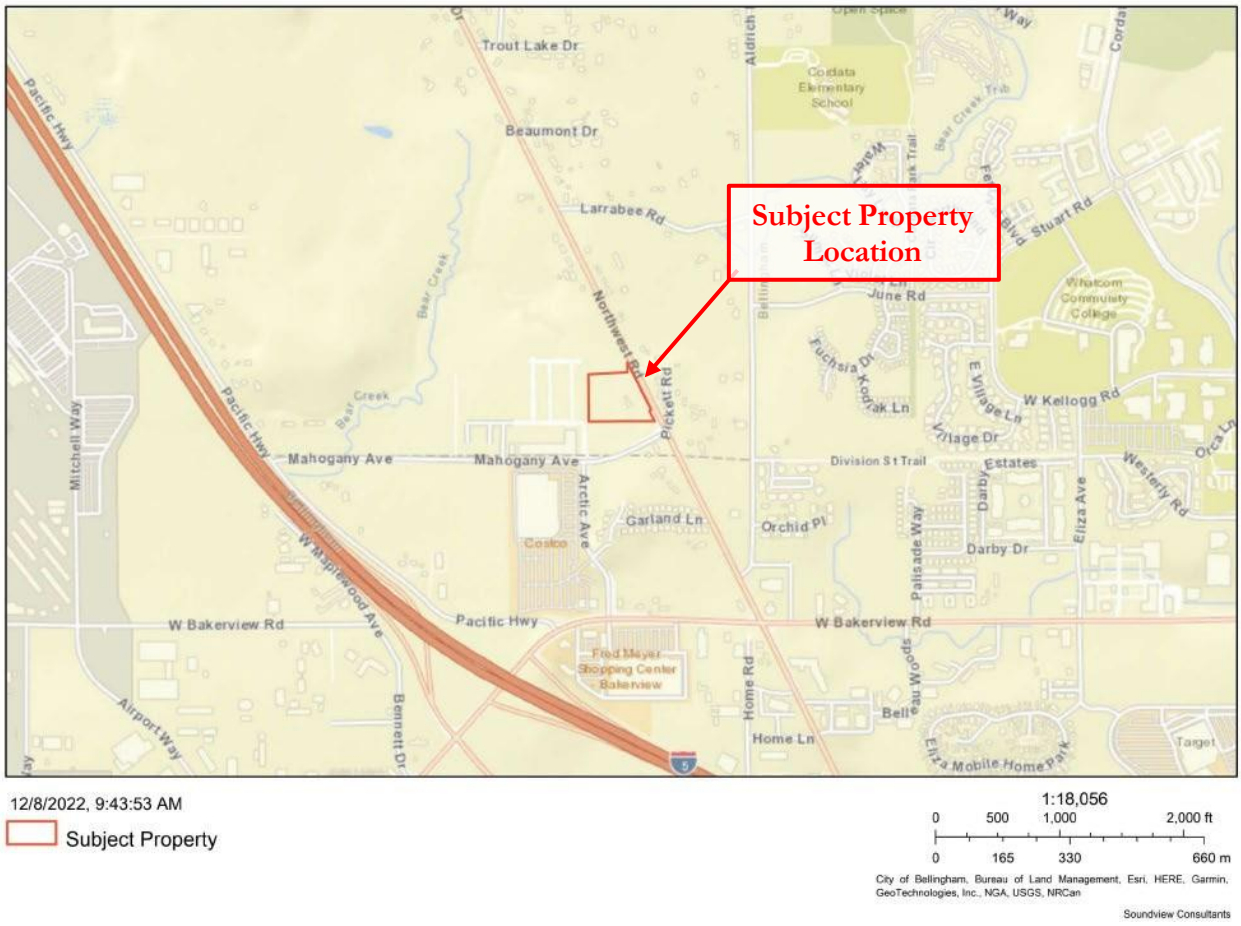
Chapter 2. Proposed Project Location

2.1 Project Location

The subject property consists of 3.99-acre site located at 4241 Northwest Drive in the City of Bellingham, Washington. The subject property is situated in the Southwest ¼ of Section 11, Township 38 North, Range 02 East, W.M. (Whatcom County Tax Parcel Number 3802114351860000).

To access the subject property from Interstate 5 North in the Bellingham area, take exit 257 for Northwest Avenue. Merge onto Northwest Avenue and continue for 341 feet. At the traffic circle, take the 1st exit to stay on Northwest Avenue. Continue for 0.8 miles and subject property will be located on the left.

Figure 1. Vicinity Map



Chapter 3. Methods

SVC investigated and assessed any potentially-regulated wetlands, streams, and other fish and wildlife habitat conservation areas on or within 300 feet of the subject property in the fall of 2022. 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, U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) and Information for Planning Purposes (IPaC) webmap tool, Washington State Department of Natural Resources (DNR) water typing system, Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) and SalmonScape mapping tools, City of Bellingham and Whatcom County Geographic Information Systems (GIS) data, and various orthophotographic resources. Appendix A contains further details for the methods and tools used to prepare this report.

Wetland boundaries were determined 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 boundaries of onsite wetlands with orange surveyor's flagging labeled alpha-numerically and tied to 3-foot lath or vegetation along the wetland boundary. 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-6). Additional tests pits were excavated at regular intervals inside and outside of the wetland boundaries to further confirm each delineation.

Wetlands were classified using both the hydrogeomorphic (Brinson, 1993) and Cowardin (Cowardin, 1979) classification systems. Following classification and assessment, wetlands were rated and categorized using the *Washington State Wetlands Rating System for Western Washington—Washington Department of Ecology, 2014, Publication No. 04-06-029,* per Bellingham Municipal Code (BMC) 16.55.280.

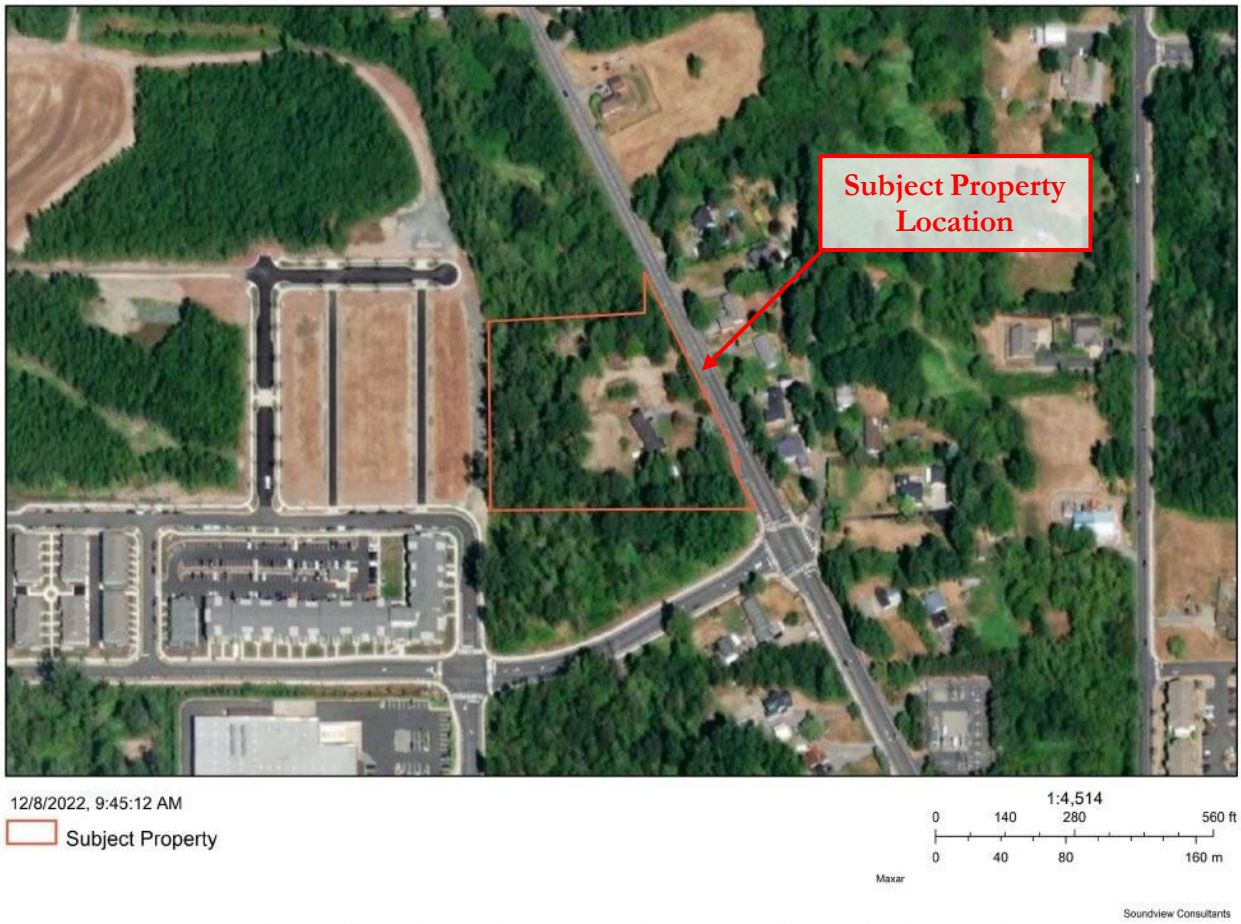
The fish and wildlife habitat assessment was conducted during the same site visits by qualified fish and wildlife biologists. The experienced biologists made visual and auditory observations using stationary and walking survey methods for both aquatic and upland habitats noting any special habitat features 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 fish and wildlife habitat conservation areas outlined under BMC 16.55.470

Chapter 4. Background Information

4.1 Landscape Setting

The subject property is located in a mixed residential and commercial setting in Bellingham, Washington (Figure 2). The subject property is developed with one residence containing maintained lawns, a driveway, and associated infrastructure. About half of the site consists of maintained lawn, while the perimeter of the site is forested. The subject property is bordered by undeveloped land to the north and south, Northwest Avenue to the east, and a housing development currently under construction to the west. Topography onsite is generally flat with a slight slope downward from the west to east, with multiple mounds varying in the west and elevations ranging from approximately from 175 feet above mean sea level (amsl) to approximately 185 feet amsl. A topographic map is provided in Appendix B1. The subject property is located within Water Resource Inventory Area (WRIA) 1 – Nooksack.

Figure 2. Aerial Image of the Subject Property



4.2 Mapped Soils

The NRCS Soil Survey of Whatcom County, Washington identifies one soil series present on the subject property: Whatcom-Labounty silt loams, 0 to 8 percent slopes (182). A soil map is provided in Appendix B2. Below is a detailed description of the soil profiles (Goldin, 1992).

Whatcom-Labounty silt loams, 0 to 8 percent slopes (182)
According to the NRCS Soil Survey of Whatcom County, Whatcom-Labounty silt loams, 0 to 8 percent slopes (182) consists of soils formed on glaciomarine drift plains that are hummocky. The unit consists of 55 percent Whatcom silt loam and 25 percent Labounty silt loam so intricately intermingled that mapping these units separated was not practical.

The Whatcom series consists of very deep, moderately well drained soils formed in a mixture of loess and volcanic ash over glaciomarine deposits. In a typical profile, the surface layer is a dark brown silt loam 9 inches thick. The upper 7 inches of the subsoil consists of a dark brown silt loam. The lower 10 inches is a light olive brown mottled loam. The upper 9 inches of the substratum is light olive gray mottled loam. The lower part to a depth of 60 inches is a dark gray loam.

The Labounty series consists of very deep poorly drained soils formed in glaceiomarine drift with an admixture of loess and volcanic ash. In a typical profile, the surface layer is a very dark grayish brown silt loam 10 inches thick. The upper 6 inches of the subsoil is grayish brown and light brownish gray mottled loam. The lower 19 inches is grayish brown, olive gray, and light olive gray mottled loam. The substratum to a depth of 60 inches is gray loam.

Whatcom-Labounty silt loams, 0 to 8 percent slopes is listed as 25 percent hydric on the NRCS hydric soils list, and as much as 17 percent of areas mapped as Whatcom-Labounty silt loams, 0 to 8 percent slopes may contain inclusions of hydric Labounty, drained, Bellingham, undrained, and Shalcar, undrained soils (NRCS, n.d).

4.3 Critical Area Inventories

The City of Bellingham Stream and Wetland Inventory map (Appendix B3) and the Whatcom County Stream and Wetland Inventory map (Appendix B4) identify a wetland on the north side of the subject property that extends onsite, a small wetland adjacent to the site to the east along Northwest Avenue, a wetland on the southern edge of the subject property, and a large wetland complex offsite to the west of the subject property. The USFWS NWI map (Appendix B5) identifies wetlands extending onsite along the northern and southern edges of the subject property, along with a stream offsite to the west. The WDFW PHS map (Appendix B6) also identifies a wetland that extends onsite along the northern boundary of the subject property. The DNR Stream Typing map (Appendix B7) and WDFW SalmonScape map (Appendix B8) identify a Type X (Unknown) channel approximately 200 feet west of the subject property, which flows into Bear Creek northwest of the site However, a residential development is being currently being built amidst the mapped stream channel, likely indicating that the stream has since been relocated, piped, or was inaccurately mapped. No other potential wetlands or streams are documented within 300-feet of the subject property.

WDFW SalmonScape map (Appendix B8) lists Bear Creek as gradient accessible to coho (*Oncorhynchus kisutch*), bull trout/dolly varden (*Salvelinus confluentus*), chum (*Oncorhynchus keta*), resident coastal cutthroat (*Oncorhynchus clarkii*), and steelhead (*Oncorhynchus mykiss*). According to the USFWS IPaC mapping database, marbled murrelet (*Brachyramphus marmoratus*), yellow-billed cuckoo (*Coccyzus americanus*), and bull trout (*Salvelinus confluentus*)/dolly varden (*Salvelinus malma*) have the potential to occur within 300 feet of the subject property. No other potential priority habitats or species are documented within 300 feet of the subject property.

4.4 Precipitation

Precipitation data was acquired from the National Oceanic and Atmospheric Administration (NOAA) station at Bellingham International Airport in order to obtain percent of normal precipitation for the general Bellingham region during and preceding the initial site investigations. 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]
11/15/2022	0.00	0.00	0.00	2.73	6.58/4.94	21.77/27.83	133/78

Notes:

1. Precipitation levels provided in inches. Data obtained from NOAA (http://w2.weather.gov/climate/xmacis.php?wfo=sew) for Bellingham International Airport
2. Year-to-date precipitation is for the 2022 calendar year from January 1st, 2022 to the November 2022 site visit date.
3. Percent of normal is shown for the last 30 days and water year or calendar year to date.

Precipitation levels during the November site visit were slightly above the statistical normal range for the prior 30 days (133 percent of normal), and within the statistical normal for the 2022 calendar year (78 percent of normal). This precipitation data suggests that hydrologic conditions encountered at the time of the site investigations in November were relatively normal. Such conditions were considered in making professional wetland determinations.

Chapter 5. Results

SVC's site investigations in the fall of 2022 identified two potentially-regulated wetlands (Wetlands A and B) on the subject property. No other potentially-regulated wetlands, waterbodies, fish and wildlife habitat, or priority species were identified within 300 feet of the subject property during the site investigations.

5.1 Uplands

The subject property is located in a commercial/residential interface and is developed with a single-family residence and associated infrastructure. Approximately half of the site consists of maintained lawn, while the perimeter of the site is forested. Forested vegetation onsite is dominated by Douglas fir (*Pseudotsuga menziesii*), red alder (*Alnus rubra*), salmonberry (*Rubus spectabalis*), twinberry (*Lonicera involucrata*), trailing blackberry (*Rubus ursinus*), non- native Himalayan blackberry (*Rubus armeniacus*), and Kentucky bluegrass (*Poa pratensis*).

5.2 Wetlands

Two wetlands (Wetlands A and B) were identified and delineated on the subject property. The identified onsite wetland contained indicators of hydric soils, wetland hydrology, and a predominance of hydrophytic vegetation according to current wetland delineation methodology. Wetland data forms are provided in Appendix D, wetland rating forms are provided in Appendix E, and wetland rating maps are provided in Appendix F. Table 2 summarizes the wetlands identified during the site investigations.

Table 2. Wetland Summary

Wetland	Predominant Wetland Classification / Rating			Wetland Size Onsite (SF)
	Cowardin[1]	HGM	City of Bellingham[2]	
A	PFOBC	Depressional	III	15,186
B	PFO/SSBC	Depressional	III	40,968

1. Cowardin et al. (1979); Federal Geographic Data Committee (2013); class based on vegetation: PFO = Palustrine Forested, PSS = Palustrine Scrub-Shrub. Modifiers for Water Regime: B = Seasonally Saturated, C = Seasonally Flooded.
2. Current WSDOE rating system per BMC 16.55.280

Wetland A

Wetland A is approximately 15,186 square feet (0.35 acres) and is located on the north portion of the subject property, extending offsite to the north. Hydrology for Wetland A is provided by surface sheet flow from adjacent uplands, direct precipitation, and a seasonally high groundwater table. Wetland A outlets into a roadside ditch alongside Northwest Drive. Wetland vegetation is dominated by an upper canopy of red alder and an understory of red osier dogwood (*Cornus alba*), hardhack (*Spiraea douglassii*), Scouler's willow (*Salix scouleriana*), and salmonberry. The groundcover is dominated by creeping buttercup (*Ranunculus repens*), slough sedge (*Carex obnupta*), soft rush (*Juncus effusus*), tall mannagrass (*Glyceria elata*), and non-native invasive reed canarygrass (*Phalaris arundinacea*). Hydric soil indicator A11 (Depleted Below Dark Surface) was identified and the water table was observed approximately 11-inches below the soil surface. The wetland was delineated based on a topographic depression and transition to wetland hydrology. The onsite buffer is partially degraded due to the adjacent residence and maintained landscaping. Wetland A is a Palustrine Forested, Seasonally Saturated and Seasonally Flooded (PFOBC) depressional wetland.

Table 3. Wetland A Summary.

WETLAND A		
	**Local Jurisdiction**	City of Bellingham
	City of Bellingham Rating	III
	Wetland Size (Onsite)	15,186 SF
	Cowardin Classification	PFOBC
	HGM Classification	Depressional
	Wetland Data Sheet(s)	DP-1
	Upland Data Sheet(s)	DP-2
Wetland Functions Summary		
Water Quality (Scores 7 out of 9 points)	• Low site potential to trap sediments and pollutants and remove nitrogen due to an intermittently flowing outlet and less than 25% of the wetland seasonally ponds. • High landscape potential to receive sediment and pollutants due to receiving stormwater discharge, surrounding residential and commercial land uses that generate pollutants, and a septic system onsite. • High societal value for water quality functions due to degraded waters and a TMDL listing within the sub-basin.	
Hydrologic (Scores 6 out of 9 points)	• Low site potential to reduce flooding and erosion due to an intermittently flowing outlet, limited storage depth during wet periods, and the wetland's relatively small sized within the contributing basin. • High landscape potential to provide flood protection due to receiving stormwater discharges, surrounding residential and commercial land uses that generate excess runoff, and high intensity land uses within the contributing basin. • Moderate societal value for hydrologic functions due to surface flooding within a downgradient sub-basin.	
Habitat (Scores 4 out of 9 points)	• Low site potential to provide diverse and complex habitat as the wetland consists of one plant community, two hydroperiods, moderate species richness, no interspersion of habitats, and two special habitat features. • Low landscape potential to support habitat use due to greater 50% of the surrounding land uses are high intensity and minimal accessible and undisturbed habitat. • Moderate societal value for habitat functions due to the presence 1 WDFW Priority Habitat within 100 meters of the wetland.	

Wetland B

Wetland B is approximately 40,968 square feet (0.94 acres) and is located on the southeast portion of the subject property, extending offsite to the south and reenters the subject property in the southwest corner. An approved wetland delineation was completed for the offsite portions of Wetland B by Widener & Associates in 2016 for a road construction project for the City of Bellingham (Widener & Associates, 2016). 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 an canopy of red alder and an understory of hardhack, twinberry, salmonberry, and vine maple (*Acer circinatum*). Hydric soil indicator F3 (Depleted Matrix) was identified. The wetland was delineated

based on a topographic depression and transition to wetland hydrology. The onsite buffer is partially degraded due to the adjacent residence and maintained landscaping. Wetland B is a Palustrine Forested, Seasonally Saturated and Seasonally Flooded (PFOBC) depressional wetland. In addition, a previous wetland delineation was completed in 2016 by Widener and Associates for the City of Bellingham for the constructed of Mahogany Avenue south of the subject property. The previous delineation also identified Wetland B on the southern portion of the subject property.

Table 4. Wetland B Summary.

WETLAND B		
	**Local Jurisdiction**	City of Bellingham
	City of Bellingham Rating	III
	Wetland Size (Onsite)	40,968 SF
	Cowardin Classification	PFOBC
	HGM Classification	Depressional
	Wetland Data Sheet(s)	DP-4
	Upland Data Sheet(s)	DP-5
Wetland Functions Summary		
Water Quality (Scores 7 out of 9 points)	• Low site potential to trap sediments and pollutants and remove nitrogen due to an intermittently flowing outlet and less than 25% of the wetland seasonally ponds. • High landscape potential to receive sediment and pollutants due to receiving stormwater discharge, surrounding residential and commercial land uses that generate pollutants, and a septic system onsite. • High societal value for water quality functions due to degraded waters and a TMDL listing within the sub-basin.	
Hydrologic (Scores 6 out of 9 points)	• Low site potential to reduce flooding and erosion due to an intermittently flowing outlet, moderate depth of storage during wet periods, and the wetland's relatively small sized within the contributing basin. • High landscape potential to provide flood protection due to receiving stormwater discharges, surrounding residential and commercial land uses that generate excess runoff, and high intensity land uses within the contributing basin. • Moderate societal value for hydrologic functions due to surface flooding within a downgradient sub-basin.	
Habitat (Scores 4 out of 9 points)	• Low site potential to provide diverse and complex habitat as the wetland consists of one plant community, two hydroperiods, moderate species richness, no interspersion of habitats, and two special habitat features. • Low landscape potential to support habitat use due to greater 50% of the surrounding land uses are high intensity and minimal accessible and undisturbed habitat. • Moderate societal value for habitat functions due to the presence 1 WDFW Priority Habitat within 100 meters of the wetland..	

5.3 Unregulated Features

One roadside ditch was identified adjacent to the subject property. The ditch is located on the western side of Northwest Drive, bordering the eastern property boundary. The ditch appears to have been artificially and intentionally created for stormwater conveyance associated with Northwest Drive. The ditch is approximately 1 to 2 feet wide vegetated channel. While the ditch contains a channel, a defined bed and bank are not present, and as such does not meet the stream criteria under WAC 222-16-030. Furthermore, per BMC 16.55.510, watercourses do not include "irrigation ditches, canals, stormwater runoff devices, or other entirely artificial watercourses". No fish use is documented anywhere onsite by WDFW, DNR, the County or the City, and the ditch does not provide any potential fish habitat. As such, the roadside ditch is not anticipated to be a regulated feature.

5.4 Wildlife Habitat Conservation Areas

Per BMC 16.55.470, fish and wildlife habitat conservation areas consist of: (1) Areas with which State or Federally designated endangered, threatened, and sensitive species have a primary association, (2) Commercial and recreational shellfish areas, (3) Naturally occurring ponds under 20 acres, (4) Waters of the State, (5) State natural area preserves and natural resource conservation areas, (5) Areas of rare plant species and high quality ecosystems, and (6) Land useful or essential for preserving connections between habitat blocks and open spaces. No fish and wildlife habitat conservation areas are present within 300 feet of the subject property.

According to the USFWS IPaC mapping database, marbled murrelet (*Brachyramphus marmoratus*), yellow-billed cuckoo (*Coccyzus americanus*), and bull trout (*Salvelinus confluentus*)/dolly varden (*Salvelinus malma*) have the potential to occur within 300-feet of the subject property. Marbled murrelet that occur in the state of Washington are year-round residents on coastal waters and primarily feed in waters within 500 feet of the shore out to 1.2 miles from shore at depths of less than one hundred feet. Potential suitable habitat typically consists of tree stands 5 or more acres in size composed of 60% or more conifer cover with minimum 15-inch diameter at breast height (DBH). The subject property is not suitable for marbled murrelet nesting habitat due to a lack of significant tree stands and distance from coastal waters.

Yellow-billed cuckoo habitat consists of low to mid-level riparian forests dominated by cottonwoods and willows. Suitable habitat is approximately 100 to 198 acres and wider than 200 meters; marginal habitat is approximately 20 to 100 acres and 100 to 200 meters wide; and unsuitable habitat is smaller than approximately 37 acres and less than 100 meters wide (Wiles & Kalasz, 2017). The subject site and surrounding undisturbed to medium land use intensity provides an enough large area suitable for yellow-billed cuckoo habitat, however it is unlikely that yellow-billed cuckoo would utilize the subject property due its close proximity to Northwest Drive, a major arterial roadway in Bellingham, and the high intensity commercial and residential uses that surround the property on three sides.

Bull trout and dolly varden require cold water temperatures, clean stream substrates, complex streams, and connectivity to river, lakes, and ocean habitats. There are no streams on or within 300 feet of the subject site to provide bull trout habitat.

Chapter 6. Regulatory Considerations

SVC's site investigations in the fall of 2022 identified two potentially-regulated wetlands (Wetlands A and B) on the subject property. No other potentially-regulated wetlands, waterbodies, fish and wildlife habitat, or priority species were identified within 300 feet of the subject property during the site investigations.

6.1 Local Considerations

BMC 16.55.280 has adopted the current wetland rating system for western Washington (Hruby, 2014). Category III wetlands are wetlands with a moderate level of functions, as characterized by a score ranging from 16 to 19 points. Generally, these wetlands have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.

BMC 16.55.340.B.2 has established wetland buffers based on wetland rating, adjacent land use intensity, and habitat score. Table 5 presents the standard wetland buffer widths for the identified wetlands with adjacent high land use intensity. Additionally, a 15-foot building setback is required from the edge of all wetland buffers per BMC 16.55.340.G.

In addition, BMC 16.55.130 states that all land uses existing within a property before the adoption of the *Critical Areas* chapter of the BMC (BMC 16.55) may be continued, maintained and replaced in kind. As such, the existing area of urban landscaping attached to the existing single-family residence onsite can remain within the wetland buffer.

Table 5. Wetland Buffer Summary.

Wetland	Category	Habitat Scores	Standard Buffer Width
A	III	4	80
B	III	4	80

Per BMC 16.55.130, all land uses, buildings, structures, parking, driveways, utilities, stormwater facilities, trails, landscaping, and supporting facilities that were lawfully established prior to the adoption of BMC Chapter 16.55 – Critical Areas, but otherwise would be determined to be located within a critical area or minimum standard buffer for a critical area, shall be deemed nonconforming, but not in violation of the Chapter's provisions. All such facilities may be continued, maintained, and replaced in kind. Landscaped areas associated with the existing single-family residential development onsite are located within the minimum standard buffer area associated with Wetland B, and are protected as a non-conforming use under this provision.

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.

Both Wetlands A and B are depressional wetlands that do not have surface water connectivity to traditionally navigable waters or associated tributaries. However, given their proximity to other likely regulated WOTUS, such as Bear Creek and the Nooksack River to the west, they may be considered to have a "significant nexus" and therefore subject to federal regulation. An Approved Jurisdictional Determination (AJD) from USACE is necessary to determine if these wetlands would be subject to Section 404 regulations. Wetland A and B are also considered a natural water that are likely regulated by the WSDOE through the Revised Code of Washington (RCW) 90.48.

Chapter 7. Closure

The findings and conclusions documented in this report have been prepared for specific application to the Northwest Drive site. They 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. Our work was also performed in accordance with the terms and conditions set forth in our proposal. The conclusions and recommendations presented in this 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. Because of such changes, our observations and conclusions applicable to this project may need to be revised wholly or in part.

The critical area determinations by Soundview Consultants LLC are based on conditions present at the time of the site inspection and considered preliminary until the presence or absence and location of critical areas are validated by the jurisdictional agencies. Validation of the critical area determinations by the regulating agencies provides a certification, usually written, that the critical area boundaries or lack thereof verified are the boundaries that will be regulated by the agencies until a specific date or until the regulations are modified. Only the regulating agencies can provide this certification.

Since critical areas are dynamic communities affected by both natural and human activities, changes in critical area determinations and/or boundaries may be expected; therefore, critical area determinations cannot remain valid for an indefinite period of time. Local agencies typically recognize the validity of critical area determinations for a period of 5 years after completion of a wetland delineation and fish and wildlife habitat assessment report. Development activities on a site 5 years after the completion of this report may require revision of the critical area determinations and/or delineations. In addition, changes in government codes, regulations, or laws may occur. Because of such changes, our observations and conclusions applicable to this site may need to be revised wholly or in part.

Chapter 8. References

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Appendix A – Methods and Tools

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

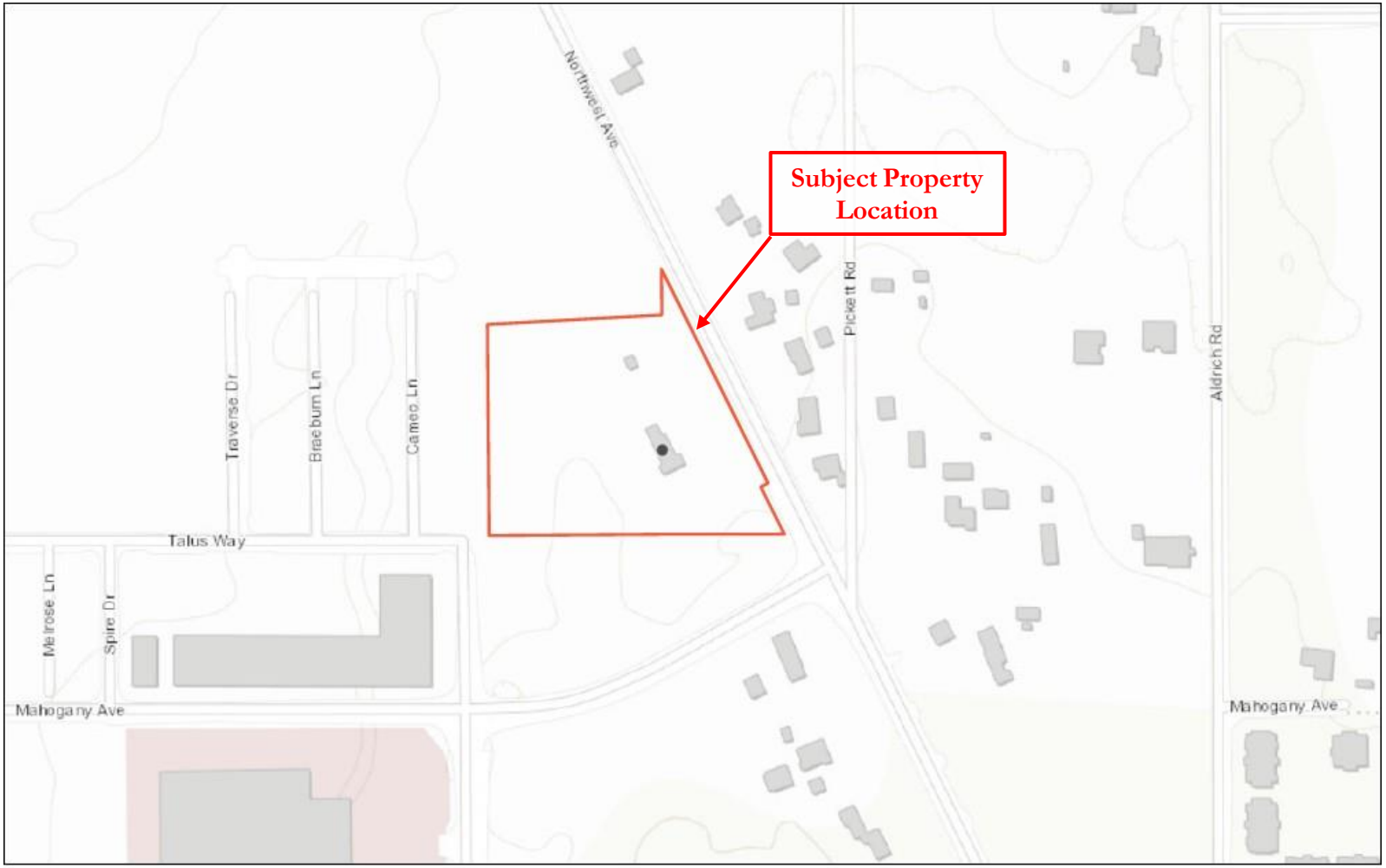
Parameter	Method or Tool	Website	Reference
Wetland Delineation	USACE 1987 Wetland Delineation Manual	http://el.erdc.usace.army.mil/elpubs/pdf/wlman87.pdf	**Environmental Laboratory.** 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, US Army Engineer Waterways Experiment 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 # 04-06-029.
Wetland Indicator Status	2020 National Wetland Plant List	http://wetland-plants.usace.army.mil/	Website.
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: **Goldin, Alan. 1992.** Soil Survey of Whatcom County Area, Washington. Soil Conservation Service United States Department of Agriculture, Soil Conservation Service, in cooperation with the Washington Agricultural Experiment Station. Natural Resource Conservation Service.
	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).
	Soil Color Charts		**Munsell®** Color. 2000. Munsell® Soil Color Charts. New Windsor, New York.
	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.

Parameter	Method or Tool	Website	Reference
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	City of Bellingham Municipal Code (BMC)	https://bellingham.municipal.codes/BMC/16.55	BMC Chapter 16.55 - Critical Areas.

Appendix B – Background Information

This Appendix includes a Whatcom County Contours map (B1), NRCS Soil Survey Map (B2), Bellingham Stream and Wetland Inventory Map (B3); Whatcom County Stream and Wetland Inventory Map (B4), a USFWS NWI Map (B5), a WDFW PHS Map (B6), a DNR Stream Typing Map (B7), and WDFW SalmonScape Map (B8).

Appendix B1. Whatcom County Contours Map



10/24/2022, 12:38:45 PM

Statewide Parcels _Query result

1:4,514

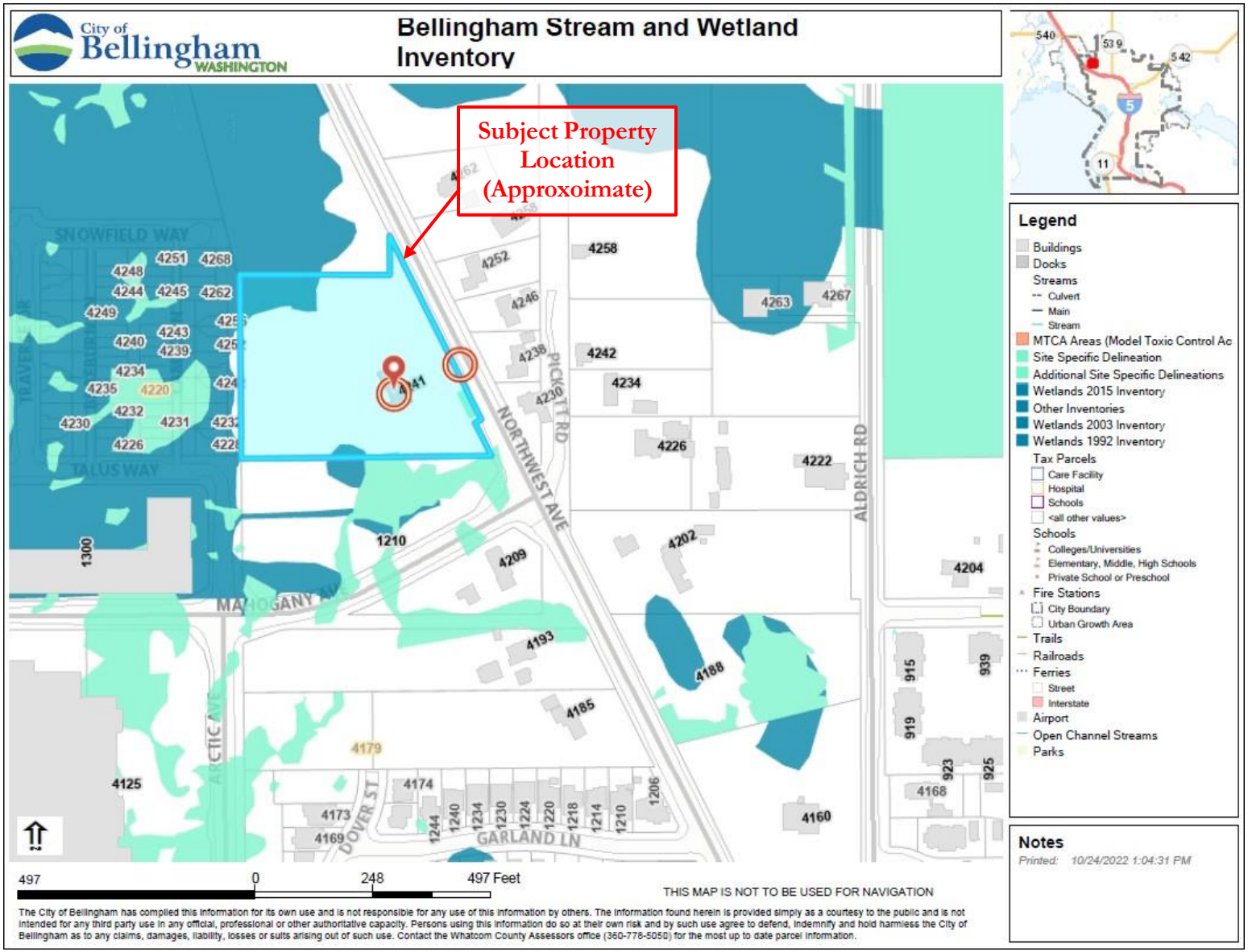
0 140 280 560 ft

0 40 80 160 m

City of Bellingham, Bureau of Land Management, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS, Soundview Consultants

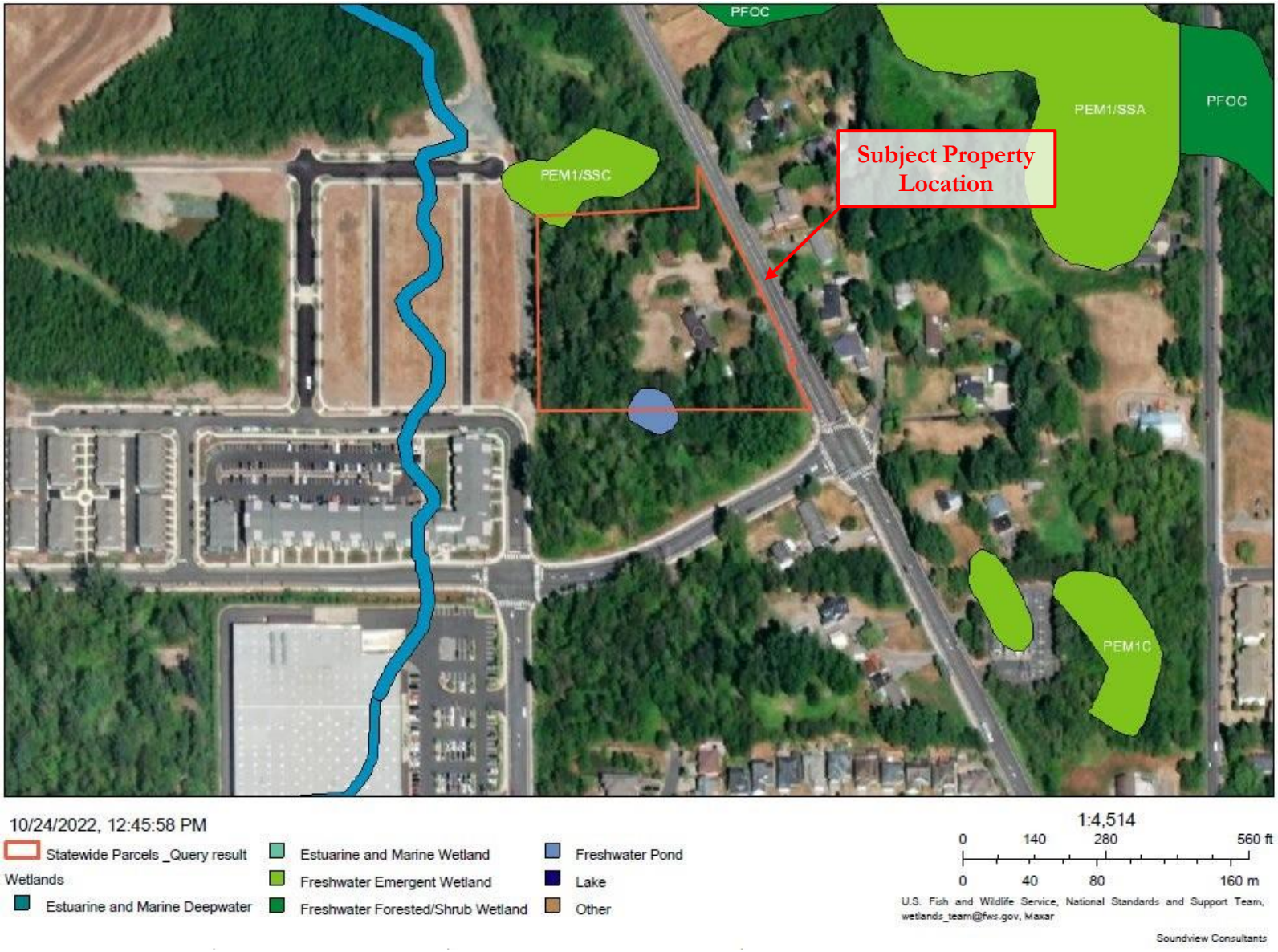
Appendix B2. NRCS Soil Survey Map

Appendix B3. Bellingham Stream and Wetland Inventory Map



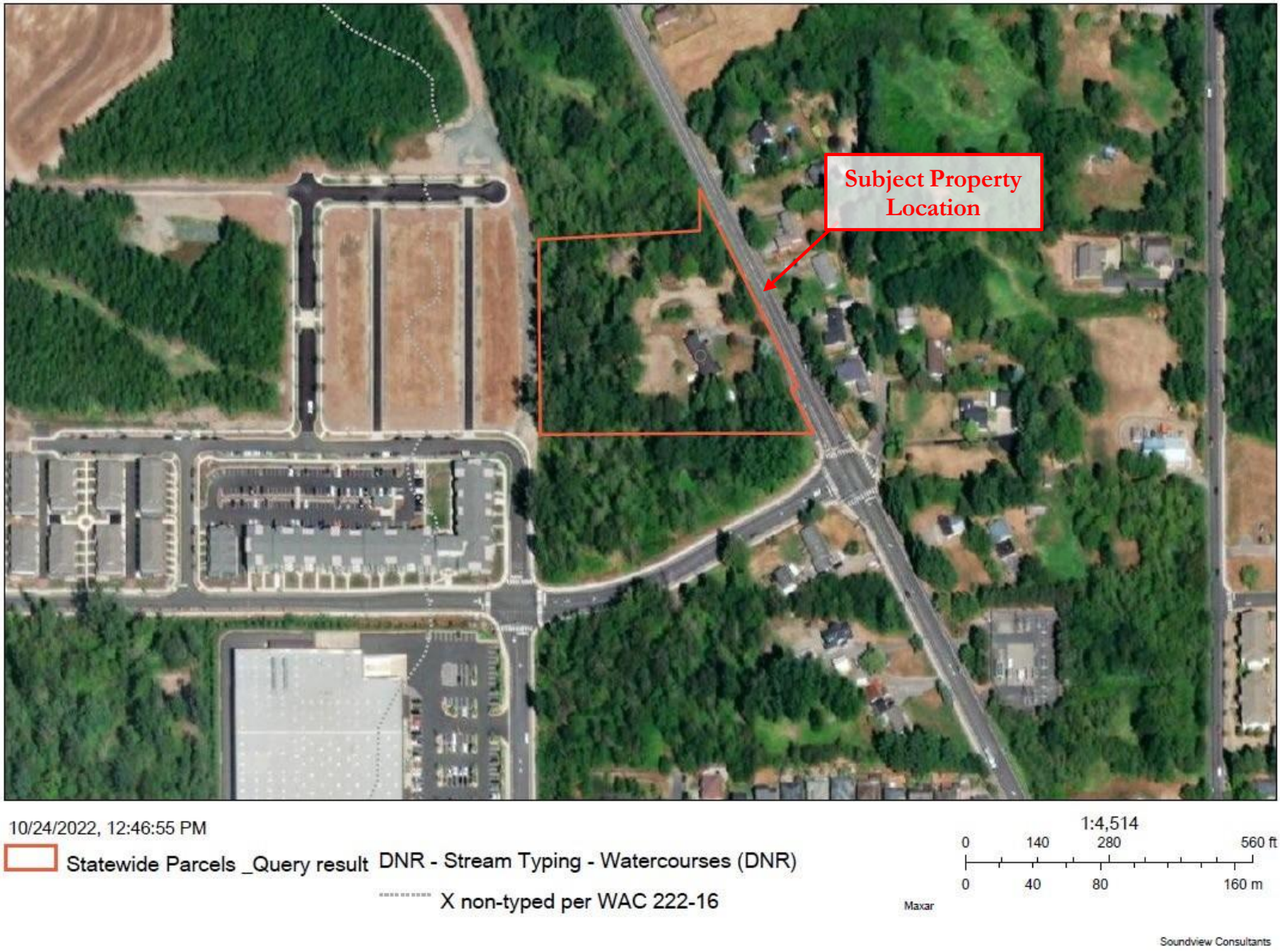
Appendix B4. Whatcom County Stream and Wetland Inventory Map

Appendix B5. USFWS NWI Map

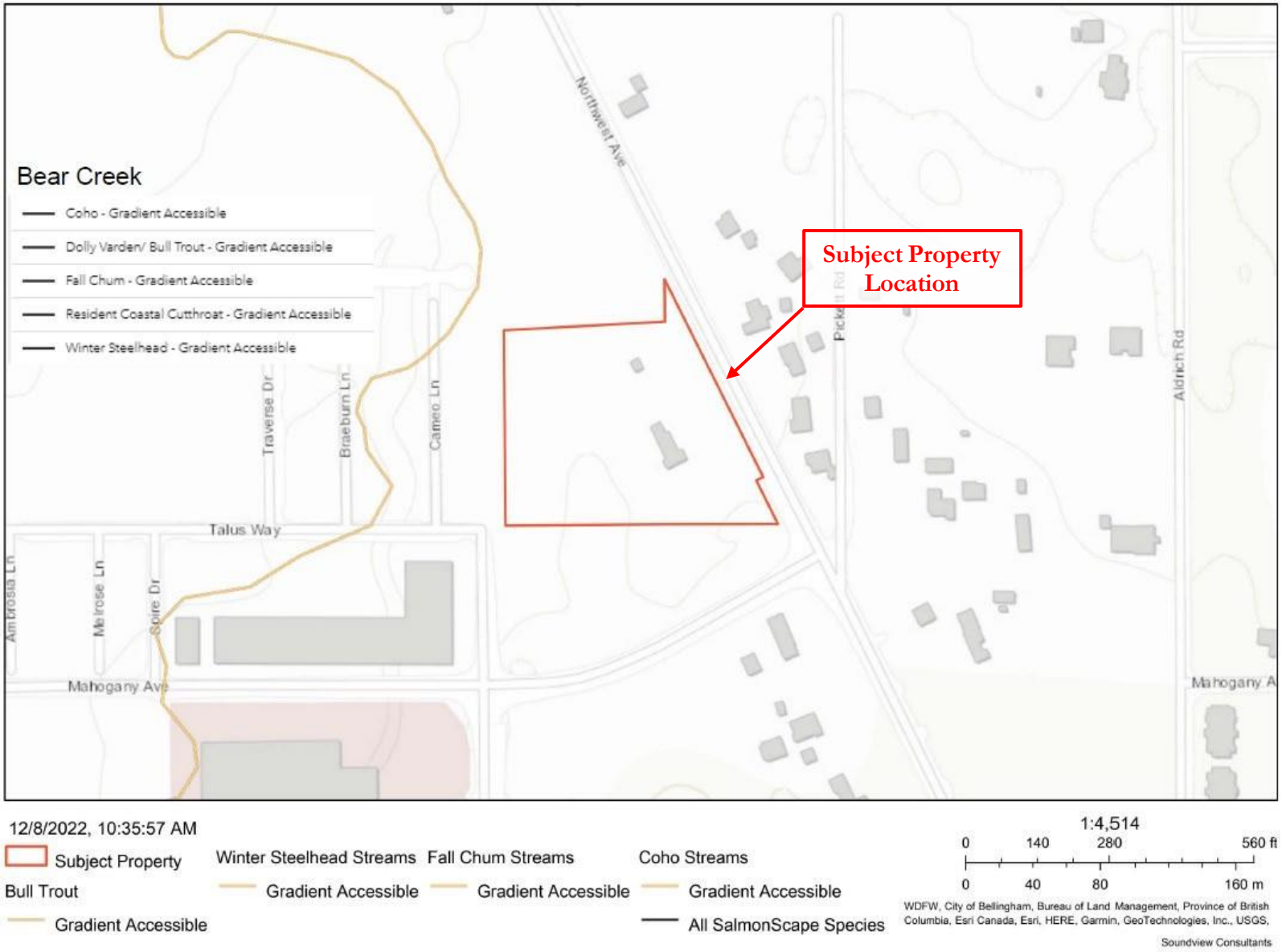


Appendix B6. WDFW PHS Map

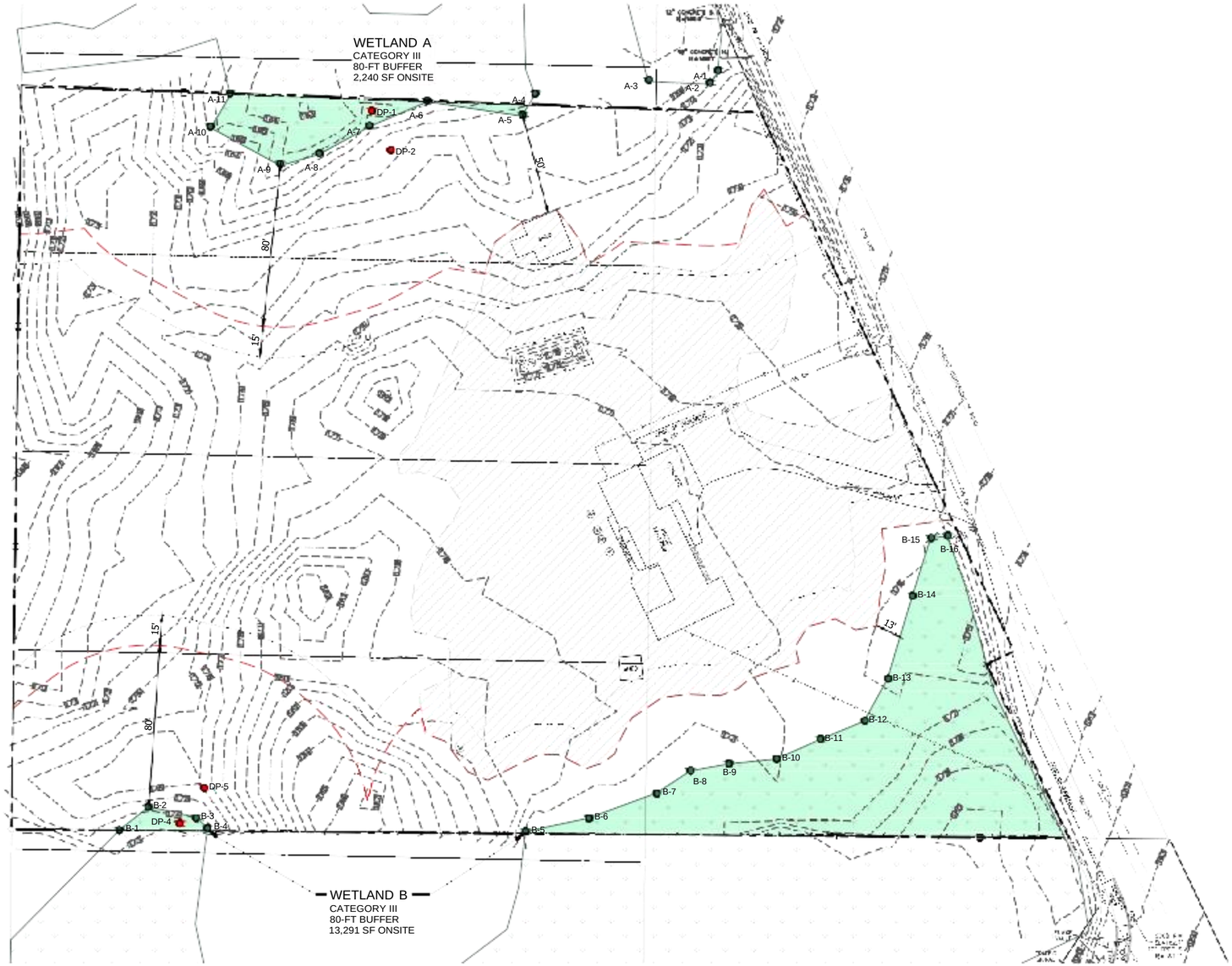
Appendix B7. DNR Stream Typing Map



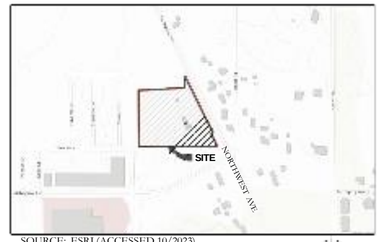
Appendix B8. WDFW SalmonScape Map



Appendix C – Existing Conditions Exhibit



VICINITY MAP



SOURCE: ESRI (ACCESSED 10/2023)

SOURCES:

LOCATION

THE SW ¼ OF SECTION 11,
TOWNSHIP 38N, RANGE 2E, WM

APPLICANT/OWNER

NAME: ETHAN POTTS
ADDRESS: 220 W CHAMPION STREET #240
BELLINGHAM, WA 98225
PHONE: (360) 510-1049
E-MAIL: ETHANPOTTS@GMAIL.COM

ENVIRONMENTAL CONSULTANT

SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WA 98355
(253) 514-8952

0 30 60 90
GRAPHIC SCALE
1"= 30'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- WETLAND BUFFER
- 15' BUILDING SETBACK LINE
- EDGE OF MAINTAINED LANDSCAPING & BUFFER INTERRUPTION
- EXISTING CONTOUR
- DATA POINT
- WETLAND FLAG

Soundview Consultants
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Environmental Assessment Planning
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PRELIMINARY
INFORMATION ONLY

NOT FOR CONSTRUCTION

SOUNDVIEW CONSULTANTS LLC ASSUMES NO LIABILITY OR RESPONSIBILITY FOR CONSTRUCTION, IMPROVEMENTS, OR ESTIMATES BASED ON THIS PLAN SET

NORTHWEST DRIVE
4241 NORTHWEST DRIVE
BELLINGHAM, WA

WHATCOM COUNTY
PARCEL NUMBER(S):
3802114351860000

DATE: 01/08/2024
JOB: 2486.0001
BY: DLS
SCALE: AS SHOWN
SHEET: 1

S:\CURRENT\2486 Potts\2486.0001 Northwest Dr\Graphics & Maps\CAD\A - CURRENT SVC DRAWINGS\A - Current Base DWGs\2486.0001 (2023-1) base.dwg
Plotted January 9, 2024

Appendix D – Data Forms

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

Project/Site: 2486.0001 Northwest Drive City/County: Bellingham/ Whatcom Sampling Date: 11/15/2022

Applicant/Owner: Ethan Potts and Chay Tan State: WA Sampling Point: DP-1

Investigator(s): Lauren Templeton and Kramer Canup Section, Township, Range: 11/38N/02E

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

Subregion (LRR): A2 Lat: 48.795118 Long: -122.51275684 Datum: WGS 84

Soil Map Unit Name: Whatcom- Labounty silt loams, 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. DP-1 is located in Wetland A.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	55	Yes	FAC
2.			
3.			
4.			
	55	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Spirea douglasii	25	Yes	FACW
2. Rubus spectabalis	8	No	FAC
3. Rubus armeniacus	5	No	FAC
4. Acer circinatum	4	No	FAC
5.			
	42	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Ranunculus repens	30	Yes	FAC
2. Rubus ursinus	5	No	FACU
3. Equisetum arvense	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 60

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 the Dominance Test.

SOIL

Sampling Point: DP-1

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	-	-	-	-	SiClLo	Silty clay loam
7-12	10YR 3/2	97	7.5YR 4/6	3	C	M	SiClLo	Silty clay loam
12-17	2.5Y 5/2	60	10YR 4/6	8	C	M	ClLo	Clay loam. Mixed matrix
12-17	10YR 4/1	30	10YR 3/6	2	C	M	ClLo	Clay 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 indicator A11.

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.

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

Project/Site: 2486.0001 Northwest Drive City/County: Bellingham/ Whatcom Sampling Date: 11/15/2022

Applicant/Owner: Ethan Potts & Chay Tan State: WA Sampling Point: DP-2

Investigator(s): Lauren Templeton and Kramer Canup Section, Township, Range: 11/38N/02E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Slope Slope (%): 4

Subregion (LRR): A2 Lat: 48.795050 Long: -122.51274066 Datum: WGS 84

Soil Map Unit Name: Whatcom- Labounty silt loams, 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. Upland plot for Wetland A.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	25	Yes	FAC
2. Sorbus aucuparia	10	Yes	UPL
3.			
4.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Rubus spectabalis	4	Yes	FAC
2. Rubus armeniacus	4	Yes	FAC
3. Alnus rubra	3	Yes	FAC
4.			
5.			
	11	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Poa pratensis	93	Yes	FAC
2. Trifolium repens	3	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	96	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (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 Dominance Test.

SOIL

Sampling Point: DP-2

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
0-8	10YR 3/2	100	-	-	-	-	SaLo	Sandy loam
8-10	2.5Y 4/2	99	10YR 3/6	1	C	M	LoCl	Loamy clay
10-24	10YR 4/2	84	10YR 3/6	1	C	M	LoCl	Loamy clay. Mixed matrix.
10-24	10YR 5/2	10	10YR 3/6	5	C	M	LoCl	Loamy clay. 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): 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. No primary or secondary indicators were observed. Soil pit dug to 24 inches.

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

Project/Site: 2486.0001 Northwest Drive City/County: Bellingham/ Whatcom Sampling Date: 11/15/2022

Applicant/Owner: Ethan Potts & Chay Tan State: WA Sampling Point: DP-3

Investigator(s): Lauren Templeton and Kramer Canup Section, Township, Range: 11/38N/02E

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

Subregion (LRR): A2 Lat: 48.794624 Long: -122.51338205 Datum: WGS 84

Soil Map Unit Name: Whatcom- Labounty silt loams, 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 ☐	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒	
Wetland Hydrology Present?	Yes ☐ No ☒	

Remarks:
Not all three wetland criteria met; lack of hydric soil and wetland hydrology. DP-3 is located near the western edge of the subject property in a topographical low point.

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. Rubus spectabalis	70	Yes	FAC
2. Acer circinatum	10	No	FAC
3. Lonicera involucrata	7	No	FAC
4. Corylus cornuta	6	No	FACU
5. Populus balsamifera	4	No	FAC
	97	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Rubus ursinus	15	Yes	FACU
2. Ranunculus repens	15	Yes	FAC
3. Tolmiea menziesii	10	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 60

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (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 Dominance Test.

SOIL

Sampling Point: DP-3

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
0-8	10YR 3/2	100	-	-	-	-	SiClLo	Silty clay loam
8-14	10YR 3/3	100	-	-	-	-	SiClLo	Silty clay 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 met. Only one secondary indicator (D2) was observed. Soil pit dug to 17 inches.

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

Project/Site: 2486.0001 Northwest Drive City/County: Bellingham/ Whatcom Sampling Date: 11/15/2022

Applicant/Owner: Ethan Potts & Chay Tan State: WA Sampling Point: DP-4

Investigator(s): Lauren Templeton and Kramer Canup Section, Township, Range: 11/38N/02E

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

Subregion (LRR): A2 Lat: 48.794116 Long: -122.51312524 Datum: WGS 84

Soil Map Unit Name: Whatcom- Labounty silt loams, 0 to 8 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐

Are Vegetation _____, Soil _____, or Hydrology _____naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ☒ 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. DP-4 is located in Wetland B.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Alnus rubra	60	Yes	FAC
2. Acer circinatum	15	Yes	FAC
3.			
4.			
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Lonicera involucrata	35	Yes	FAC
2. Spirea douglasii	8	No	FACW
3. Rubus spectabalis	5	No	FAC
4. Acer circinatum	5	No	FAC
5.			
	53	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Ranunculus repens	60	Yes	FAC
2. Tolmiea menziesii	5	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 35

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-4

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	-	-	-	-	SiLo	Silty loam
4 - 9	10YR 3/2	92	5YR 4/6	3	C	PL	SiLo	Silty loam. Mixed matrix.
4 - 9	10YR 4/2	5	-	-	-	-	SiLo	Silty loam. Mixed matrix.
9 - 15	10YR 4/2	70	5YR 4/6	15	C	M	SiClLo	Silty clay loam. Mixed matrix.
9 - 15	10YR 3/2	15	-	-	-	-	SiLo	Silty 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 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): 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:

Wetland hydrology criteria met through secondary indicators D2 and D5.

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

Project/Site: 2486.0001 Northwest Drive City/County: Bellingham/ Whatcom Sampling Date: 11/15/2022

Applicant/Owner: Ethan Potts & Chay Tan State: WA Sampling Point: DP-5

Investigator(s): Lauren Templeton and Kramer Canup Section, Township, Range: 11/38N/02E

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

Subregion (LRR): A2 Lat: 48.794192 Long: -122.51306712 Datum: WGS 84

Soil Map Unit Name: Whatcom- Labounty silt loams, 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:

No wetland criteria was met. Upland plot for Wetland B.

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. Alnus rubra	40	Yes	FAC
3.			
4.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Symphoricarpos alba	40	Yes	FACU
2.			
3.			
4.			
5.			
	40	= Total Cover	
Herb Stratum (Plot size: 10 ft)			
1. Rubus ursinus	15	Yes	FACU
2. Polystichum munitum	3	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	18	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 82

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (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 a lack of hydric soils and wetland hydrology.

SOIL

Sampling Point: DP-5

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
0-16	10YR 3/6	80	-	-	-	-	SiLo	Silty loam. Mixed matrix.
0-16	10YR 3/3	20	-	-	-	-	SiLo	Silty 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): 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. No hydrology to 16 inches.

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

Project/Site: 2486.0001 Northwest Drive City/County: Bellingham/ Whatcom Sampling Date: 11/15/2022

Applicant/Owner: Ethan Potts & Chay Tan State: WA Sampling Point: DP-6

Investigator(s): Lauren Templeton and Kramer Canup Section, Township, Range: 11/38N/02E

Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): Concave Slope (%): 4

Subregion (LRR): A2 Lat: 48.794411 Long: -122.51269613 Datum: WGS 84

Soil Map Unit Name: Whatcom- Labounty silt loams, 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 ☒	**Is the Sampled Area within a Wetland?** Yes ☐ No ☒
Hydric Soil Present? Yes ☒ No ☐	
Wetland Hydrology Present? Yes ☐ No ☒	

Remarks:
Not all three wetland criteria met; only hydric soils was observed. DP-6 is a representative upland plot and is located near the south central portion of the site. The soil material found in DP-6 contained high amounts of old fill material.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pseudotsuga menziesii	20	Yes	FACU
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: 30 ft)			
1. Symphoricarpos alba	5	Yes	FACU
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 10 ft)			
1. Lolium perenne	99	Yes	FAC
2. Trifolium repens	5	No	FAC
3. Rubus ursinus	3	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	107 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft)			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum -7

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (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 met. Prevalence index not warranted due to a lack of wetland hydrology.

SOIL

Sampling Point: DP-6

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
0-2	10YR 3/2	100	-	-	-	-	SaLo	Sandy loam
2-10	2.5Y 4/2	92	10YR 3/6	8	C	M	LoCl	Loamy clay
10-15	7.5YR 3/2	95	-	-	-	-	SaLo	Sandy loam. Mixed matrix.
	2.5Y 4/3	5	-	-	-	-	SaLo	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 indicator A11. Soils are inverted and appear to include old fill material.

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. No primary or secondary indicators observed. Soil pit dug to 15 inches.

Appendix E – Wetland Rating Forms

Wetland name or number Wetland A

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland A Date of site visit: 11/15/2022

Rated by Kramer Canup and Lauren Templeton Trained by Ecology? ✔ Yes ___No Date of training 06/2022

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	L	L	
Landscape Potential	H	H	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 Wetland 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 Wetland 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 Wetland 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 Wetland 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	3
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	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 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	1
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	3

Rating of Landscape Potential If score is: X **3 or 4 = H** ___ **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	1
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	4

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 Wetland 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 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	1
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	1
Total for D 5 Add the points in the boxes above	3

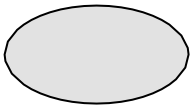
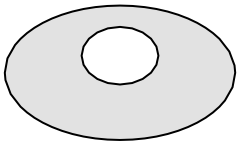
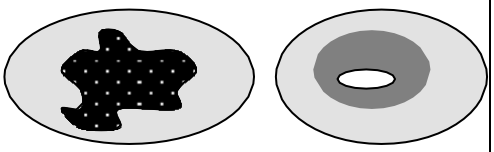
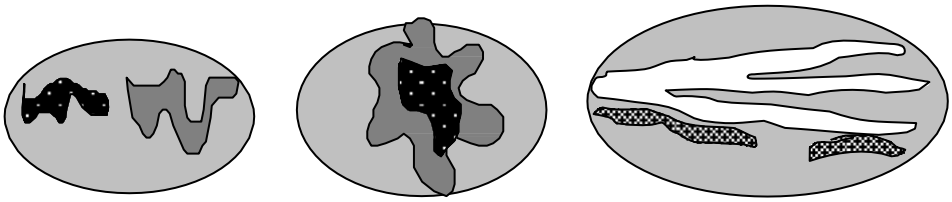
Rating of Landscape Potential If score is: X **3 = H** ___ **1 or 2 = M** ___ **0 = L** *Record the rating on the first page*

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 Wetland 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 ____Emergent — 3 structures: points = 2 ____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	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 __x__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 	0

Wetland name or number Wetland 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*)	2
Total for H 1 Add the points in the boxes above	4

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** __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:* [1.36] % undisturbed habitat **+** [(% moderate and low intensity land uses) [.92] /2] = _1.82_ % 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:* [23.05] % undisturbed habitat **+** [(% moderate and low intensity land uses) [22.36] /2] = _34.230000000000_ % 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 Wetland 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 Wetland 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 Wetland 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 Wetland- B

RATING SUMMARY – Western Washington

Name of wetland (or ID #): Wetland- B Date of site visit: 11/15/2022

Rated by Kramer Canup and Lauren Templeton Trained by Ecology? ✔ Yes ___No Date of training 06/2022

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	L	L	
Landscape Potential	H	H	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 Wetland- 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 Wetland- 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 Wetland- 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 Wetland- 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	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	3
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	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 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	1
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	3

Rating of Landscape Potential If score is: X **3 or 4 = H** ___ **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	1
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	4

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 Wetland- 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
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	1
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	1
Total for D 5	Add the points in the boxes above	3

Rating of Landscape Potential If score is: X **3 = H** ___ **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

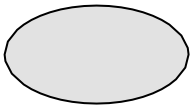
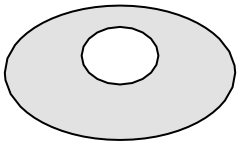
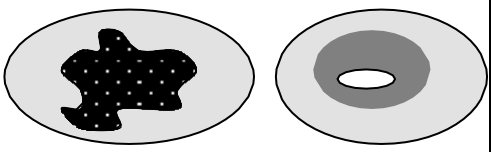
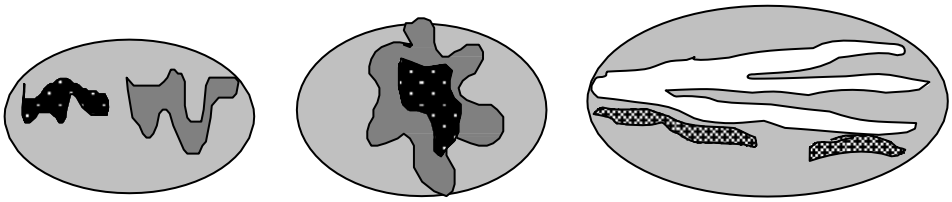
There are no problems with flooding downstream of the wetland. points = 0

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 Wetland- 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 ____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	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 __x__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 	0

Wetland name or number Wetland- 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*)	2
Total for H 1 Add the points in the boxes above	4

Rating of Site Potential If score is:___**15-18 = H** ___**7-14 = M** __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:* [1.36] % undisturbed habitat **+** [(% moderate and low intensity land uses) [.92] /2] = 1.82 % 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:* [23.05] % undisturbed habitat **+** [(% moderate and low intensity land uses) [22.36] /2] = 34.230000000000 % 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 Wetland- 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 Wetland- 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 Wetland- 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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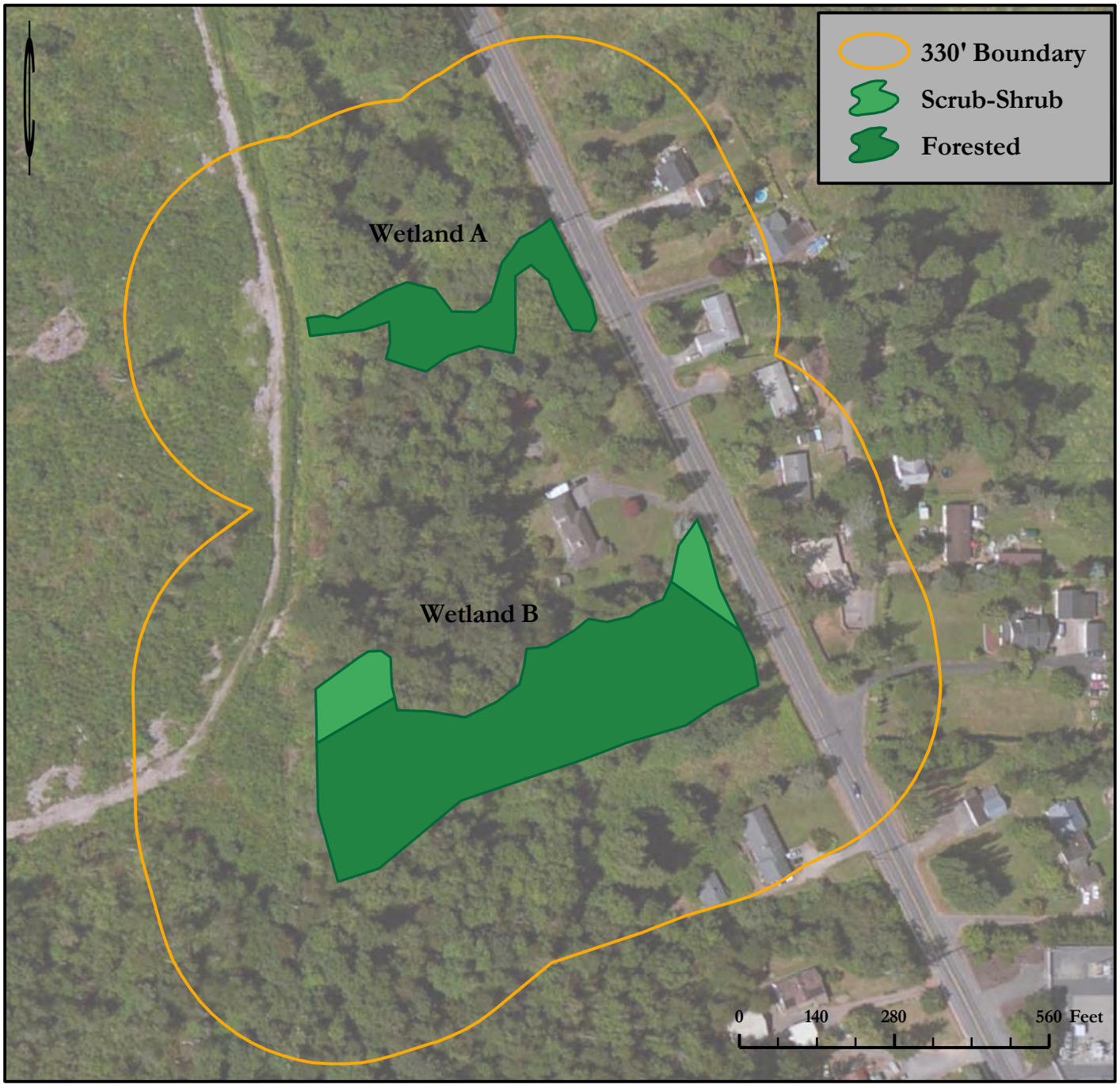
Appendix F – Wetland Rating Figures

COWARDIN MAP



H.1.0 Presence Cowardin Classes in Wetland A		
H.1.1		
	Percent of Forested Class	100.0%
H.1.1	Presence Cowardin Classes in Wetland B	
	Percent of Scrub-Shrub Class	12.2%
	Percent of Forested Class	87.8%

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Phone: (253) 514-8952 Fax: (253) 514-8954
www.soundviewconsultants.com

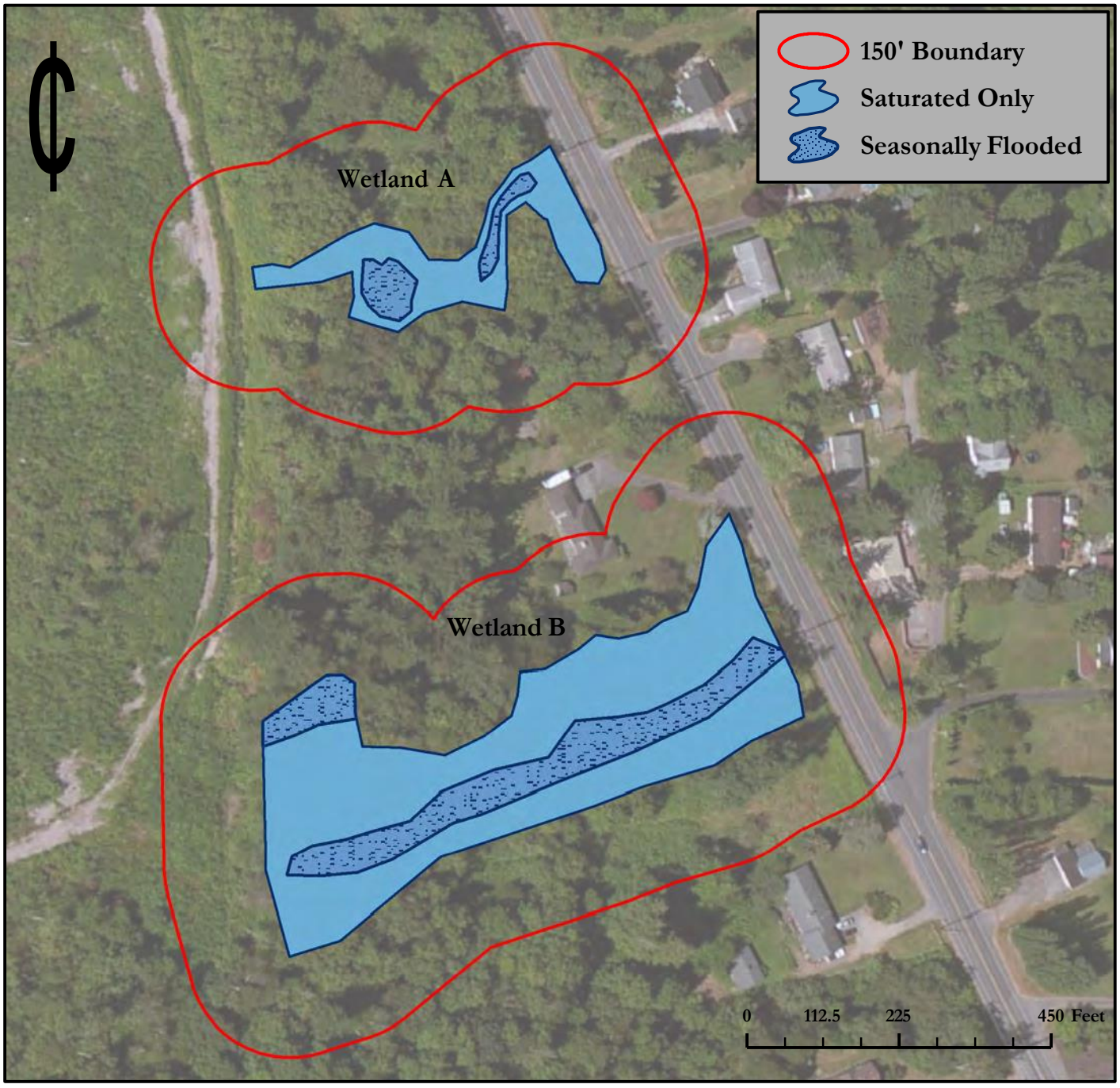
NORTHWEST DRIVE

4241 NORTHWEST DRIVE,
BELLINGHAM, WA

WHATCOM COUUNTY PARCEL NUMBER:
3802114351860000

DATE: 12/4/2022
JOB: 2486_0001
BY: JML
SCALE: 1 " = 275 '
FIGURE NO. 1 of 5

HYDROPERIOD MAP



H.1.0		
H.1.1	Presence Hydroperiod Classes in Wetland A	
	Percent of Seasonally Flooded or Inundated	19.0%
	Percent of Saturated Only	81.0%
H.1.1	Presence Hydroperiod Classes in Wetland B	
	Percent of Seasonally Flooded or Inundated	24.2%
	Percent of Saturated Only	75.8%

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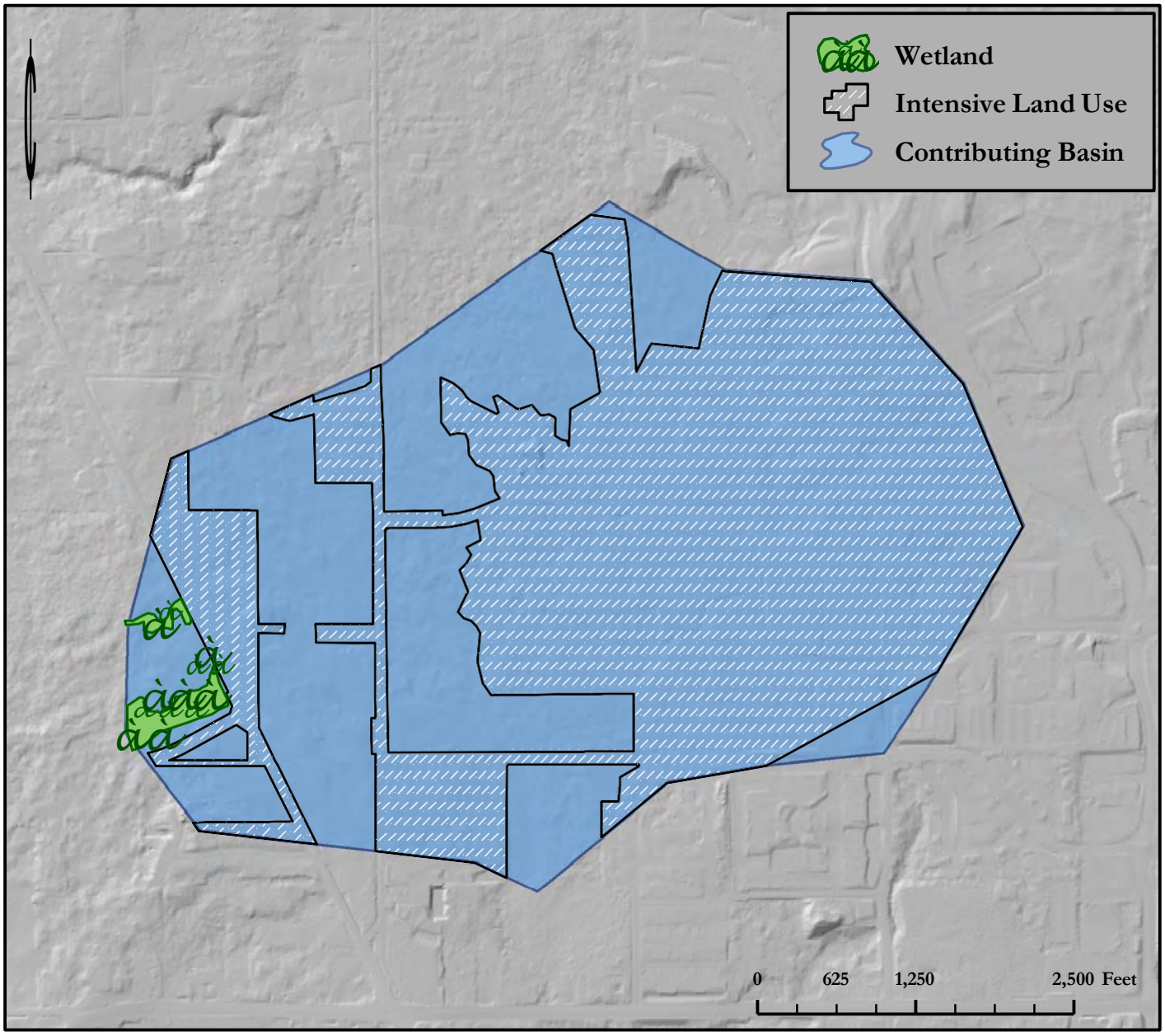
NORTHWEST DRIVE

4241 NORTHWEST DRIVE,
BELLINGHAM, WA

WHATCOM COUUNTY PARCEL NUMBER:
3802114351860000

DATE: 12/4/2022
JOB: 2486_0001
BY: JML
SCALE: 1 " = 225 '
FIGURE NO. 2 of 5

HYDROPERIOD MAP



D.4.0		
D.4.3		
	Area of Contributing Basin (SF)	25,457,940
	Area of Wetland A (SF)	46,171
	Percent of Wetland A within Contributing Basin	**0.181%**
D.5.0		
D.5.3		
	Area of Contributing Basin	25,457,940
	Area of Intensive Human Land Uses	15,990,755
	Percent of Intensive Human Land Use within Contributing Basin	**63%**

D.4.0		
D.4.3		
	Area of Contributing Basin (SF)	25,457,940
	Area of Wetland B (SF)	192,319
	Percent of Wetland B within Contributing Basin	**0.755%**
D.5.0		
D.5.3		
	Area of Contributing Basin	25,457,940
	Area of Intensive Human Land Uses	15,990,755
	Percent of Intensive Human Land Use within Contributing Basin	**63%**

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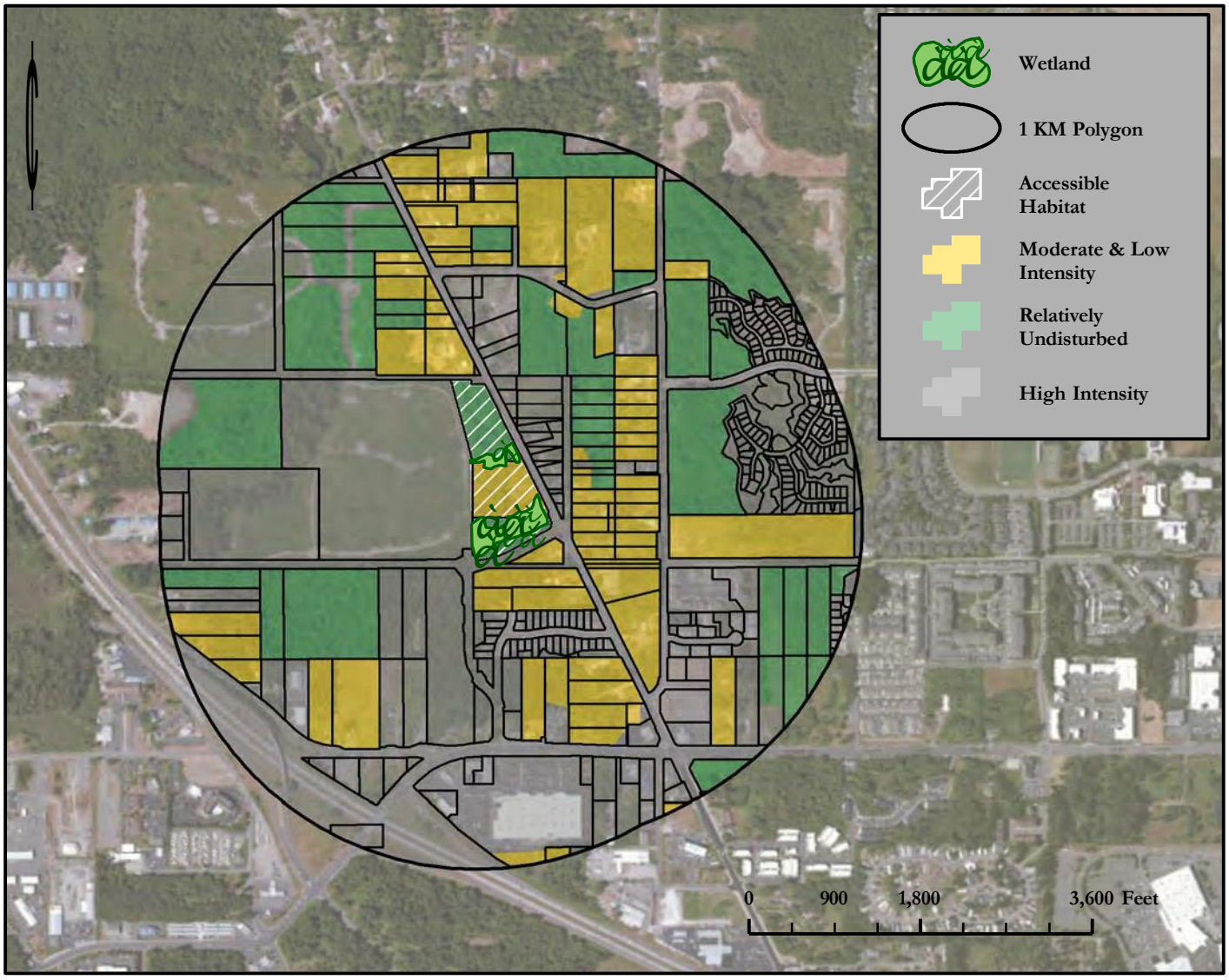
NORTHWEST DRIVE

4241 NORTHWEST DRIVE,
BELLINGHAM, WA

WHATCOM COUUNTY PARCEL NUMBER:
3802114351860000

DATE:	12/5/2022
JOB:	2486_0001
BY:	JML
SCALE:	1 " = 1,250 '
FIGURE NO.	3 of 5

HYDROPERIOD MAP



H.2.0		
H.2.1	Wetland A & B	
	Abutting Undisturbed Habitat	1.36%
	Abutting Moderate & Low Intensity Land Uses	0.92%
	Accessible Habitat	**1.82%**
H.2.2		
	Undisturbed Habitat	23.05%
	Moderate & Low Intensity Land Uses	22.36%
	Undisturbed Habitat in 1 KM Polygon	**34.23%**
H.2.3		
	High Intensity Land Use in 1 KM Polygon	**54.59%**

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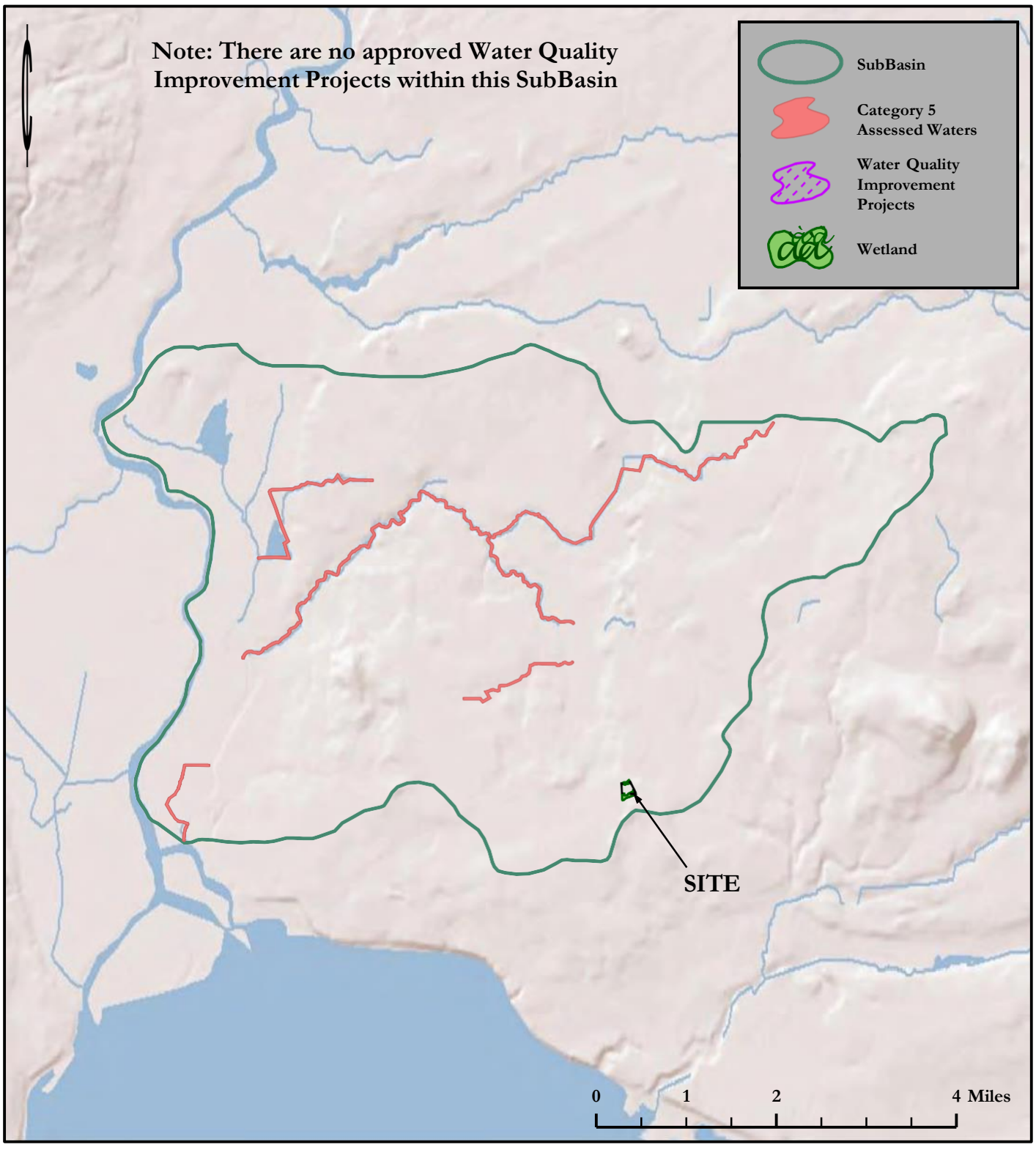
NORTHWEST DRIVE

4241 NORTHWEST DRIVE,
BELLINGHAM, WA

WHATCOM COUUNTY PARCEL NUMBER:
3802114351860000

DATE: 12/4/2022
JOB: 2486_0001
BY: JML
SCALE: 1 " = 1,750 '
FIGURE NO. 3 of 5

303(D) MAP



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NORTHWEST DRIVE

4241 NORTHWEST DRIVE,
BELLINGHAM, WA

WHATCOM COUUNTY PARCEL NUMBER:
3802114351860000

DATE:	12/4/2022
JOB:	2486_0001
BY:	JML
SCALE:	1 " = 2 mi
FIGURE NO.	5 of 5

Appendix G – Site Photographs

General upland conditions in the central portion of the maintained lawn (facing northwest).

General upland conditions on the northern portion of the subject property (facing west).

General upland conditions on the west portion of property (looking southeast).

Ditch along Northwest Drive and the eastern property border (looking north).

General upland conditions (left) and soil profile (right) at DP-2.

General upland conditions (left) and soil profile (right) at DP-3.

General upland conditions (left) and soil profile (right) at DP-5.

General upland conditions (left) and soil profile (right) at DP-6.

Appendix H – Qualifications

All field inspections, habitat assessments, wetland delineations, and supporting documentation, including this ***Wetland and Fish and Wildlife Habitat Assessment Report*** prepared for the ***Northwest Drive*** property were prepared by, or under the direction of Lauren Templeton of SVC. In addition, the field investigations were performed by Lauren Templeton and Kramer Canup, report preparation was completed by Emma Santana, and additional project oversight and quality assurance/quality control was completed by Lauren Templeton.

Lauren Templeton

Environmental Scientist
Professional Experience: 4 years

Lauren Templeton is an Environmental Scientist with a professional background in environmental planning, wetland science, stream ecology, water quality, natural resource assessments and monitoring, and NEPA compliance. Lauren has a background in wetland and biological assessments in various states, most notably Washington, Montana, Oregon, and New Mexico. Her project experience includes residential land use and developments, transportation, and water resources projects, working for federal, state, tribal, and private agencies. Lauren has experience developing various environmental documentation including environmental assessments, biological evaluations, mitigation reports, and permit applications at the federal, state and tribal levels. Additionally, Lauren has experience utilizing desktop and remote GIS software and equipment to collect and process data, perform data analysis, and develop delineation exhibits. Lauren currently performs wetland delineations, conducts environmental code analysis, and prepares various environmental compliance documentation including fish and wildlife habitat assessments, biological evaluations, and permit applications.

Lauren graduated from Western Washington University with a Bachelor of Arts in Environmental Science and Policy where she gained hands-on experience associated with water quality, statistical analysis, CERCLA projects, and ecological biomonitoring. Lauren has completed Basic Wetland Delineator Training with the Wetland Training Institute and received 40-hour USACE wetland delineation training. Lauren has been formally trained through the Washington State Department of Ecology, Coastal Training Program, How to Determine the Ordinary High Water Mark, Using the Washington State Wetland Rating System, and Using the Credit-Debit Method for Estimating Mitigation Needs. Additionally, Lauren has been trained through the Shipley Group on the National Environmental Policy Act, Endangered Species Act, National Historic Preservation Act, and Administrative Record.

Kramer Canup

Environmental Project Coordinator
Professional Experience: 5 years

Kramer Canup is an Environmental Project Coordinator with a professional background in project management, habitat restoration, vegetation monitoring, invasive plant management, monitoring protocol development, grant writing, tropical ecology, wildlife monitoring and environmental education. Kramer brings years of experience coordinating logistics for a variety of habitat restoration projects, vegetation monitoring programs, along with study abroad and backpacking courses. Previously, Kramer has managed riparian and upland habitat restoration projects, managed vegetation

monitoring programs, and he has taught study abroad courses in the Peruvian Amazon and Andes for the University of Washington. Beyond Kramer's project management and coordination skills, he brings over 10 years of experience performing ecological field work such as vegetation monitoring, plant installation and invasive weed control.

Kramer currently coordinates project logistics, prepares environmental assessment reports, prepares scope of work documents, and assists with field work.

Emma Santana

Staff Scientist
Professional Experience: 2 years

Emma Santana is a Staff Scientist with a diverse background in technical writing, permitting, and marine field work in the Pacific Northwest. Emma earned a Bachelor of Science degree in Environmental Science from Mills College (Oakland, California) and a Master of Science degree in Environmental Science from Western Washington University (Bellingham, Washington). During her studies she received extensive, hands-on experience working in lab and field settings, with a focus on marine and estuarine environments. In her thesis work, she quantified the springtime sedimentary exchange of nutrients and dissolved oxygen with the overlying water across the Salish Sea and worked jointly across with various government agencies. Emma has vast experience completing technical field reports and result assessments and has helped prepare various permits in Washington State.

Emma currently assists in 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.

CONCEPTUAL WETLAND BUFFER MITIGATION PLAN
NORTHWEST DRIVE

FEBRUARY 2024

Soundview Consultants
Environmental Assessment
Planning + Land Use Solutions

CONCEPTUAL WETLAND BUFFER MITIGATION PLAN
NORTHWEST DRIVE

FEBRUARY 13, 2024

PROJECT LOCATION

4241 NORTHWEST DRIVE
BELLINGHAM, WASHINGTON 98226

PREPARED FOR

ETHAN POTTS
PROSPECT DEVELOPMENT
220 W CHAMPION STREET, #240
BELLINGHAM, WASHINGTON 98225

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) is assisting Ethan Potts and Chay Tan (Applicant) with a Conceptual Mitigation Plan for the proposed residential development of a 3.99-acre site located at 4241 Northwest Drive in the City of Bellingham, Washington. The subject property is situated in the Southwest ¼ of Section 11, Township 38 North, Range 02 East, W.M. (Whatcom County Tax Parcel Number 3802114351860000).

SVC investigated the subject property for the presence of potentially-regulated wetlands, waterbodies, and fish and wildlife habitat in the fall of 2022. The site investigations identified two potentially regulated wetlands on the subject property (Wetlands A and B). Per Bellingham Municipal Code (BMC) 16.55.280, Wetlands A and B are classified as Category III wetlands with low habitat scores of 4. Per BMC 16.55.340.B.2., Wetlands A and B are subject to 80-foot buffers based on proposed high land use intensity. An additional 15-foot building setback is required from the edge of all wetland buffers per BMC 16.55.340.G. No other potentially regulated wetlands or fish and wildlife habitat conservation areas were identified on or within 300 feet of the subject property. Please see SVC's *Wetland and Fish and Wildlife Habitat Assessment Report – Northwest Drive* (SVC, 2024) prepared under separate cover for more details regarding the site assessment.

Applicant proposes residential development of the subject property with seven multi-unit townhouses, paved site access and parking stalls, utilities, and associated infrastructure, and includes frontage improvements along Northwest Drive to meet City development standards. The existing single-family residence and associated landscaping on the eastern portion of the subject property will be retained as non-conforming land uses as allowed pursuant to BMC 16.55.130.A. The project was carefully designed to avoid and minimize impacts to Wetlands A and B and the associated buffer areas to the greatest extent feasible by centralizing the location of development to maximize the use of available upland areas onsite, implementing buffer reduction and reasonable measures to reduce the adverse effect of adjacent land uses pursuant to BMC 16.55.340.C.2, containing frontage improvements within the existing footprint of Northwest Drive, and implementing best management practices (BMPs) and temporary erosion and sediment control (TESC) measures to protect the identified wetlands and associated buffers from temporary construction impacts. However, due to the extent of encumbrance by Wetlands A and B and the reduced buffers, complete avoidance is not feasible. The project requires 510 square feet of permanent impacts to the buffer of Wetland A in order to accommodate site layout needs, and 1,892 square feet of permanent impacts to the buffer of Wetland B in order to accommodate City requirements for a stormwater/sewer connection and pedestrian trail connecting to the southwest of the site. Per BMC 16.55.310, regulated activities, such as trail construction and utility installation, are not outright prohibited in wetland buffers provided the activity obtains appropriate permits and is offset with mitigation. The project also requires minor intrusion into the 15-foot building setbacks from the buffers of Wetlands A and B to accommodate the proposed development; however, development activities have been designed to ensure they do not cause damage to the critical root zones of trees existing or proposed in the wetland buffer and permitted pursuant to BMC 16.55.340.G.

In order to compensate for necessary, unavoidable wetland buffer impacts, 4,496 square feet of wetland buffer will be created (519 square feet adjacent to Wetland A and 3,977 square feet adjacent to Wetland B), in excess of the standard 1:1 ratio required for mitigation to buffer impacts. Approximately 2,450 square feet of buffer creation is proposed in areas currently degraded by non-

conforming land uses and will be fully restored. The remaining buffer areas onsite, totaling 41,366 square feet, will be enhanced. Restoration and enhancement activities will include the removal of non-native invasive species and other degradations from the buffer areas, and planting a dense assortment of native trees, shrubs, and groundcover to improve habitat and screening between Wetlands A and B and the proposed development. Overall, these actions are anticipated to ensure no net loss of buffer functions onsite. See Chapter 2 for additional details.

The table below identifies the onsite critical areas and summarizes the potential regulatory status by local, state, and federal agencies.

Wetland Name	Size (Onsite)	Category[1]	Regulated Under BMC Chapter 16.55	Regulated Under RCW 90.48	Regulated Under Clean Water Act
Wetland A	15,186 SF	III	Yes	Yes	Not Likely
Wetland B	40,968 SF	III	Yes	Yes	Not Likely

1. Current WSDOE and BMC 16.55.280 wetland ratings.

The table below summarizes the proposed wetland buffer impacts.

Type of Impact	Impact Area
Permanent Wetland A Buffer Impacts	510 SF
Permanent Wetland B Buffer Impacts	1,892 SF

The table below summarizes the proposed mitigation to offset wetland buffer impacts.

Mitigation Type	Mitigation Area
Wetland A Buffer Creation	519 SF
Wetland B Buffer Creation	3,977 SF
Buffer Enhancement (Wetland A and B)	41,366 SF
Buffer Restoration (Wetland A and B)	2,450 SF
Total Buffer Mitigation	**43,816 SF**

Site Map

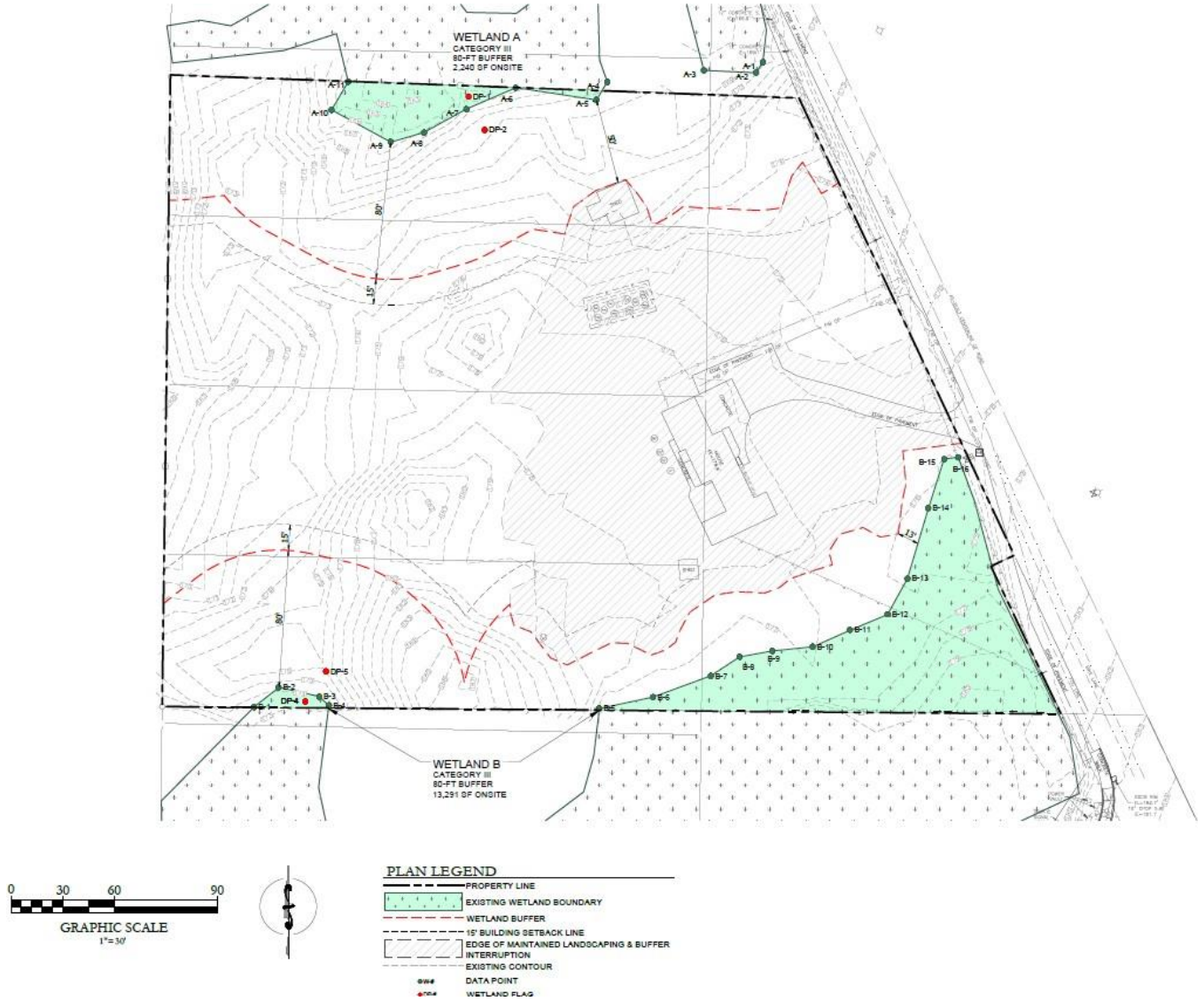
WETLAND A
CATEGORY III
80-FT BUFFER
2,240 SF ONSITE
WETLAND B
CATEGORY III
80-FT BUFFER
13,291 SF ONSITE
DP-1
DP-2
DP-3
DP-4
DP-5
0
30
60
90
GRAPHIC SCALE
1"= 30'
PLAN LEGEND
PROPERTY LINE
EXISTING WETLAND BOUNDARY
WETLAND BUFFER
15' BUILDING SETBACK LINE
EDGE OF MAINTAINED LANDSCAPING & BUFFER INTERRUPTION
EXISTING CONTOUR
DATA POINT
WETLAND FLAG

Table of Contents

Tables

Appendices

Chapter 1. Regulatory Considerations

SVC identified two wetlands (Wetlands A and B) on the subject property during site investigation work completed on November 15, 2022. No other potentially regulated wetlands, waterbodies, or fish and wildlife habitat conservation areas were identified on or within 300 feet of the subject property. A detailed assessment of these areas is provided in the *Wetland and Fish and Wildlife Habitat Assessment Report – Northwest Drive* prepared under separate cover (SVC, 2024). This chapter provides a detailed analysis of local, state, and federal regulatory requirements applicable to the proposed project.

1.1 Local Regulations

1.1.1 Buffer Requirements

Bellingham Municipal Code (BMC) 16.55.280 has adopted the current wetland rating system for western Washington (Hruby, 2014). Category III wetlands are wetlands with a moderate level of functions, as characterized by a score ranging from 16 to 19 points. Generally, these wetlands have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands. Wetlands A and B are classified as Category III wetlands with low habitat scores of 4 points.

BMC 16.55.340.B has established wetland buffers based on wetland rating, adjacent land use intensity, and habitat score. Per BMC 16.55.340.B.3, Category III wetlands with low habitat scores adjacent to high-intensity land uses require a standard 80-foot buffer. A summary of the standard buffer widths for the onsite wetlands is provided in Table 1.

Table 1. Wetland Summary Table

Wetland	Category	Habitat Score	Standard Buffer Width (ft)
A	III	4	80
B	III	4	80

An additional 15-foot building setback is also required from the edge of any wetland buffer per BMC 16.55.340.G.

The proposed project requires intrusion in the building setback associated with Wetlands A and B in order to meet site layout needs. Per BMC 16.55.340.G, the purpose of the building setback is to avoid conflicts with tree branches and/or critical root zones of trees that are in the buffer or will be planted in the buffer. Land uses not causing damage to the critical root zone are permitted in the building setback. The proposed project activities within the building setback include portions of uncovered porches, a paved sidewalk, and the edge of one of the proposed townhome units. These developments are not anticipated to cause damage to the critical root zone of existing trees or trees to be planted within the wetland buffers.

The Applicant intends to maintain the existing single-family residence and associated infrastructure onsite, including areas of landscaping located within the buffer of Wetland B. Per BMC 16.55.130, all land uses, buildings, structures, parking, driveways, utilities, stormwater facilities, trails, landscaping,

and supporting facilities that were lawfully established prior to the adoption of BMC Chapter 16.55 – Critical Areas, but otherwise would be determined to be located within a critical area or minimum standard buffer for a critical area, shall be deemed nonconforming, but not in violation of the Chapter's provisions. All such facilities may be continued, maintained, and replaced in kind. Landscaped areas associated with the existing single-family residential development onsite are located within the minimum standard buffer area associated with Wetland B and are protected as a non-conforming use under this provision.

1.1.2 Wetland Buffer Reduction

The Applicant proposes to reduce the standard buffer widths of Wetlands A and B in order to meet site layout needs and avoid and minimize critical area impacts. Per BMC 16.55.340.C.2, the director shall have the authority to reduce the standard buffer widths provided that the following criteria apply:

a. The buffer of a Category I wetland shall not be reduced.

N/A – The Applicant proposes to reduce the standard buffers associated with two Category III wetlands (Wetlands A and B).

b. The buffer reduction shall not adversely affect the functions and values of the adjacent wetlands.

The proposed buffer reduction will not adversely affect the functions and values of the adjacent wetlands. The existing buffers of Wetlands A and B are degraded due to the presence of landscaped areas associated with the existing single-family residence and non-native invasive species, such as Himalayan blackberry (*Rubus armeniacus*). The Applicant will implement all reasonable measures to reduce the adverse effects of the proposed residential development consistent with the requirements of item "e" below. Additionally, a combination of buffer creation, restoration, and enhancement is proposed which will improve onsite habitat and establish a dense vegetative screen between Wetlands A and B and the proposed development. Additional details are provided in Chapter 2.

The implementation of these measures, combined with the proposed buffer restoration and enhancement activities, will improve habitat and screening adjacent to Wetlands A and B, and ensure no adverse impacts to the functions and values of the wetlands result from the proposed buffer reduction.

c. The buffer of a Category II or III wetland shall not be reduced to less than 75 percent of the required buffer or 50 feet, whichever is greater;

The Applicant proposes to reduce the buffers of Wetlands A and B by 75 percent to 60 feet.

d. The buffer of a Category IV wetland shall not be reduced to less than 50 percent of the required buffer, or 25 feet, whichever is greater, provided the buffer reduction does not result in reducing the functions and values of the wetland; and

N/A – The Applicant proposes to reduce the standard buffers associated with two Category III wetlands (Wetlands A and B).

e. *The applicant implements all reasonable measures to reduce the adverse effects of adjacent land uses and ensure no new loss of buffer functions and values. The specific measures that shall be implemented include, but are not limited to, the following:*

i. *Direct lights away from the wetland and buffer;*

Lights will be directed away from the wetlands to the greatest extent feasible. Major light generating sources, such as access roads, are located internal to the proposed residences where possible. Additionally, proposed buffer restoration and enhancement actions will provide additional protection from light generating sources.

ii. *Locate facilities that generate substantial noise (such as some manufacturing, industrial and recreational facilities) away from the wetland and buffer;*

No substantial noise generating sources are anticipated from the proposed residential development. Nonetheless, proposed buffer restoration and enhancement actions are anticipated to provide an adequate buffer for noise from the proposed development.

iii. *Implement integrated pest management programs;*

Integrated pest management programs will be implemented as needed.

iv. *Infiltrate or treat, detain and disperse runoff into buffer;*

N/A – new runoff from the proposed development will be collected and routed either to the City's sewer system underneath Northwest Avenue, or to stormwater system that drains to the North End Regional Pond offsite to the southwest of the subject property.

v. *Construct a wildlife permeable fence around buffer and post signs at the outer edge of the critical area or buffer to clearly indicate the location of the critical area according to the direction of the city;*

A split-rail fence will be installed around the perimeter of the wetland buffers and marked with critical area signs to indicate the location of these areas and prevent intrusion.

vi. *Plant buffer with "impenetrable" native vegetation appropriate for the location;*

Approximately 43,816 square feet of modified buffer area onsite will be restored and enhanced with a dense assortment of native trees, shrubs, and groundcover in order to establish an "impenetrable" screen between Wetlands A and B and the proposed development. See Chapter 2 for additional details.

vii. *Use low impact development techniques to the greatest extent possible;*

Low impact development techniques will be implemented to the greatest extent feasible; additional details are provided by the Project Engineer under separate cover.

viii. Establish and record a permanent conservation easement to protect the wetland and the associated buffer and restrict the use of pesticides and herbicides in the easement.

Wetlands A, B, and the associated buffers will be placed in an established and recorded conservation easement where the use of pesticides and herbicides will be restricted.

1.1.3 Regulated Activities

The proposed project requires permanent impacts to the reduced buffers of Wetlands A and B in order to meet site layout needs, and to meet the City's offsite utility connection requirements, and provide a pedestrian trail connecting to Arctic Avenue offsite to the southwest. Per BMC 16.55.320, regulated activities, such as trail construction and utility installation, are not outright prohibited in wetland buffers. Approval of these activities should obtain the appropriate critical area permit, minor critical area permit, or exception depending on the activity, and mitigation should be provided in accordance with the provisions of BMC Chapter 16.55. This report provides mitigation to offset impacts to the buffers of Wetlands A and B and ensure no net loss of wetland buffer functions, and has been prepared to support the application for a critical area permit from the City of Bellingham.

1.1.4 Review Criteria

Per BMC 16.55.200.A, any alteration to a critical area shall be reviewed and approved, with conditions, or denied based on the proposals ability to comply with all of the following criteria:

1. *The proposal minimizes the impact on critical areas in accordance with mitigation sequencing (BMC 16.55.250);*

   The mitigation sequencing criteria under BMC 16.55.250 is addressed in Section 1.1.6 below.

2. *The proposal does not pose an unreasonable threat to the public health, safety, or welfare on or off the development proposal site;*

   The proposed project does not pose an unreasonable threat to public health, safety, or welfare on or off the development proposal site. All runoff from the proposed development will be collected and conveyed to existing stormwater facilities in the vicinity of the development site. Project impacts are limited to minor, permanent impacts (2,402 square feet) to the outer portions of the reduced buffers associated with Wetlands A and B. Impacts will be offset through a combination of buffer creation (4,496 square feet), restoration (2,450 square feet), enhancement (41,366 square feet) to ensure no net loss of wetland buffer functions onsite. No adverse wetland impacts or impacts to offsite areas are anticipated.

3. *The proposal is consistent with the general purposes of this chapter and the public interest;*

   The proposed project has been designed for consistency with the general purposes of BMC Chapter 16.55 – *Critical Areas*. Impacts to Wetlands A and B and the associated buffers are being avoided and minimized to the greatest extent feasible (see Section 1.1.6 below), and the proposed project has been designed to ensure no net loss of wetland/wetland buffer functions. Additionally, all project activities are consistent with the Chapter's provisions and allowances as demonstrated herein.

4. *Any alterations permitted to the critical area are mitigated in accordance with mitigation requirements in BMC 16.55.240 and 16.55.260 and additional requirements as outlined in specific critical area sections;*

   Mitigation for impacts to the buffers of Wetlands A and B is proposed in accordance with the mitigation requirements of BMC 16.55.240 (Section 1.1.5 below) and BMC 16.55.260, as well as additional requirements applicable to wetlands outlined in BMC 16.55.270-350. The proposed project avoids direct wetland impacts entirely; as such, mitigation requirements for direct and indirect wetland impacts under BMC 16.55.350 are not applicable.

5. *The proposal protects the critical area functions and values consistent with the best available science and results in no net loss of critical area functions and values; and*

   The proposed project has been designed to protect critical are functions and values and ensure no net loss of critical area functions and values, consistent with best available science. See Chapter 2 for additional details.

6. *The proposal is consistent with other applicable regulations and standards.*

   The proposed impacts to the buffers of Wetlands A and B are consistent with all applicable regulations and standards outlined in BMC Chapter 16.55 – Critical Areas.

1.1.5 Mitigation Requirements

Per BMC 16.55.240, proposals requiring critical area impacts must meet the following requirements:

A. *The applicant shall avoid all impacts that increase risk to the general public and/or degrade the functions and values of a critical area or areas and their buffers. Unless otherwise provided in this chapter, and after mitigation sequencing in BMC 16.55.250 has been applied, if alteration to the critical area is unavoidable, all adverse impacts to critical areas and buffers resulting from a development proposal or alteration shall be mitigated using the best available science in accordance with an approved critical area report and SEPA documents, so as to result in no net loss of critical area functions and values.*

   No impacts are proposed that will increase the risk to the general public and/or degrade the functions and values of the identified wetlands or their associated buffers. The proposed project has been carefully designed to avoid and minimize critical area impacts to the greatest extent feasible, and direct wetland impacts are avoided entirely. However, due to site layout needs and the City's requirements for utility connections offsite to the southwest and a pedestrian access trail connecting to Arctic Avenue offsite to the south, permanent impacts to the buffers of Wetlands A and B are necessary and unavoidable. Mitigation sequencing demonstrating reasonable measures to avoid and minimize wetland impacts is addressed in Section 1.1.6 below. As permanent impacts to the reduced buffers of Wetlands A and B are necessary and unavoidable, a buffer restoration and enhancement plan has been prepared to ensure no net loss of critical area functions and values. See the Conceptual Mitigation Plan in Chapter 2 for additional details.

B. *Mitigation site selection shall be focused on the site's ability to sustain a critical area over the long term. Mitigation design shall be based on replacing functions and values in the context of the watershed in order to compensate for loss. In some case, on-site mitigation may not be the best location.*

Mitigation for permanent impacts to the buffers of Wetlands A and B will be provided through a combination of onsite buffer creation, restoration, and enhancement in order to maintain adequate screening between Wetlands A and B and the proposed development.

C. *Mitigation shall not be implemented until after city approval of a critical area report that includes a mitigation plan, and mitigation shall be in accordance with the provisions of the approved critical area report.*

Acknowledged. The proposed buffer restoration and enhancement plan will be provided concurrently with residential development of the subject property, after appropriate approvals have been obtained from the City.

D. *The applicant shall be required to submit a financial guarantee ("surety" or "assignment of funds") for 150 percent of the total costs of mitigation to ensure the mitigation requirements are met and the mitigation plan is fully implemented, including, but not limited to, the required monitoring and maintenance periods.*

Acknowledged. A financial guarantee will be submitted to the City of Bellingham as a condition of project approval.

1.1.6 Mitigation Sequencing

Per BMC 16.55.25, Applicants shall demonstrate that all reasonable efforts have been examined with the intent to avoid impacts to critical areas and buffers. When an alteration to a critical area is proposed, Applicants shall follow the mitigation sequential order of preference below:

A. *Avoid impact to critical areas by not taking a certain action or parts of an action*;

The proposed project is for residential development of the subject property with seven multi-unit townhouses, paved site access and parking stalls, utilities, and associated infrastructure, and includes frontage improvements along Northwest Drive to meet City development standards. The existing single-family residence and associated landscaping on the eastern portion of the subject property will be retained as non-conforming land uses as allowed pursuant to BMC 16.55.130.A.

The project has been carefully designed in order to avoid impacts to Wetlands A and B and the associated buffer areas identified onsite, and direct and indirect impacts to Wetlands A and B are avoided entirely. Development activities have been centralized to maximize the use of available upland areas. Additionally, buffer reduction pursuant to BMC 16.55.340.2 is being implemented, and frontage improvements are being limited to the existing footprint of Northwest Drive to avoid buffer impacts to the greatest extent feasible. However, due to the extent of encumbrance by Wetlands A and B and the associated buffers following reduction, the proposed development requires 510 square feet of permanent impacts to the reduced buffer of Wetland A to meet site layout needs and accommodate the footprint of one of the proposed townhouses. Additionally, 1,892 square feet of permanent impacts to the reduced buffer of Wetland B are necessary and unavoidable to meet the City's requirements for utility connections offsite to the southwest and a pedestrian access trail connecting to Arctic Avenue offsite to the south. The proposed project also requires intrusion into the 15-foot building

setbacks from the buffers of Wetlands A and B; however, these intrusions will not damage the critical root zone of trees currently present or proposed in the wetland buffer and as such, are permitted pursuant to BMC 16.55.340.G.

B. *Minimize impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps, such as project redesign, relocation, or timing, to avoid or reduce impacts;*

As mentioned under part 1 above, direct impacts to the buffers of Wetlands A and B are necessary and unavoidable to meet site layout needs and City development requirements. In order to minimize these impacts, the project will implement all reasonable measures to reduce the adverse effects of adjacent land uses in compliance with the buffer reduction criteria of BMC 16.55.340.C.2.e. Additionally, all permanent buffer impacts are located at the outer perimeter of the wetland buffer and will be limited to the minimum disturbance required to meet site layout needs and City development requirements. Furthermore, all appropriate best management practices (BMPs) and temporary erosion and sediment control (TESC) measures will be implemented for the duration of project activities to protect Wetlands A and B and the associated buffers from temporary construction impacts.

C. *Rectifying the impact to wetlands, critical aquifer recharge areas, frequently flooded areas, and habitat conservation areas by repairing, rehabilitating, or restoring the affected environment to the historical conditions or the conditions existing at the time of the initiation of the project;*

Mitigation to offset 2,402 square feet of permanent buffer impacts will be provided in excess of the standard 1:1 ratio for mitigation to buffer impacts by creating 519 square feet of buffer adjacent to Wetland A and 3,977 square feet of buffer area adjacent to Wetland B (4,496 square feet of wetland creation total). Approximately 2,450 square feet of proposed buffer creation area is currently degraded by non-conforming land uses protected under 16.55.120.A. These areas will be fully restored by removing non-native invasive species and other degradations (including a shed currently present in the buffer of Wetland A) and establishing a dense assortment of native trees, shrubs, and groundcover. Buffer creation areas not currently degraded by non-conforming land uses, as well as the remaining wetland buffer areas onsite (41,366 square feet total) will be enhanced by removing non-native invasive species and planting a dense assortment of native trees shrubs and groundcover. These actions will improve habitat and screening between the proposed development and Wetlands A and B and ensure no net loss of wetland buffer functions onsite. Additional details are provided in Chapter 2.

D. *Minimizing or eliminating the hazard by restoring or stabilizing the hazard area through engineered or other methods;*

Following site development, any disturbed soils outside of the buffer restoration and enhancement areas will be seeded with a native grass-seed mix and landscape plantings at the discretion of the Project Engineer to remove any erosion hazards. The establishment of a dense assortment of native trees, shrubs, and groundcover within the buffers is anticipated to provide adequate stability within those areas.

E. *Reducing or eliminating the impact or hazard over time by preservation and maintenance operations during the life of the action;*

Consistent with the buffer reduction requirements of BMC 16.55.340.C.2.e, permanent split-rail fencing and signs indicating the presence of critical areas will be installed along the perimeter of the buffers of Wetlands A and B onsite in order to discourage trespassing and reduce potential impacts over time. Additionally, the wetlands and associated buffer areas will be established and recorded in a conservation easement to restrict the use of pesticides and herbicides and prohibit development in perpetuity.

F. *Compensating for the impact to wetlands, critical aquifer recharge areas, frequently flooded areas, and habitat conservation areas by replacing, enhancing, or providing substitute resources or environments;*

No direct wetland impacts are proposed. Permanent impacts to the buffers of Wetlands A and B, totaling 2,402 square feet, will be compensated by creating 4,496 square feet of buffer area between Wetlands A and B and the proposed development. The proposed buffer creation exceeds the standard 1:1 ratio of mitigation required for impacts to wetland buffers. A combination of buffer restoration and enhancement will be provided throughout the buffer creation areas as well as the remaining buffer areas onsite, totaling 43,816 square feet. The proposed buffer restoration and enhancement actions will include removing non-native invasive species and other degradations and planting a dense assortment of native trees, shrubs, and groundcover. These actions will improve habitat and screening between the proposed development and Wetlands A and B and ensure no net loss of wetland buffer functions onsite. Additional details are provided in Chapter 2.

G. *Monitoring the hazard or other required mitigation and taking remedial action when necessary.*

To ensure success of the enhancement and restoration actions, the project site will be monitored for a period of five years with formal inspections by a qualified biologist. If monitoring results indicate the performance standards are not being met, it may be necessary to implement part or all of a contingency plan. Refer to Chapter 2 for more details regarding the maintenance, monitoring, and contingency plan details.

1.2 State and Federal Considerations

On January 18, 2023, USACE and EPA published a revised definition of "Waters of the United States" (USACE and EPA, 2023a). The revised rule became effective on March 20, 2023. On May 25, 2023, the U.S. Supreme Court issued a decision affecting the definition of Waters of the United States, or "WOTUS", in *Sackett Et Ux. V Environmental Protection Agency Et Al.* On August 29, 2023, the US EPA and USACE issued a final rule to amend the final "Revised Definition of 'Waters of the United States'" rule. Under the 2023 revised rule, Waters of the United States is described as follows (USACE and EPA, 2023b):

(a) Waters of the United States means:

(1) Waters which are: (i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (ii) The territorial seas; or (iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section: that are relatively permanent, standing or continuously flowing bodies of water; or;

(4) Wetlands adjacent to the following waters: (i) Waters identified in paragraph (a)(1) of this section; or (ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds not identified in paragraphs (a)(1) through (4) of this section: that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section;

(b) The following are not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5) of this section:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating 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 or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

Both Wetlands A and B are depressional wetlands that do not appear to have a continuous surface water connection to regulated Waters of the United States (WOTUS). As such, they do not likely meet the adjacent wetland criteria under part (a)(4) above and are not likely regulated by the USACE under Section 404 of the Clean Water Act (CWA).

Wetlands A and B are considered natural waters that are likely regulated by the WSDOE through the Revised Code of Washington (RCW) 90.48.

As no direct or indirect wetland impacts are proposed, additional State and Federal permits are not required.

Chapter 2. Conceptual Mitigation Plan

The following sections present the proposed conceptual wetland and buffer mitigation plan to improve wetland and wetland buffer protections and ecological functions. The proposed enhancement and restoration actions for the project attempt to strike a balance between achieving project goals and creating a positive result for the watershed and critical area habitat functions within the confines of the site.

2.1 Purpose and Need

The proposed project is for residential development of the subject property with seven multi-unit townhouses and associated infrastructure. The purpose of the proposed project is to provide additional housing units in the City of Bellingham and alleviate the shortage of residences in the greater Whatcom County area.

2.2 Description of Wetland Buffer Impacts

The proposed project is for residential development of the subject property with seven multi-unit townhouses, paved site access and parking stalls, utilities, and associated infrastructure, and includes frontage improvements along Northwest Drive to meet City development standards. The existing single-family residence and associated landscaping on the eastern portion of the subject property will be retained as non-conforming land uses as allowed pursuant to BMC 16.55.130.A. The project was carefully designed to avoid and minimize impacts to Wetlands A and B and the associated buffer areas to the greatest extent feasible by centralizing the location of development to maximize the use of available upland areas onsite, implementing buffer reduction and reasonable measures to reduce the adverse effect of adjacent land uses pursuant to BMC 16.55.340.C.2, containing frontage improvements within the existing footprint of Northwest Drive, and implemented best management practices (BMPs) and temporary erosion and sediment control (TESC) measures to protect the identified wetlands and associated buffers from temporary construction impacts.. However, due to the extent of encumbrance by Wetlands A and B and the reduced buffers, complete avoidance is not feasible. The project requires 510 square feet of permanent impacts to the buffer of Wetland A in order to accommodate site layout needs, and 1,892 square feet of permanent impacts to the buffer of Wetland B in order to accommodate City's requirements for utility connections offsite to the southwest and a pedestrian access trail connecting to Arctic Avenue offsite to the south. Per BMC 16.55.310, regulated activities, such as trail construction and utility installation, are not outright prohibited in wetland buffers provided the activity obtains appropriate permits and is offset with mitigation. The project also requires minor intrusion into the 15-foot building setbacks from the buffers of Wetlands A and B to accommodate the proposed development; however, development activities have been designed to ensure they do not cause damage to the critical root zones of trees existing or proposed in the wetland buffer, and permitted pursuant to BMC 16.55.340.G.

The table below summarizes the proposed wetland buffer and building setback impacts. A figure depicting the location of impacts is provided in Appendix A.

Table 2. Proposed Impacts to Critical Areas

Type of Impact	Impact Area
Permanent Wetland A Buffer Impacts	510 SF
Permanent Wetland B Buffer Impacts	1,892 SF

2.3 Onsite Mitigation Strategy

Full compensation for impacts to the buffers of Wetlands A and B will be provided through a combination of onsite buffer creation, restoration, and enhancement. The existing buffers of Wetlands A and B are degraded due to the presence of landscaped areas that are considered a non-conforming use protected under BMC 16.55.130.A and the presence of non-native invasive species. Buffer creation activities will include restoring 2,450 square feet of non-conforming land uses within the buffers of Wetlands A and B to functional, native buffer habitat. The buffer will also be increased in other areas between Wetlands A and B and the proposed development where feasible to provide additional screening. Overall, approximately 519 square feet of buffer will be created adjacent to Wetland A, and 3,977 square feet of buffer area adjacent to Wetland B will be created. The buffer creation areas not currently degraded by non-conforming uses, as well as the remaining buffer areas onsite (41,366 square feet total) will be enhanced. A figure depicting the location of buffer creation, restoration, and enhancement areas is provided in Appendix A.

Overall, the project proposes to restore and enhance approximately 43,816 square feet of modified buffer associated with Wetlands A and B. Buffer restoration and enhancement actions will focus on removing non-native invasive species and other buffer degradations potentially present (including a shed in the buffer of Wetland A), and planting a dense assortment of native trees, shrubs, and groundcover. These actions are intended to improve habitat diversity in the wetland buffers and provide a dense screen between the wetlands and the proposed development. A summary of mitigation actions is provided below.

Table 3. Proposed Mitigation

Mitigation Type	Mitigation Area
Wetland A Buffer Creation	519 SF
Wetland B Buffer Creation	3,977 SF
Buffer Enhancement (Wetlands A & B)	41,366 SF
Buffer Restoration (Wetlands A & B)	2,450 SF
Total Buffer Mitigation:	**43,816 SF**

The proposed buffer enhancement/restoration actions include, but may not be limited to, the following recommendations:

- Remove any trash and other debris within the buffer mitigation areas;
- Pre-treat invasive plants, if present, with a Washington Department of Agriculture approved herbicide. Pre-treatment of the invasive plants should occur a minimum of two weeks prior to removal. After pre-treatment, grub to remove the invasive plants in preparation of plant installation;
- Plant all enhancement/restoration areas with native trees, shrubs and/or groundcovers to help retain soils, filter stormwater, and increase biodiversity;

- An approved native seed mix will be used to seed the disturbed enhancement areas after planting;
- Maintain and control invasive plants annually, at a minimum, or more frequently if necessary. Maintenance to reduce the growth and spread of invasive plants is not restricted to chemical applications but may include hand removal, if warranted;
- Provide dry-season irrigation as necessary to ensure native plant survival;
- Direct exterior lights away from the wetland wherever possible; and
- Place all activities that generate excessive noise (e.g., generators and air conditioning equipment) away from the identified critical areas where feasible.

2.4 Approach and Best Management Practices

Mitigation activities within the wetland buffers should occur immediately after grading is complete. TESC measures will be implemented that consists of high-visibility fencing (HVF) installed around native vegetation along the perimeter of the buffers, silt fencing between the graded areas and buffers, plastic sheeting on stockpiled materials, and seeding of disturbed soils. These TESC measures should be installed prior to the start of development or enhancement actions and actively managed for the duration of the project.

All equipment staging and materials stockpiles should be kept out of the critical areas and buffers, and the area will need to be kept free of spills and/or hazardous materials. Construction materials along with all construction waste and debris should be effectively managed and stockpiled on paved surfaces and kept free of the modified buffer areas. Following completion of the development, the entire site should be cleaned and detail graded using hand tools wherever necessary, and TESC measures will need to be removed.

2.5 Goals, Objectives, and Performance Standards

The goals and objectives for the proposed wetland buffer mitigation actions are based on providing additional habitat and protection for the onsite wetlands (Wetlands A and B) and providing supplementary water quality and hydrological functions. The wetland buffer creation, restoration and enhancement actions are capable of improving habitat function for the wetlands over time by establishment of a dense native, diverse vegetation barrier between the project and the critical areas. The goals and objectives of the creation, enhancement and restoration actions are as follows:

Goal 1 – Restore and enhance 43,816 square feet of buffer associated with Wetlands A and B.

> ***Objective 1*** – Establish dense cover of native trees, shrubs, grasses and forbs within the targeted enhancement and restoration areas to create diverse horizontal and vertical vegetation structure and improve wildlife habitat.
>
> > **Performance Standard 1.1.1** – Minimum plant survivorship within the enhancement and restoration areas will be 100 percent of installed plants at the end of Year 1. Native recruits may be counted.
> >
> > **Performance Standard 1.1.2** – Minimum native woody species cover in the enhancement/restoration areas will be a minimum 30 percent total cover at the end

of Year 2, 40 percent total cover at the end of Year 3, and 50 percent at the end of Year 5.

Performance Standard 1.1.3 – At least 3 native tree species and 5 native shrub species will be present in the enhancement/restoration areas in all monitoring years. Native volunteer species will be included in the count.

Performance Standard 1.4 – State-listed, Class A noxious weeds must be completely eliminated from the enhancement/restoration areas in all monitoring years and invasive species that are not considered state-listed, Class-A noxious weeds shall not exceed 15 percent aerial cover in the buffer areas in all monitoring years.

2.6 Plant Materials and Installation

2.6.1 Plant Materials

All plant materials to be used for buffer mitigation actions will be nursery grown stock from a reputable, local source. Only native species are to be used; no hybrids or cultivars will be allowed. Plant material provided will be typical of their species or variety; if not cuttings they will exhibit normal, densely developed branches and vigorous, fibrous root systems. Plants will be sound, healthy, vigorous plants free from defects, and all forms of disease and infestation.

Container stock shall have been grown in its delivery container for not less than six months but not more than two years. Plants shall not exhibit rootbound conditions. Under no circumstances shall container stock be handled by their trunks, stems, or tops. Seed mixture used for hand or hydroseeding shall contain fresh, clean, and new crop seed mixed by an approved method. The mixture is specified in this plan set.

All plant material shall be inspected by the Project Scientist upon delivery. Plant material not conforming to the specifications below will be rejected and replaced by the planting contractor. Rejected plant materials shall be immediately removed from the site.

Fertilizer will be in the form of Agriform plant tabs or an approved like form. Mulch will consist of sterile wheat straw or clean recycled wood chips approximately 1/2 inch to 1 inch in size and 1/2 inch thick. If free of invasive plant species, the mulch material may be sourced from woody materials salvaged from the land clearing activities.

2.6.2 Plant Scheduling, Species, Size, and Spacing

Plant installation should occur as close to the conclusion of clearing and grading activities as possible to limit erosion and limit the temporal loss of function provided by the wetland buffer. All planting should occur between September 1 and May 1 to ensure plants do not dry out after installation, or temporary irrigation measures may be necessary. All planting will be installed according to the procedures detailed in the following subsections using the species and densities outlined in Appendix A.

2.6.3 Quality Control for Planting Plan

All plant material shall be inspected by the qualified Project Scientist upon delivery. Plant material not conforming to the specifications above will be rejected and replaced by the planting contractor.

Rejected plant materials shall be immediately removed from the site. Under no circumstances shall container stock be handled by their trunks, stems, or tops.

The landscape contractor shall provide the responsible Project Scientist with documentation of plant material that includes the supplying nursery contact information, plant species, plant quantities, and plant sizes.

2.6.4 Product Handling, Delivery, and Storage

All seed and fertilizer should be delivered in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. This material should be stored in a manner to prevent wetting and deterioration. All precautions customary in good trade practice shall be taken in preparing plants for moving. Workmanship that fails to meet industry standards will be rejected. Plants will be packed, transported, and handled with care to ensure protection against injury and from drying out. If plants cannot be planted immediately upon delivery they should be protected with soil, wet peat moss, or in a manner acceptable to the responsible Project Scientist. Plants, fertilizer, and mulch not installed immediately upon delivery shall be secured on the site to prevent theft or tampering. No plant shall be bound with rope or wire in a manner that could damage or break the branches. Plants transported on open vehicles should be secured with a protective covering to prevent windburn.

2.6.5 Preparation and Installation of Plant Materials

The planting contractor shall verify the location of all elements of the mitigaton plan with the Project Scientist prior to installation. The responsible Project Scientist reserves the right to adjust the locations of landscape elements during the installation period as appropriate. If obstructions are encountered that are not shown on the drawings, planting operations will cease until alternate plant locations have been selected by and/or approved by the Project Scientist.

Circular plant pits with vertical sides will be excavated for all container stock. The pits should be at least 12 inches in diameter, and the depth of the pit should accommodate the entire root system. The bottom of each pit will be scarified to a depth of 4 inches.

Broken roots should be pruned with a sharp instrument and rootballs should be thoroughly soaked prior to installation. Set plant material upright in the planting pit to proper grade and alignment. Water plants thoroughly midway through backfilling and add Agriform tablets. Water pits again upon completion of backfilling. No filling should occur around trunks or stems. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water and install a 4- to 6-inch layer of mulch around the base of each container plant.

2.6.6 Temporary Irrigation Specifications

While the native species selected for enhancement are hardy and typically thrive in northwest conditions and the proposed actions are planned in areas with sufficient hydroperiods for the species selected, some individual plants might perish due to dry conditions. Therefore, irrigation or regular watering may be provided as necessary for the duration of the first two growing seasons while the native plantings become established.

2.6.7 Invasive Plant Control and Removal

Invasive species onsite to be removed include Himalayan blackberry and any listed noxious weeds or other invasive species that are existing or may colonize the enhancement area. These species are found nearby; therefore, to ensure these species do not expand following the enhancement actions, invasive

species within the enhancement and restoration areas will be pretreated with a root-killing herbicide approved for use in aquatic sites (e.g. Glyphosate 5.4 containing herbicide) a minimum of two weeks prior to being removed from the wetland buffer. The pre-treatment with herbicide should occur prior to all planned enhancement actions, and spot treatment of any surviving other invasive vegetation should be performed again each fall prior to leaf senescence for a minimum of three years.

2.7 Maintenance & Monitoring Plan

The Applicant is committed to compliance with the mitigation plan and overall success of the project. As such, the Applicant will continue to maintain the project, keeping the site free from of non-native invasive vegetation, trash, and waste.

The mitigation plan will require continued monitoring and maintenance to ensure the actions are successful. Therefore, the project site will be monitored for a period of five years with formal inspections by a qualified Project Scientist. Monitoring events will be scheduled at the time of construction, 30 days after planting, early in the growing season and the end of the growing season for Year 1, twice during Year 2, and annually in Years 3 and 5. Closeout assessment will also be conducted in Year 5 to ensure the adequate enhancement and restoration area was established.

Monitoring will consist of percent cover measurements at permanent monitoring stations, walk-through surveys to identify invasive species presence and dead or dying enhancement plantings, photographs taken at fixed photo points, wildlife observations, and general qualitative habitat and wetland function observations.

To determine percent cover, observed vegetation will be identified and recorded by species and an estimate of areal cover of dominant species within each sampling plots. Circular sample plots, approximately 30 feet in diameter (706 square feet), are centered at each monitoring station. The sample plots encompass the specified buffer areas and terminate at the observed buffer boundary. Trees and shrubs within each 30-foot diameter monitoring plot are then recorded to species and areal cover. Herbaceous vegetation is sampled from a 10-foot diameter (78.5 square feet) within each monitoring plot, established at the same location as the center of each tree and shrub sample plot. Herbaceous vegetation within each monitoring plot is then recorded to species and includes an estimate of percent areal cover. A list of observed tree, shrub, and herbaceous species including percent areal cover of each species and wetland indicator status is included within the monitoring report.

2.8 Reporting

Following each formal monitoring event, a brief annual monitoring report detailing the current ecological status of the enhancement and restoration actions, measurement of performance standards, and management recommendations will be prepared and submitted to the City of Bellingham by December 31st each year to ensure full compliance with the mitigation plan.

2.9 Contingency Plan

If monitoring results indicate that performance standards are not being met, it may be necessary to implement all or part of the contingency plan. Careful attention to maintenance is essential in ensuring that problems do not arise. Should any portion of the site fail to meet the success criteria, a

contingency plan will be developed and implemented with regulatory approval. Such plans are adaptive and should be prepared on a case-by-case basis to reflect the failed enhancement/restoration characteristics. Contingency plans can include additional plant installation, erosion control, and plant substitutions including type, size, and location. The Contingency measures outlined below can also be utilized in perpetuity to maintain the wetland buffer associated with the proposed project site.

Contingency/maintenance activities may include, but are not limited to:

- Replacing plants lost to vandalism, drought, or disease, as necessary;
- Replacing any plant species with a 15 percent or greater mortality rate after two growing seasons with the same species or native species of similar form and function;
- Irrigating the enhancement and restoration areas only as necessary during dry weather if plants appear to be too dry, with a minimal quantity of water;
- Reseeding and/or repair of wetland and buffer areas as necessary if erosion or sedimentation occurs;
- Spot treat non-native invasive plant species; and
- Removing all trash or undesirable debris from the wetland and buffer areas as necessary.

2.10 Critical Area Protective Measures

Long-term protection of the enhancement and restoration site shall be provided by establishing a conservation easement to protect the identified wetlands and associated buffers consistent with the requirements of BMC 16.55.340.C.2.e.viii. The easement will be recorded and dedicated to the City of Bellingham. In addition, the entire onsite buffer area will be permanently marked with critical areas fencing and signage consistent with the requirements of BMC 16.55.230 and BMC 16.55.340.C.2.e.v to limit intrusion into the critical area following development.

2.11 Financial Assurance

Per BMC 16.55.240.D, performance security is required to assure that all actions approved under this mitigation plan are satisfactorily completed in accordance with the plan, performance standards, and regulatory conditions of approval. Prior to final inspection, a maintenance and warranty security (bond) shall be obtained in an amount equal to 150 percent of the total fair market cost of construction/installation labor and materials. A bond quantity worksheet will be prepared and included with the Final Mitigation Plan.

Chapter 3. Closure

The findings and conclusions documented in this report have been prepared for specific application to the Northwest Drive site. They 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. Our work was also performed in accordance with the terms and conditions set forth in our proposal. The conclusions and recommendations presented in this 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. Because of such changes, our observations and conclusions applicable to this project may need to be revised wholly or in part.

Chapter 4. References

Bellingham Municipal Code (BMC). 2023. Chapter 16.55 — Critical Areas. Website: https://bellingham.municipal.codes/BMC/16.55. Current through December 11, 2023.

Soundview Consultants (SVC). 2024. *Wetland and Fish and Wildlife Habitat Assessment Report – Northwest Drive*. February 2024.

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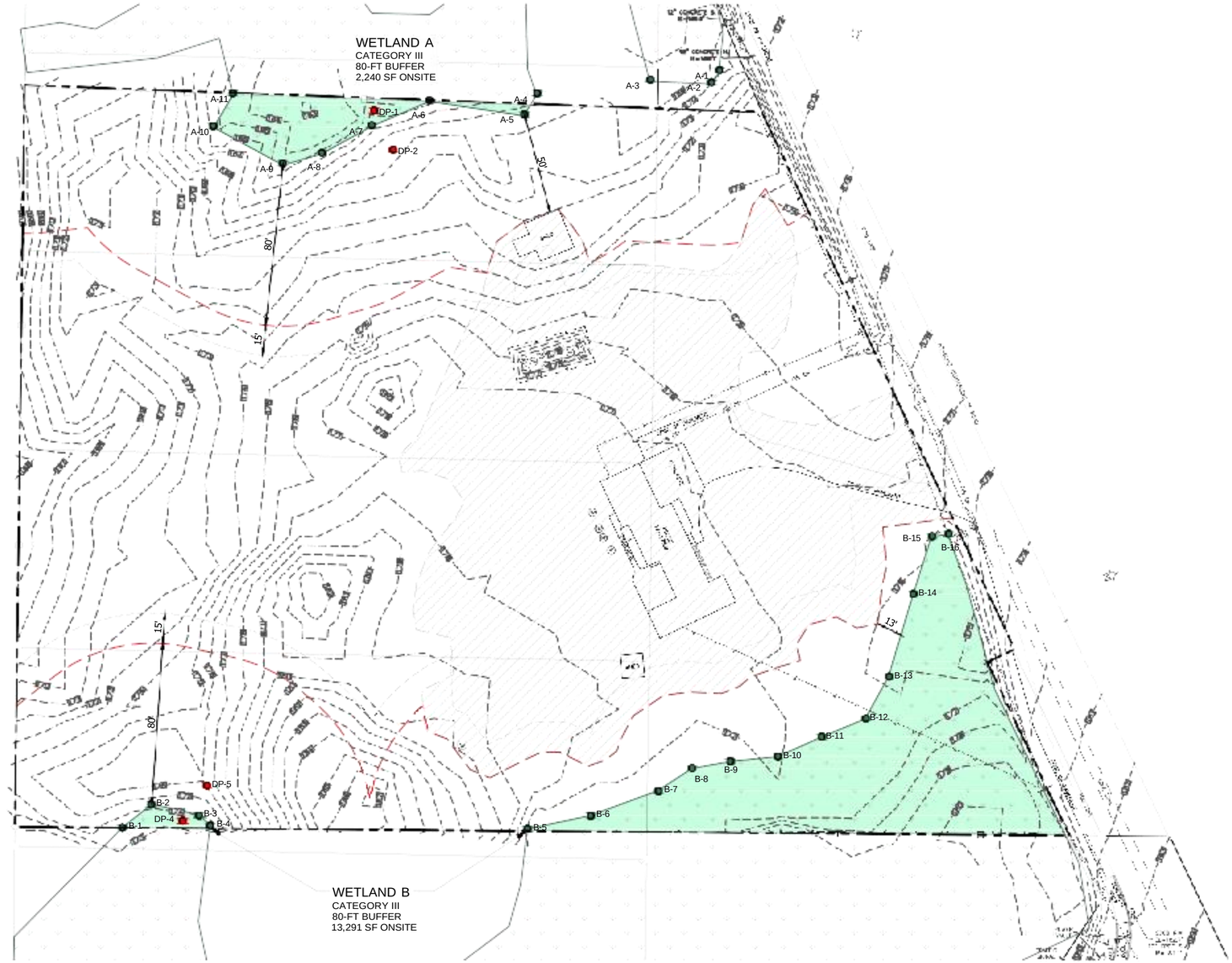
USACE. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Ver2.0),* ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-3. U.S. Army Engineer Research and Development Center. Vicksburg, Mississippi.

USACE and Environmental Protection Agency (EPA). 2023a. *"Revised Definition of Waters of the United States."* 88 FR 3004. January 18, 2023.

USACE and EPA. 2023b. *Revised Definition of "Waters of the United States"; Conforming. Final Rule.* Federal Register. Volume 88, Number 173 (33 CFR Part 328, 40 CFR Part 120). September 8, 2023.

Appendix A – Existing and Proposed Conditions Exhibits



VICINITY MAP

SOURCE: ESRI (ACCESSED 10/2023)

SOURCES:

LOCATION

THE SW ¼ OF SECTION 11,
TOWNSHIP 38N, RANGE 2E, WM

APPLICANT/OWNER

NAME: ETHAN POTTS
ADDRESS: 220 W CHAMPION STREET #240
BELLINGHAM, WA 98225
PHONE: (360) 510-1049
E-MAIL: ETHANPOTTS@GMAIL.COM

ENVIRONMENTAL CONSULTANT

SOUNDVIEW CONSULTANTS LLC
2907 HARBORVIEW DRIVE
GIG HARBOR, WA 98355
(253) 514-8952

SHEET INDEX

0 30 60 90
GRAPHIC SCALE
1"= 30'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- WETLAND BUFFER
- 15' BUILDING SETBACK LINE
- EDGE OF MAINTAINED LANDSCAPING & BUFFER INTERRUPTION
- EXISTING CONTOUR
- DATA POINT
- WETLAND FLAG

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Land Use Solutions
Environment Planning
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WWW.SOUNDVIEWCONSULTANTS.COM

NORTHWEST DRIVE
4241 NORTHWEST DRIVE
BELLINGHAM, WA

WHATCOM COUNTY
PARCEL NUMBER(S):
380211435186000

PRELIMINARY
INFORMATION ONLY

NOT FOR CONSTRUCTION

SOUNDVIEW CONSULTANTS LLC ASSUMES NO LIABILITY OR RESPONSIBILITY FOR CONSTRUCTION, IMPROVEMENTS, OR ESTIMATES BASED ON THIS PLAN SET

DATE: 01/08/2024
JOB: 2486.0001
BY: DLS
SCALE: AS SHOWN
SHEET: 1

S:\CURRENT\2486 Forks\2486.0001 Northwest Drive\Graphics & Maps\CAD\A - CURRENT SVC DRAWINGS\A - Current Base DWGs\2486.0001 (2023-1) base.dwg
Plotted January 9, 2024

0 30 60 90

GRAPHIC SCALE
1"= 30'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- REDUCED WETLAND BUFFER
- POST CONSTRUCTION BUFFER
- EDGE OF MAINTAINED LANDSCAPING
- 15' BUILDING SETBACK LINE
- CLEARING LIMITS

IMPACTS LEGEND

BUFFER IMPACTS

PERMANENT WETLAND A BUFFER IMPACTS	510 SF
PERMANENT WETLAND B BUFFER IMPACTS	1,892 SF
TOTAL BUFFER IMPACTS:	2,402 SF

BUILDING SETBACK

BUILDING SETBACK INTRUSIONS	1,231 SF

MITIGATION LEGEND

BUFFER MITIGATION

WETLAND A BUFFER CREATION	519 SF
WETLAND B BUFFER CREATION	3,977 SF
TOTAL BUFFER MITIGATION:	4,496 SF

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DATE: 01/08/2024
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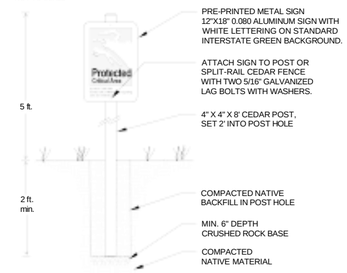
BY: DLS
SCALE: AS SHOWN
SHEET: 2

PROPOSED BUFFER PLANTING PLAN

CRITICAL AREA SIGN DETAIL

NOT TO SCALE

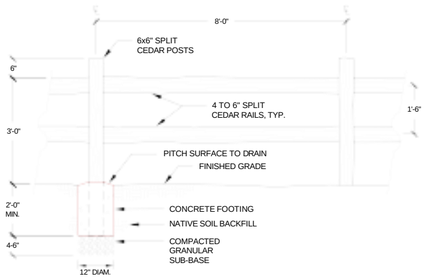


CRITICAL AREA BOUNDARY SIGN NOTES:

1. THE DIRECTOR MAY REQUIRE THE APPLICANT TO INSTALL PERMANENT SIGNS ALONG THE BOUNDARY OF A CRITICAL AREA.
2. SIGNS MUST BE POSTED AT AN INTERVAL OF 100 FEET, OR AS THE DIRECTOR DEEMS NECESSARY, AND MUST BE MAINTAINED AND REPLACED BY THE PROPERTY OWNER IF THE SIGN LANGUAGE IS NO LONGER VISIBLE.
3. SIGNS SHALL BE MADE OF A DURABLE MATERIAL AND VANDAL-RESISTANT, AND SHALL BE ATTACHED TO A METAL POST, OR OTHER MATERIAL OF EQUAL DURABILITY.
4. PRE-PRINTED METAL SIGN AVAILABLE THROUGH:
   ZUMAR INDUSTRIES
   PHONE: 1-800-426-7967,
   WEBSITE: WWW.ZUMAR.COM

SPLIT RAIL FENCE DETAIL

NOT TO SCALE



NOTES:

1. POSTS AND RAILINGS PRE-CUT FOR ASSEMBLY.
2. 3-RAIL DESIGNS ARE PERMITTED.
3. FENCE SHALL BE PLACED AT APPROVED BUFFER EDGE.

0 30 60 90

GRAPHIC SCALE
1"= 30'

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND BOUNDARY
- POST CONSTRUCTION BUFFER & SPLIT RAIL FENCE (1,000 SF)
- CRITICAL AREA SIGNAGE (10 SIGNS)

PLANTING LEGEND

BUFFER PLANTING

BUFFER RESTORATION	2,450 SF
BUFFER ENHANCEMENT	41,366 SF
TOTAL BUFFER MITIGATION:	43,816 SF

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BY: DLS
SCALE: AS SHOWN
SHEET: 3

Scientific Name	Common Name	WL Status	Buffer Restoration	Buffer Enhancement	TOTAL	Spacing (min.)	Height (min.)	Size (min.)	Planting Area
		Area (sf):	2,450	41,366	43,816				
		Cover (%):	100	65					
		Trees (%):	50	50					
		Shrubs (%):	50	50					
TREES			(Qty)	(Qty)	(Qty)				
Abies grandis	grand fir	FACU	2	12	14	10 ft	3 ft	5 gal	Dry
Acer macrophyllum	bigleaf maple	FACU		8	8	10 ft	3 ft	5 gal	Dry
Alnus rubra	red alder	FAC	11	117	128	10 ft	2 ft	1 gal	Dry/Moist - on hummock
Pseudotsuga menziesii	Douglas fir	FACU	2	13	30	10 ft	3 ft	5 gal	Dry
Tsuga heterophylla	western hemlock	FACU	[illegible]	2	4	10 ft	2 ft	2 gal	Moist - on hummock
		Total:	17	158	175				
SHRUBS			(Qty)	(Qty)	(Qty)				
Holodiscus discolor	oceanspray	FACU	4	38	42	5 ft	2 ft	1 gal	Dry
Mahonia nervosa	low Oregon grape	FACU	2	[illegible]	50	4 ft	1 ft	1 gal	Dry/Moist
Polystichum munitum	western swordfern	FACU	11	114	125	4 ft	1 ft	1 gal	Dry/Moist
Ribes lacustre	swamp gooseberry	FAC	[illegible]	17	19	4 ft	2 ft	1 gal	Moist/Wet
Rubus spectabilis var. spectabilis	salmonberry	FAC	36	[illegible]	[illegible]	4 ft	2 ft	1 gal	Moist
Rubus ursinus	trailing blackberry	FACU	4	44	48	5 ft		1 gal	
Sambucus racemosa var. racemosa	red elderberry	FACU	2	22	24	5 ft	2 ft	5 gal	Dry
Vaccinium parvifolium	red huckleberry	FACU	6	59	65	4 ft	18 in	1 gal	Dry
		Total:	60	634	694				

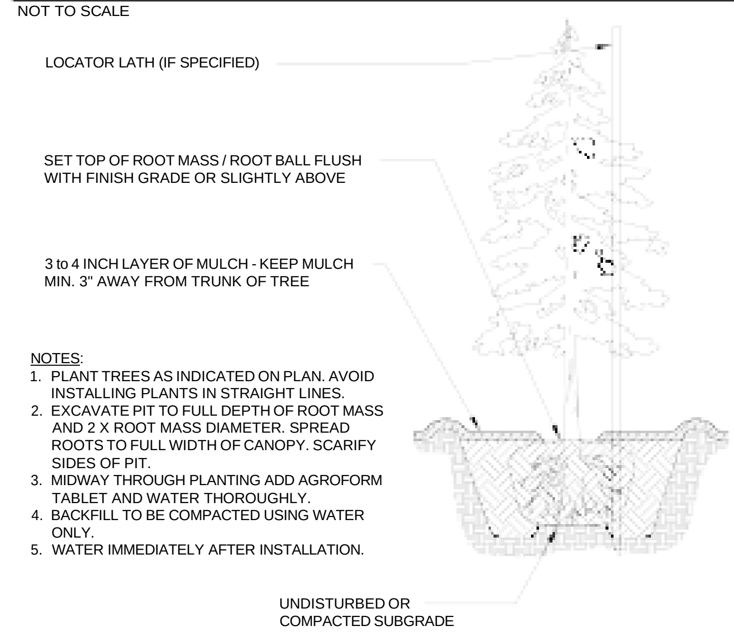
SEED MIXES (cover all disturbed ground)		WL Status	Buffer Restoration	Buffer Enhancement	TOTAL
Native Upland Grass Mix @	20 lbs/acre		(Qty)	(Qty)	(Qty)
Elymus glaucus	Blue wildrye	20%			
Bromus carinatus	California brome	20%			
Hordeum brachyantherum	Meadow barley	10%			
Festuca roemeri	Roemer's fescue	10%			
Deschampsia elongata	Slender hairgrass	10%			
Agrostis exarata	Spike bentgrass	5%			
Deschampsia cespitosa	Tufted hairgrass	5%			
Festuca rubra var. rubra	Red fescue	5%			
		Total (lbs):	1	0	1

1 - [illegible] *Pacific Northwest* [illegible] *and Grasses* [illegible] 2020.
2 - [illegible]
3 - Alternate native plant species may be substituted or added with Project Biologist approval.
4 - All disturbed and bare soil areas in the buffer to be seeded with a native grass seed mix.
5 - Shrub quantities based upon 4-ft average spacing.
6 - Tree quantities based upon 10-ft average spacing.
7 - [illegible]
8 - Dense plantings to be located around buffer edge.

PLANT SCHEDULE

CONIFEROUS TREE PLANTING DETAIL (TYPICAL)

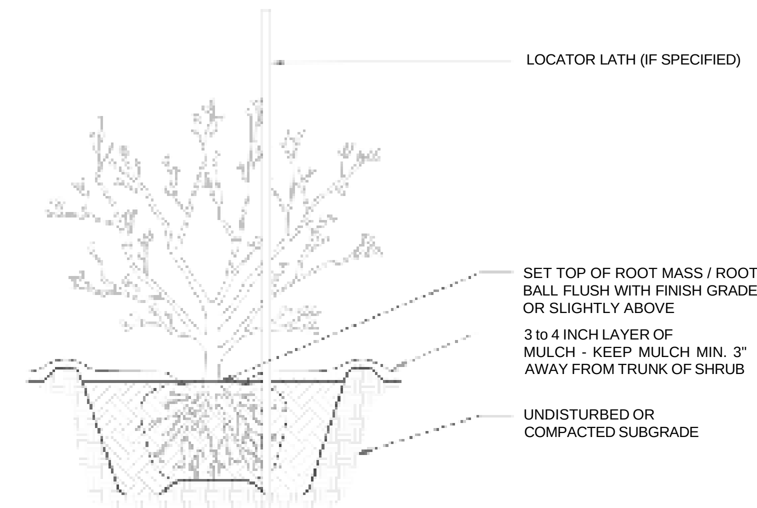
NOT TO SCALE



NOTES:
1. PLANT TREES AS INDICATED ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

TREE AND SHRUB PLANTING DETAIL (TYPICAL)

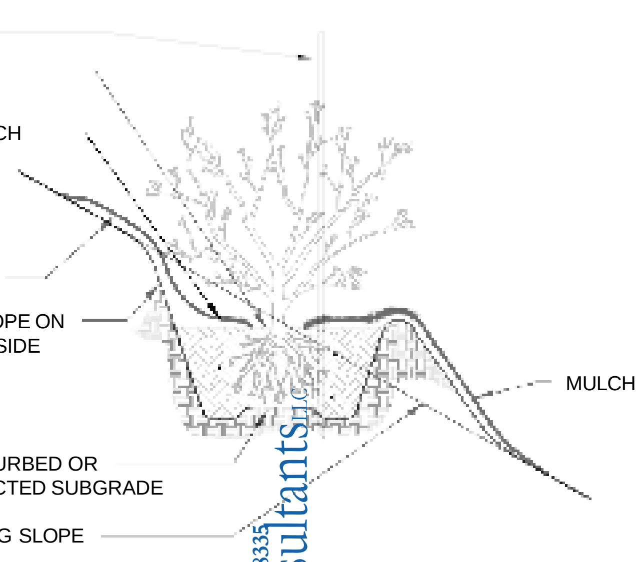
NOT TO SCALE



NOTES:
1. PLANT SHRUBS OF THE SAME SPECIES IN GROUPS OF 3 to 9 AS APPROPRIATE, OR AS SHOWN ON PLAN. AVOID INSTALLING PLANTS IN STRAIGHT LINES TO ACHIEVE A NATURAL-LOOKING LAYOUT.
2. EXCAVATE PIT TO FULL DEPTH OF ROOT MASS AND 2 X ROOT MASS DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. SCARIFY SIDES OF PIT.
3. MIDWAY THROUGH PLANTING ADD AGROFORM TABLET AND WATER THOROUGHLY.
4. BACKFILL TO BE COMPACTED USING WATER ONLY.
5. WATER IMMEDIATELY AFTER INSTALLATION.

TREE AND SHRUB PLANTING ON STEEP SLOPE

NOT TO SCALE



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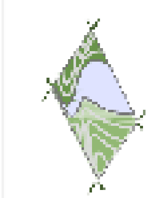
SOURCES:



NORTHWEST DRIVE
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PARCEL NUMBER(S):
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JOB: 2486.0001

BY: DLS

SCALE: AS SHOWN

SHEET: 3

Appendix B – Qualifications

All determinations and supporting documentation, including this ***Conceptual Buffer Mitigation Plan*** prepared for the ***Northwest Drive*** project were prepared by, or under the direction of, Alex Murphy of SVC. In addition, site investigations were performed by Kramer Canup, report preparation was completed by Garrett M. Jordan, and additional project oversight and final report review was completed by Morgan Kentch.

Alex Murphy, AICP

Project Manager / Senior Environmental Planner
Professional Experience: 8 years

Alex Murphy is a Planner and Project Manager with a background in land use planning, site planning & design, permitting, and project management. He has over 7 years of experience working for local jurisdictions in the Intermountain West and Pacific Northwest with an emphasis on maximizing opportunities for culturally and environmentally sensitive projects.

Alex earned a Bachelor of Landscape Architecture degree from Utah State University. He is a Certified Planner through the American Institute of Certified Planners and has received formal training in climate adaptation planning for coastal communities from NOAA. Mr. Murphy currently assists in wetland, stream, and shoreline delineations and fish and wildlife habitat assessments; conducts environmental code analysis; and prepares environmental assessment and mitigation reports. He also manages development projects, supporting clients through the regulatory and planning process for various land use proposals

Kramer Canup

Environmental Scientist
Professional Experience: 10 years

Kramer Canup is an Environmental Scientist with a professional background in project management, habitat restoration, vegetation monitoring, invasive plant management, monitoring protocol development, grant writing, tropical ecology, wildlife monitoring and environmental education. Kramer brings years of experience coordinating logistics for a variety of habitat restoration projects, vegetation monitoring programs, along with study abroad and backpacking courses. Previously, Kramer has managed riparian and upland habitat restoration projects and vegetation monitoring programs for the Green Seattle Partnership, the University of Washington, and the Pierce Conservation District, and he has taught study abroad courses in the Peruvian Amazon and Andes for the University of Washington. Kramer currently performs wetland delineations, conducts environmental code analysis, and prepares various environmental compliance documentation including fish and wildlife habitat assessments, biological evaluations, and permit applications.

Kramer has completed Basic Wetland Delineator Training with the Wetland Training Institute and received 40-hour USACE wetland delineation training. Kramer has been formally trained through the Washington State Department of Ecology, Coastal Training Program, How to Determine the Ordinary High Water Mark, and Using the Washington State Wetland Rating System. Beyond Kramer's project management, coordination, and delineation skills, he brings over 10 years of

experience performing ecological field work such as vegetation monitoring, plant installation and invasive weed control.

Morgan Kentch

Environmental Scientist
Professional Experience: 5 years

Morgan Kentch is an Environmental Scientist with a background in marine and freshwater ecology, wildlife and natural resource assessments, and monitoring wetland and riparian habitat restoration sites in the Pacific Northwest. Morgan has field experience conducting wetland, stream, and shoreline delineations and fish and wildlife habitat assessments in Washington State. She currently assists with performing wetland, stream, and shoreline delineations and fish and wildlife habitat assessments, conducting environmental code analysis, and preparing and/or providing final quality assurance/control for various types of scientific reports and permits for agency submittal.

Morgan earned her Bachelor of Science degree in Biology with Marine Emphasis from Western Washington University, Bellingham. There she received extensive, hands-on experience working in lab and field settings, conducting scientific background research, and performing statistical analyses. She has also received 40-hour wetland delineation training (Western Mountains, Valleys, and Coast and Arid West Regional Supplements) and has received formal training through the Washington State Department of Ecology and Coastal Training Program in Using the 2014 Wetland Rating System and How to Determine the Ordinary High Water Mark.

Garrett M. Jordan

Environmental Scientist
Professional Experience: 2 years

Garrett M. Jordan is an Environmental Scientist with a background in conducting critical habitat investigations, wetland delineations, botanical surveys, avian surveys, and threatened & endangered species surveys. He has considerable experience in production of wetland delineations and Biological Assessments and Evaluations for projects regulated by the U.S. Army Corps of Engineers and the Washington State Department of Ecology. Garrett has completed wetland delineation training with Portland State University and OHWM training with Washington's Coastal Training Program. . In addition, Garrett is a FAA trained remote pilot for unmanned aircraft and has extensive experience in utilizing GIS to collect, manage and analyze spatial and temporal field data.

NERP Memorandum

September 6, 2023

City of Bellingham
Planning and Community Development
210 Lottie Street
Bellingham, WA 98225

Re: North End Regional Pond

To Whom it May Concern:

This letter is intended to provide an overview of past and anticipated development as it pertains to stormwater for Silver Springs, Inc. ("**Silver Springs**") and Mersey, LLC ("**Mersey**") and request the City of Bellingham ("**City**") allocate stormwater capacity to a neighboring development.

Background

Silver Springs currently owns and is actively developing property located within the City on Parcel #3802113702250000 ("**Development**"). Mersey, LLC, has previously developed projects known as Aurora Court Phase 1, Aurora Court Phase 2, and Mahogany Manor ("**Prior Development**"). In 2013, before the Prior Development, Mersey entered into an agreement with the City whereby the City would construct a stormwater pond called the North End Regional Pond ("**NERP**"). In designing the NERP, the City was contractually bound to include the Prior Development and the Development in calculating the capacity of the NERP. Specifically, 15 acres of impervious surface was to be allocated.

Status of Development

Since that time, the Prior Development has been fully built out. However, the full 15 acres has not been utilized. Although the future projects in the Development have the ability to use the NERP, for reasons beyond the scope of this letter, the Development will instead treat and detain stormwater on site. Therefore, the remaining capacity in the NERP allocated to the Development will not be utilized.

Capacity in the NERP

Recently, Silver Springs and Mersey have been contacted by Ethan & Kelli Potts and Chay & Christina Tan regarding the NERP and their development of adjacent property located at 4241 Northwest Dr., Parcel #3802114351860000 ("**Neighboring Property**"). For the reasons stated above, the remaining capacity from the 15 acres that was allocated to the Development will not be used. Instead, it should be allocated to the Neighboring Property. To the extent the City desires Mersey and Silver Springs execute additional documents relinquishing any right they may have in the NERP, Mersey and Silver Springs are willing to do so.

Thank you for your time and attention to this matter. If you have any questions, please feel free to contact me.

SILVER SPRINGS, INC.

ROBERT W. JANICKI
103 N. Township St.
Sedro Woolley, WA 98284-1243

Stormwater Site Plan
Aurora Court Phase II
Bellingham, Washington

TPN: 380211 374195

Prepared For:
Mersey, LLC
103 N. Township Street
Sedro Woolley, WA 98264
(360) 738-9033

Prepared By:
Freeland & Associates, Inc.
220 W. Champion Street
Suite 200
Bellingham, WA 98225
(360) 650-1408

May 2020

FREELAND & ASSOCIATES
CIVIL ENGINEERS

Table of Contents

ENGINEER'S DECLARATION

"I, Jean-Paul Slagle, a Professional Engineer registered in the State of Washington as a Civil Engineer, do hereby declare that the Aurora Court Phase II Stormwater Site Plan dated May 2020 was prepared by, or under my personal supervision, and 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 full compliance with the 2019 Washington State Department of Ecology Stormwater Management Manual for Western Washington (2019 DOE SWMM), City of Bellingham Municipal Code 15.42.060, and all Technical Standards adopted there under.

Jean-Paul Salomé Slagle
WA P.E. #43224

This report is not intended to be a final site plan for this project or any individual proposed improvements and is not intended for use as part of any review of critical area. Existing drainage and site conditions or improvements not mentioned are beyond the scope of this report.

STORMWATER SITE PLAN

The Stormwater Site Plan (SSP) is the comprehensive report containing all of the technical information and analysis necessary for regulatory agencies to evaluate the proposed development for compliance with stormwater requirements.

Existing Conditions Summary

The subject property is located at 4220 Traverse Drive in north Bellingham, Washington (TPN 380211 374195). The project totals 5.40 acres of undeveloped land. The location of the property is northeast of the intersection of Traverse Drive and Talus Way. The City of Bellingham North End Regional Pond (NERP) stormwater facility is located to the southwest of the property. Refer to *Figure 1 – Vicinity Map* for a map outlining the project location.

Per City of Bellingham maps, the property is situated within Area 20 of the Cordata Neighborhood and zoned Residential Single, Mixed. Adjacent land uses vary and include the recent Aurora Court Phase I residential development (southwest), Mahogany Manor residential development (south), Costco Wholesale retail development (south), municipal stormwater facility (west), and scattered residential properties (north, east).

Existing conditions of the site is second growth forest as result of the property being logged nearly 10 years ago. Bear Creek, the only major water body near the project area, runs through the western region of the site. Topography of the site is generally flat with 2% to 5% slopes to the northwest towards Bear Creek. The subject property is impacted by wetlands which will require mitigation and fill prior to building development, which is detailed later in this report. Refer to *Figure 2 – Aerial Photograph* for the existing site conditions.

Existing Soil Conditions

According to the NRCS Soils Survey Map, soils on the site are mapped as Whatcom-Labounty silt loams #182 of Hydrologic Group ‘C’. Hydrologic Group ‘C’ soils tend to have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine structure. Refer to *Figure 3 – Soils Map* for a copy of the regional soils map.

On-Site Soils Testing

Materials Testing & Consulting, Inc. (MTC) performed several subsurface soil explorations at the project location and summarized their findings in a report dated December 30,2019. The fourteen test pit locations selected focused on the proposed residential buildings, roadways, and parking locations. The full geotechnical report from MTC is attached in the *Appendix* of this report for reference.

Results of the geotechnical investigation indicate that the native subgrade soils consist of predominantly fine-grained glacial drift deposits below cover soils. The topsoil layer was typically between one to two feet in depth. Below the topsoil layer, it was predominantly fine-grained glacialmarine drift (GMD) deposits that were encountered beginning as shallow as 0.8 feet and as deep as 7 feet below ground surface (BGS). The upper weathered portions of the GMD exhibited light modeling with a stiff consistency. As the soil profile became deeper, the weathered appearance gave way and became a dense unweathered GMD. The unweathered soil profile varied from less than three feet BGS to greater than six feet BGS. At all test pits, silty clay with minor coarse-grained sediments were present at termination depth and remained hard or very dense, causing refusal of machinery.

During field investigations, evidence of seasonal saturation where observed indicating a likely wet season condition including potential perched water. Moderate orange-brown oxidation and mottling was observed within most of the weathered glacial drift unit and generally within the upper 0.5 feet of the underlying unweathered glacial drift soils. These patterns are interpreted to indicate water infiltration and seasonal perched water table above a relatively imperviable fine-grained drift soil horizon. Due to the fine-grained nature of site soils, water seepage from perched water conditions is anticipated to be prevalent seasonally and may be present locally throughout the year.

Project Overview

The overall Aurora Court Plat consists of single and multifamily residential developments with a total allowable density of 714 units. The completed project will include five phases and a multifamily tract. It is anticipated that unit types for the project will include both single-family attached and detached, and larger multifamily complexes. Approximately 5.40 of the total 70 acres of the property will be developed as part of Aurora Court Phase II. Phase II of the Aurora Court Plat will include construction of 16 townhome buildings for a total of 72 residential units.

Units will be served from public lanes allowing homeowners access to covered garage parking. Two road frontages will be constructed with the project. Both Traverse Drive and Snowfield Drive will be constructed with the plat to connect to the private internal alleyways. Private and shared open space will surround the buildings to meet planning goals for a sense of community. The entire project is required to meet a Green Factor score as part of the City of Bellingham Infill Toolkit.

All utilities for the project will be public. Stormwater and sewer services will be from public stormwater and public sewer pipes located in the public lanes. A publicly maintained sewer lift station was constructed as part of Aurora Court Phase I. This sewer lift station will serve Aurora Court Phase II and the surrounding developable areas.

To serve this phase, a long sewer extension will be required to reach the public sewer pump station. This sewer main will be constructed within the future Snowfield Way right-of-way to the west of the site. Access to the sewer manholes will be accomplished by a 20-foot wide gravel access road. Stormwater runoff will sheet flow away from the away to the north into forested area. Trees and vegetation will be preserved along both sides of the access road.

Stormwater management systems have been designed to comply with Bellingham Municipal Code (BMC) 15.42.060. As such, this project will address each of the minimum requirements as presented in the 2019 DOE Manual. The 2019 DOE Manual requires Low Impact Development strategies to infiltrate, disperse, and retain stormwater runoff onsite to the maximum extent feasible. However, as noted in the geotechnical report from MTC, soils onsite cannot accommodate typical infiltration systems. This also precludes the use of permeable pavements, bioretention cells, and rain gardens used to meet low impact development goals. Therefore, conventional stormwater treatment and flow control systems will be used. Stormwater from the developed areas in Phase II will be collected in downspouts and a series of catch basins for conveyance to the City of Bellingham North End Regional Pond south west of the Aurora Court Phase II Site. No additional detention or treatment systems will be required within the site. Additional information regarding each of these proposed systems is provided in the *DOE Minimum Requirements* and *Calculations* sections of this report.

Offsite Analysis

All the proposed improvements will drain to a City of Bellingham designed and maintained stormwater management facility (NERP stormwater pond) which will provide flow control and treatment for all areas within its contributing basin. As such, a typical downstream analysis is not required since capacity downstream of the NERP was evaluated by the City of Bellingham during the design process.

DOE MINIMUM REQUIREMENTS

Minimum stormwater management requirements for this project have been determined using BMC 15.42.060 and the 2019 Department of Ecology Stormwater Management Manual for Western Washington (2019 DOE SWMM or DOE Manual). With more than 5,000 square feet new plus replaced hard surface area, the project is subject to Minimum Requirements 1 through 9 in BMC 15.42.060.

For each Minimum Requirement that is applicable to the project per information above, the Threshold Discharge Area (TDA) must be analyzed to determine which, if any, BMP(s) must be constructed within each TDA to satisfy that Minimum Requirement. Thresholds that apply to each TDA are identified within BMC 15.42.060 or the 2019 DOE SWMM.

Minimum Requirements #1, #2, #3, #4, #5, and #9 do not have separate TDA Thresholds, and must be applied to the entire project if they are applicable to the project. Minimum Requirements #6, #7, and #8 have TDA Thresholds that describe when and/or what type(s) of BMP(s) must be constructed within each TDA, if they are applicable to the project.

It is possible for a project to require Minimum Requirements #6, #7, and #8 per the Project Thresholds, but then not require construction of BMPs in individual TDAs to comply with Minimum Requirement #6, #7, and/or #8. By documenting that the TDA Thresholds that would require construction of a BMP have not been triggered for an individual TDA, the project proponent is in compliance with that Minimum Requirement for that TDA.

MINIMUM REQUIREMENT SUMMARY LARGE PARCEL REDEVELOPMENT					
Minimum Requirement		**Not Applicable**	**Variance Requested**	**Standard Requirements Incorporated**	**Comments (Report Section Reference or BMP Identifier)**
#	**Description**				
1	Preparation of Stormwater Site Plans			✓	
2	Construction Stormwater Pollution Prevention Plan			✓	See "Additional Comments"
3	Source Control of Pollution			✓	
4	Preservation of Natural Drainage Systems and Outfalls			✓	
5	On-Site Stormwater Management			✓	
6	Runoff Treatment			✓	
7	Flow Control			✓	
8	Wetlands Protection			✓	
9	Operation and Maintenance			✓	
#	**Additional Comments**				
2	The Construction SWPPP is included in the civil construction drawings.				

Minimum Requirement #1 - Preparation of Stormwater Site Plans ("SSP")

This report serves as a Stormwater Site Plan (SSP). All stormwater management systems have been designed according Department of Ecology (DOE) and City of Bellingham standards. A construction Stormwater Pollution Prevention Plan (SWPPP) has also been prepared and is incorporated in the construction documents.

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

A SWPPP narrative is provided in the construction plans to ensure that it will be onsite during construction. Each of the thirteen elements of a SWPPP, as identified in BMC 15.42.060(F)(2), must be considered and included in a Construction SWPPP unless site conditions render the element unnecessary and the exemption from that element is clearly justified in the narrative of the SWPPP. The SWPPP shall include, at a minimum, the narrative, the Stormwater Site Plan and copies of Best Management Practice detail sheets that will be utilized as a part of the SWPPP.

During construction, the contractor shall maintain a copy of the SWPPP on site and shall update or modify the SWPPP as necessary for the current conditions on site. The contractor's schedule and available crew, equipment, and materials will be determined prior to construction, but after this project is reviewed for permits. Accordingly, some BMPs that have been specified may not be necessary, while other additional BMPs may be required.

This project will disturb more than one acre of soil. As such, an NPDES permit from Washington Department of Ecology will be obtained to ensure that temporary erosion controls are adequately installed and maintained for the life of the project. The Contractor shall provide a Certified Erosion and Sediment Control Lead (CESCL) to inspect existing BMPs and to determine which BMPs are necessary as site conditions change during construction. The Contractor or CESCL shall add any BMP specifications that have not already been included in the SWPPP prepared by Freeland & Associates, Inc.

Minimum Requirement #3 - Source Control of Pollution

Pollutant sources for residential developments may include vehicular traffic, fertilizers, and other detergents or chemicals typical to residential maintenance activities. Pollution will be controlled at the source to the maximum extent possible. All known, available and reasonable source control BMPs have been applied to the design and layout of the site and stormwater plans. Per the DOE Manual, land use controls that emphasize prevention of water quality impacts are preferred over

treatment strategies. Therefore, clearing areas will be limited to the minimum areas necessary for construction. No vehicle or machinery repair or maintenance will be performed on site unless the maintenance area is contained and protected in such a way as to prevent any contact with stormwater. Maintenance such as oil changes or fluid replacements should be performed off site to the maximum extent practicable. Selected source control BMPs include:

- BMPs for Landscaping and Lawn/Vegetation Management
- BMPs for Maintenance of Stormwater Drainage and Treatment Systems
- S453 BMPs for Formation of a Pollution Prevention Team
- S454 BMPs for Preventive Maintenance / Good Housekeeping
- S455 BMPs for Spill Prevention and Cleanup
- S456 BMPs for Employee Training
- S457 BMPS for Inspections
- S458 BMPs for Record Keeping

See additional details in the 2019 Department of Ecology Stormwater Management Manual for Western Washington.

https://fortress.wa.gov/ecy/ezshare/wq/Permits/Flare/2019SWMMWW/2019SWMMWW.htm

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

Stormwater runoff generated by the Aurora Court Phase II will be conveyed to the North End Regional Pond (NERP) for stormwater detention and treatment. The NERP outfalls to Bear Creek. No significant stormwater diversions are anticipated as part of this project and natural drainage patterns will be maintained.

Minimum Requirement #5 - On-site Stormwater Management

Minimum Requirement #5 in Volume I of the 2019 DOE Manual states, "Projects shall employ On-site Stormwater Management BMPs in accordance with the following projects thresholds, standards, and lists to infiltrate, disperse, and retain stormwater runoff on-site to the extent feasible without causing flooding or erosion impacts." As a project triggering Minimum Requirements #1 through #9, and a project that is inside the Bellingham city limits, this project may use On-site Stormwater Management BMPs from List #2 for all surfaces within each type of surface in List #2 or demonstrate compliance with the LID Performance Standards. This project will meet the requirements outlined in List #2 to the maximum extent feasible.

Projects choosing to utilize List #2 of the 2019 DOE Manual to meet the requirements for Minimum Requirement #5 - On-site Stormwater Management must consider the BMPs in the order listed for each type of surface. The first BMP that is considered feasible must be used on the site. No other On-site Stormwater Management BMPs are necessary for that surface. The following table identifies all the required BMPs in List #2 and if they are feasible or infeasible. Additional discussion of the feasibility criteria is outlined after the table.

TABLE 2 - MINIMUM REQUIREMENT #5 LIST #2				
Minimum Requirement		**Feasible**	**Infeasible**	**Criteria Comments**
#	**Lawn & Landscaped Area**			
1	Post-Construction Soil Quality and Depth - BMP T5.13	✓		This BMP will be applied to all areas outside of roofs or hard surfaces disturbed during construction.
#	**Roofs**			
1	Full Dispersion - BMP T5.30 Full Infiltration - BMP T5.10A		✓	Infeasible due to impervious coverage and soil conditions.
2	Bioretention – BMP T5.70		✓	Infeasible due to soil conditions.
3	Downspout Dispersion BMP T5.10B		✓	Infeasible due to insufficient vegetated flow path length
4	Perforated Stub-out Connection BMP T5.10C		✓	Infeasible due to limited distance to storm main connection.
#	**Other Hard Surfaces**			
1	Full Dispersion BMP T5.30		✓	Infeasible due to impervious surface limits and lot size.
2	Permeable Pavement - BMP T5.15		✓	Infeasible due to soil conditions.
3	Bioretention – BMP T5.70		✓	Infeasible due to soil conditions.
4	Sheet Flow Dispersion BMP T5.12 Concentrated Flow Dispersion BMP T5.11	✓	✓	Infeasible due to insufficient vegetated flow path length. Used for sewer access road.

Lawn & landscaped areas:

All lawn and landscaped areas disturbed during construction will receive post-construction soil quality and depth in accordance with BMP T5.13 in Chapter 5 of Volume V of the 2014 DOE SWMM. Proposed topsoil quality and depth requirements are provided in the project's landscaping plans, which are prepared to meet or exceed the requirements in BMP T5.13. A copy of BMP T5.13 is also included in the civil plans for reference.

Roofs

Requirement: Full Dispersion in accordance with BMP T5.30 in Chapter 5 of Volume V, or Downspout Full Infiltration Systems in accordance with BMP T5.10A in Section 3.1.1 in Chapter 3 of Volume III.

Application: Full Dispersion will not be feasible for this project because the proposed hard surfaces will exceed the 10% allowance for BMP T5.30. In addition, the site does not contain suitable vegetated flow paths downstream from the proposed improvements.

Requirement: Bioretention facilities that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.

Application: Bioretention facilities are not feasible due to the dense underlying soil profile and perched groundwater conditions of the native soil condition.

Requirement: Downspout Dispersion Systems in accordance with BMP T5.10B in Section 3.1.2 in Chapter 3 of Volume III.

Application: This project has been designed using the infill toolkit to provide a dense single-family layout. Due to this density, there are insufficient vegetated areas to meet the flow path requirement.

Requirement: Perforated Stub-out Connections in accordance with BMP T5.10C in Section 3.1.3 in Chapter 3 of Volume III.

Application: Perforated Stub-out Connections are infeasible due to limited distance between the buildings and storm mains located in the private roads.

Hardscapes

Requirement: Full Dispersion in accordance with BMP T5.30 in Chapter 5 of Volume V.

Application: Full Dispersion will not be feasible for this project because the hardscape surfaces such as the proposed driveways, sidewalks, and parking areas will exceed the 10% allowance for BMP T5.30.

Requirement: Permeable pavement in accordance with BMP T5.15 in Chapter 5 of Volume V.

Application: Permeable pavements are not feasible due to the dense underlying soil profile and perched groundwater conditions found in the native soil. However, they may be considered as a landscape feature if desired by the landscape architect to meet the Green Factor Score requirements. If they are utilized, no stormwater credit shall be afforded.

Requirement: Bioretention facilities that have a minimum horizontally projected surface area below the overflow which is at least 5% of the total surface area draining to it.

Application: Bioretention facilities are not feasible due to the dense underlying soil profile and perched groundwater conditions of the project site.

Requirement: Sheet Flow Dispersion in accordance with BMP T5.12 or Concentrated Flow Dispersion in accordance with BMP T5.11 in Chapter 5 of Volume V.

Application: In general, Sheet Flow and Concentrated Dispersion are considered infeasible for this project. The site plans do not contain adequate vegetated flow paths for onsite or offsite hardscapes.

However, the sanitary sewer access roadway will sheet flow to the north into existing vegetation. Trees will be preserved along both sides of the gravel access roadway.

Proposed Stormwater Management

For most of the site, existing topography, site development, and native soil conditions preclude the use of LID features such as dispersion systems, infiltration systems, rain gardens, or permeable pavement. Therefore, runoff from the proposed improvements will be collected in a stable drainage system for conveyance to the regional stormwater management facility located west of the site.

The North End Regional Pond will provide flow control and stormwater treatment. In addition, landscaping plans will ensure that all disturbed lawn and landscaping areas will meet topsoil quality and depth requirements in BMP T5.13. Refer to *Minimum Requirement #6-Runoff Treatment* and *Minimum Requirement #7-Flow Control* for further information about the proposed stormwater management systems.

Stormwater mitigation for the sanitary sewer access roadway will sheet flow into the adjacent preserved vegetation. As this gravel access road is temporary, it is anticipated that sufficient trees will be preserved per BMP T5.16: Tree Retention and Tree Planting to fully mitigate the associated impervious surfaces. Preserved trees are located along the north and south side of the sewer access roadway, along the north side of Aurora Court Phase 1, and along the west and north side of Aurora Court Phase 2, which are all within 20 feet of an impervious surface. Eventually, preserved trees removed with future development of the parcels; however, at this time the gravel roadway will be replaced with the continuation of Snowfield Way and stormwater mitigation will be updated accordingly. For this project, hard surfaces associated with sanitary sewer access roadway are considered ineffective.

Minimum Requirement #6 - Runoff Treatment

The proposed development will create more than 5,000 square feet of pollution-generating impervious surfaces. As such, the project will exceed the treatment thresholds in Section 2.5.6 in the 2019 DOE Manual and must provide stormwater treatment per BMC 15.42.060.

The Aurora Court Plat includes 75% single family residential and 25% multifamily residential development. None of the proposed roadways will be classified as arterials. Single family developments discharging to fresh water systems designated for or has an existing aquatic life use are required to meet basic treatment requirements. Multifamily developments and roads with AADT exceeding 15,000 that discharge to fresh water system designated or has existing aquatic life, are required to meet the enhanced treatment requirements.

Per Section 3.4 – Enhanced Treatment in Volume V of the 2019 DOE SWMM, developments with a mix of land use types, the Enhanced Treatment requirement shall apply when the runoff from the areas subject to Enhanced Treatment comprises of 50% or more of the total runoff within a threshold discharge area. Since the multifamily portion of the development only constitutes 25% of the developable area, the Aurora Court development will need to meet the basic treatment requirements.

As discussed in the Minimum Requirement #7 below, this phase of the proposed development will discharge to the North End Regional Pond (NERP). A minimum of basic treatment will be provided for pollution generating surfaces in the NERP. Stormwater runoff volume contributing from the proposed Phase II of Aurora Court is calculated using WWHM and these calculations are included in the *Calculations Section* of this report.

Minimum Requirement #7 - Flow Control

Proposed development will create more than 10,000 square feet of new impervious surfacing. Therefore, this project must provide flow control for all of the new impervious surfacing per BMC 15.42.060. As negotiated in the purchase and sale agreement with the City of Bellingham for the land that the North End Regional Pond (NERP) is situated on, the Aurora Court Plat is allowed to discharge equivalent runoff volume from 15 acres of impervious surface to the regional pond.

Developed areas associated with this project will drain to the NERP. This facility will provide water quality treatment and flow control for this proposed development. It is understood that the design criteria for the existing detention pond, outflow control structure, primary overflow, emergency overflow spillway, and access meet the current requirements of BMC 15.42.060.

For stormwater conveyed to the NERP, a secondary inlet system will be installed along the south bank of the NERP to convey water directly from the Aurora Court Plat. This will be required since

the previously constructed conveyance system in Mahogany Street does have sufficient depth to service the 15 acres of impervious surface allowed in the purchase and sale agreement between the City of Bellingham and the project proponent. A copy of the purchase and sale agreement is included in the *Appendix* for information.

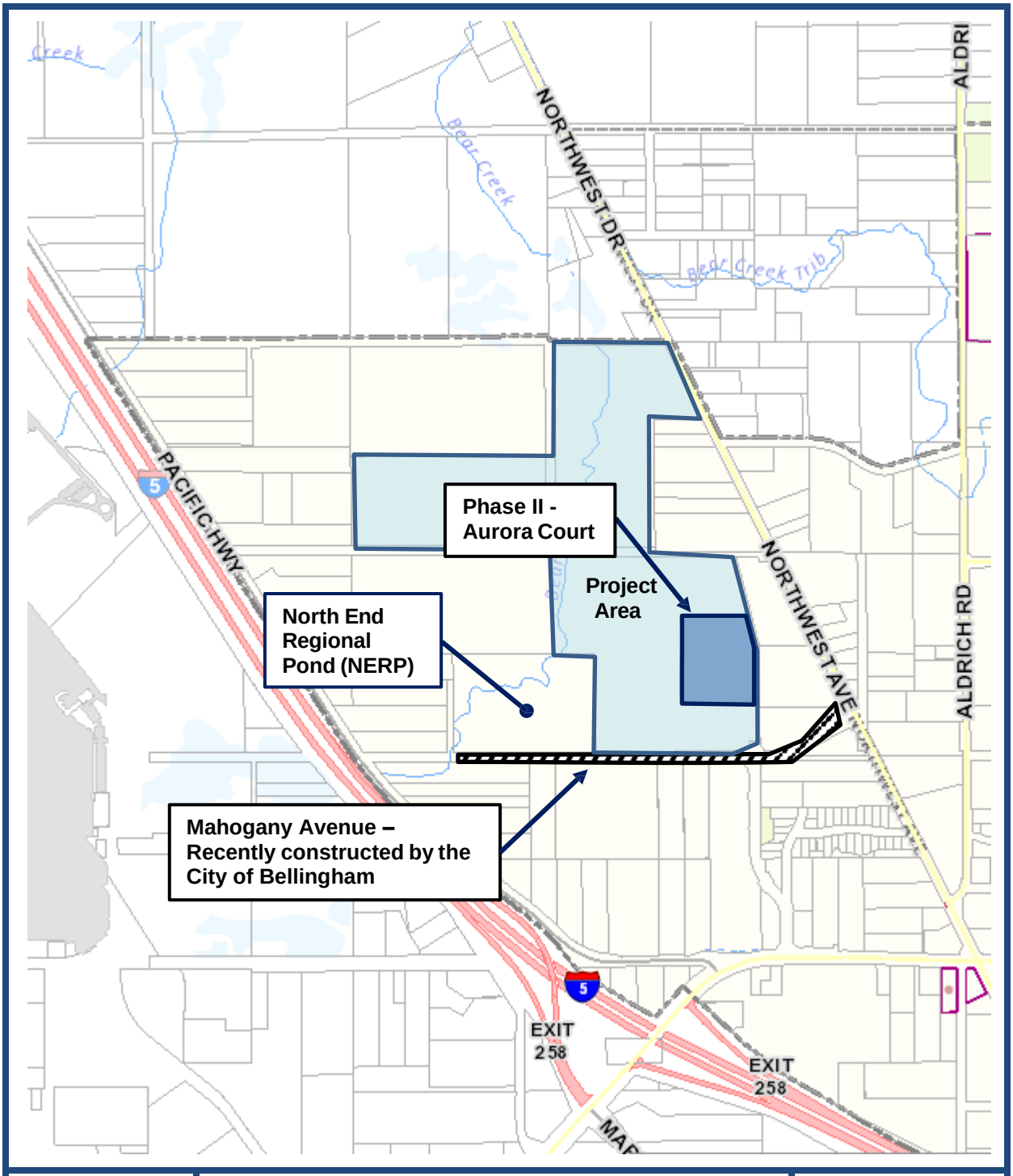
Minimum Requirement #8 - Wetlands Protection

All existing wetlands in the developable area of Aurora Court Phase II will be filled in order to accommodate the future build-out of the project. Phased wetland mitigation will occur in the reserve area north of the residential development and will require approval from the Department of Ecology, Army Corps of Engineers, and the City of Bellingham. As of this submittal, the City of Bellingham has approved the wetland mitigation under CAP2016-0063 and approvals from both the Department of Ecology and Army Corps of Engineers are expected imminently.

Minimum Requirement #9 - Operation & Maintenance

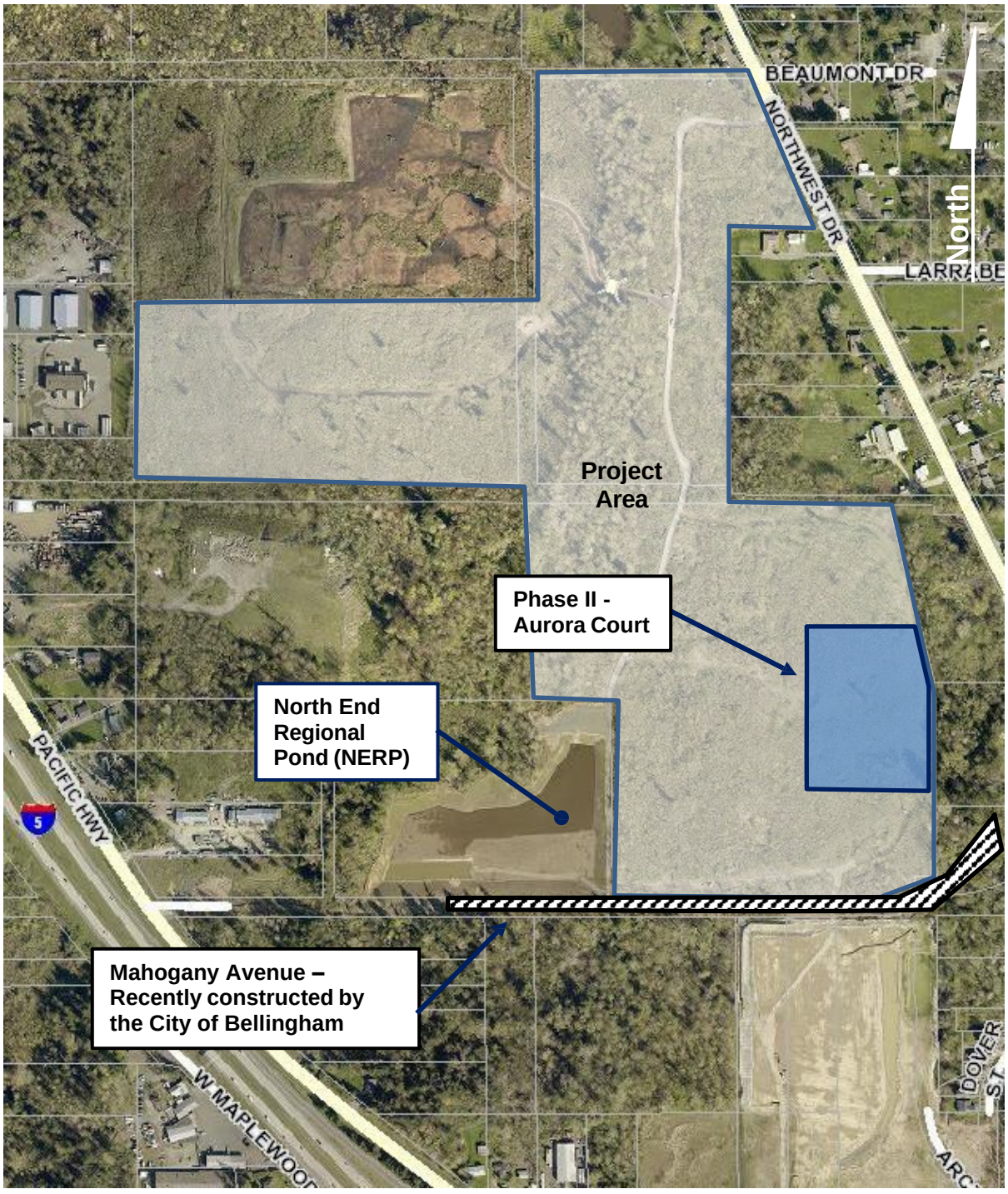
An operations and maintenance manual is not required for this project. Stormwater flow control and treatment facilities associated with Aurora Court Phase II are owned and maintained by the City of Bellingham. Conveyance facilities in both private roads and all surrounding roadways are owned and maintained by the City of Bellingham.

FIGURES



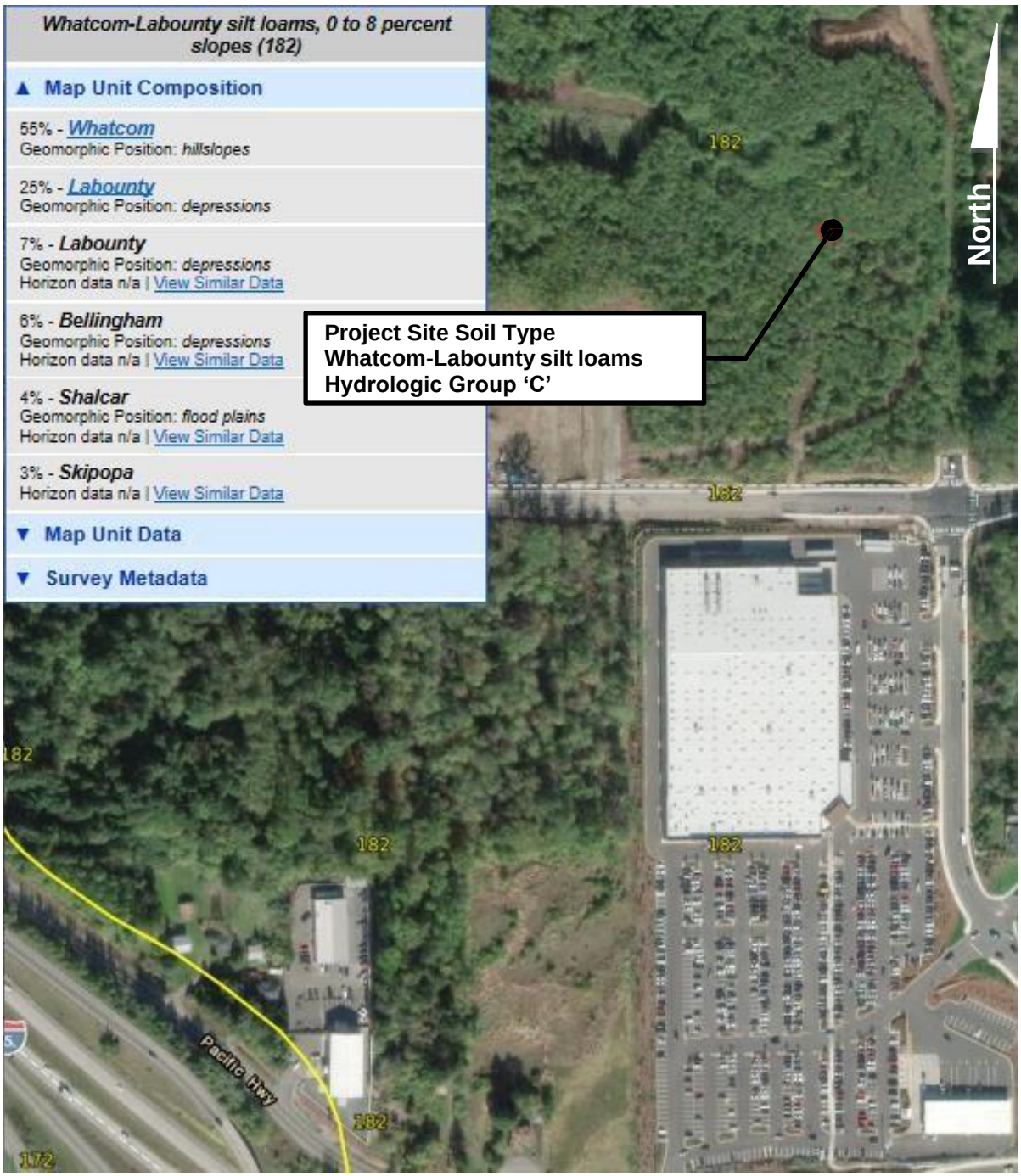
Vicinity Map

Figure 1



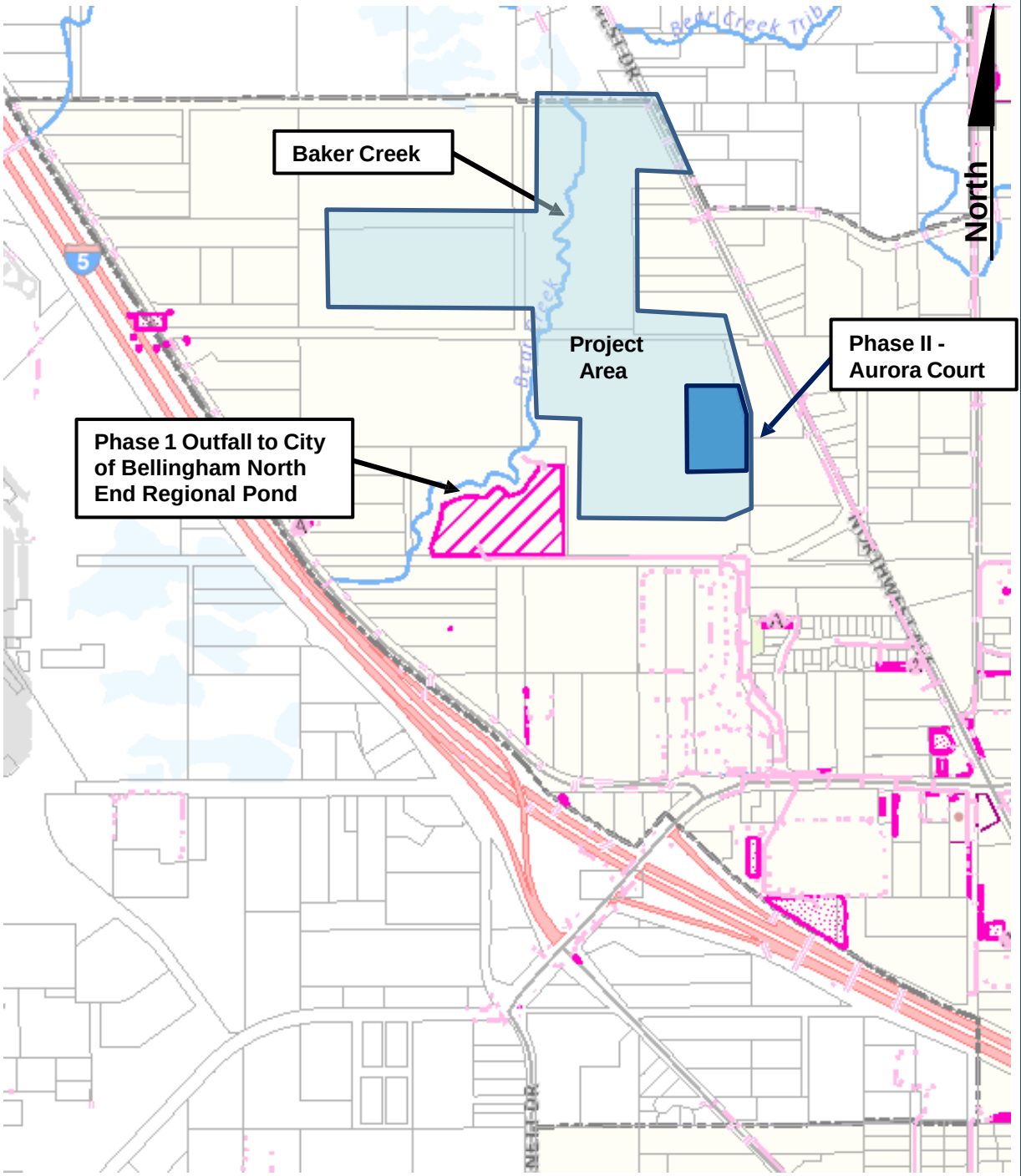
Aerial Photo

Figure 2



NRCS Soils Map

Figure 3



	Downstream Drainage System	**Figure 4**

Figure 5 - Post-Development Drainage Basin Map

DRAINAGE LEGEND

PROPOSED HARDSCAPE TO WERP
150,564 SF (3.457 AC)

DISCONNECTED HARDSCAPE TO WERP
10,285 SF (0.236 AC)

LANDSCAPE
74,477 SF (1.710 AC)

TRAVERSE DRIVE

BRAEBURN LANE (PUBLIC ALLEY)

CAMEO LANE (PUBLIC ALLEY)

SNOWFIELD WAY

TALUS WAY

PFC2018-0031

1 inch = 60 ft.

0 30 60

W S N E

220 W. Champion Street, Suite 200
Bellingham, WA 98225
t: 360.650.1405
f: 360.650.1401

FREELAND & ASSOCIATES

SHEET CONTENTS

POST-DEVELOPMENT BASIN MAP

JOB #	DATE
18239	MAY, 2020
DRAWING #	SHEET NAME
18239SP5.DWG	**FIG 5**

CALCULATIONS

Stormwater Modeling Overview

In accordance with the BMC 15.42.060, Western Washington Hydrology Model (WWHM2012) software is used to model the anticipated stormwater flows and durations from the site. WWHM2012 software uses HSPF continuous simulation methodology to compare predevelopment discharge rates to post-development discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow. Predevelopment conditions are considered to be forested.

Stormwater flow control for this project is provided in the North End Regional Pond (NERP), as allowed in the purchase and sale agreement between the City of Bellingham and the property owner. Per the agreement, the property owner can purchase credits for an equivalent volume from up to 15 acres of impervious surfaces. Totals are shown below.

Table C1
Allowable Plat Flows to NERP

Phase	Treatment Volume (acre feet)
Total Treatment Volume Allowable*	1.5349
Phase 1 Treatment Volume**	0.2182
Mahogany Manor Treatment Volume***	0.3509
Phase 2 Treatment Volume	0.3945
Total Treatment Volume Remaining	**0.5713**

**Volume per Purchase & Sale Agreement equivalent to 15 acres of impervious.*
***Volume per asbuilt update to Aurora Court Phase 1.*
****Volume per Approved SSP for Mahogany Manor*
(All documents available upon request)

Although the purchase and sale agreement allocates equivalent volumes from a basin with 15 acres of impervious surfaces to the proposed project, contributing volumes are required to be calculated to determine cost for the NERP capacity. Per discussions with the City of Bellingham, stormwater treatment volume calculated with WWHM is the agreed upon metric to evaluate costs. Table C2 below shows the contributing areas added to the WWHM model.

Table C2 Phase 2 Contributing Areas	
Ground Cover	**Area (Acres)**
Proposed Hardscapes to NERP	3.469
Disconnected Hardscapes to NERP**	0.232
Landscape and Grass Surfaces*	1.700
Total	**5.401**

*Landscape modeled as pasture per BMP T5.13

*Disconnected walkways modeled as landscape per BMP T5.18

As shown in the Stormwater Modeling in the following, the proposed development requires 0.3945 acre-feet of treatment volume.

Stormwater Modeling Input & Output

Several screenshots of the stormwater models are included on the following pages. The left half of each screenshot shows the entire pre- or post-development stormwater model layout with a single component selected, while the right half provides input information for the selected component of the model.

Figure C1: Rain Gage Scaling

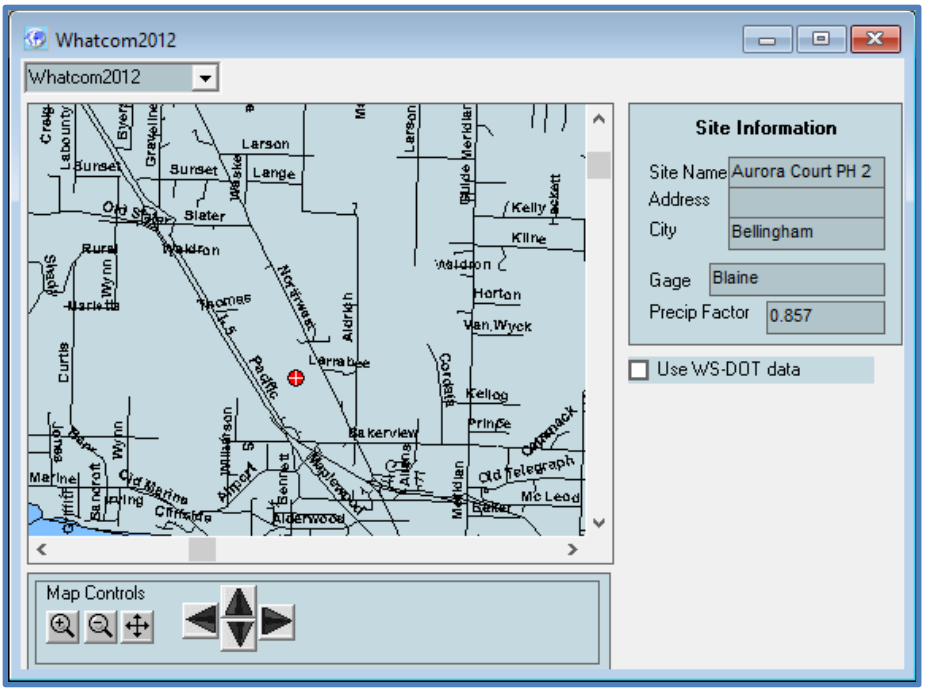


Figure C2: Onsite Basin

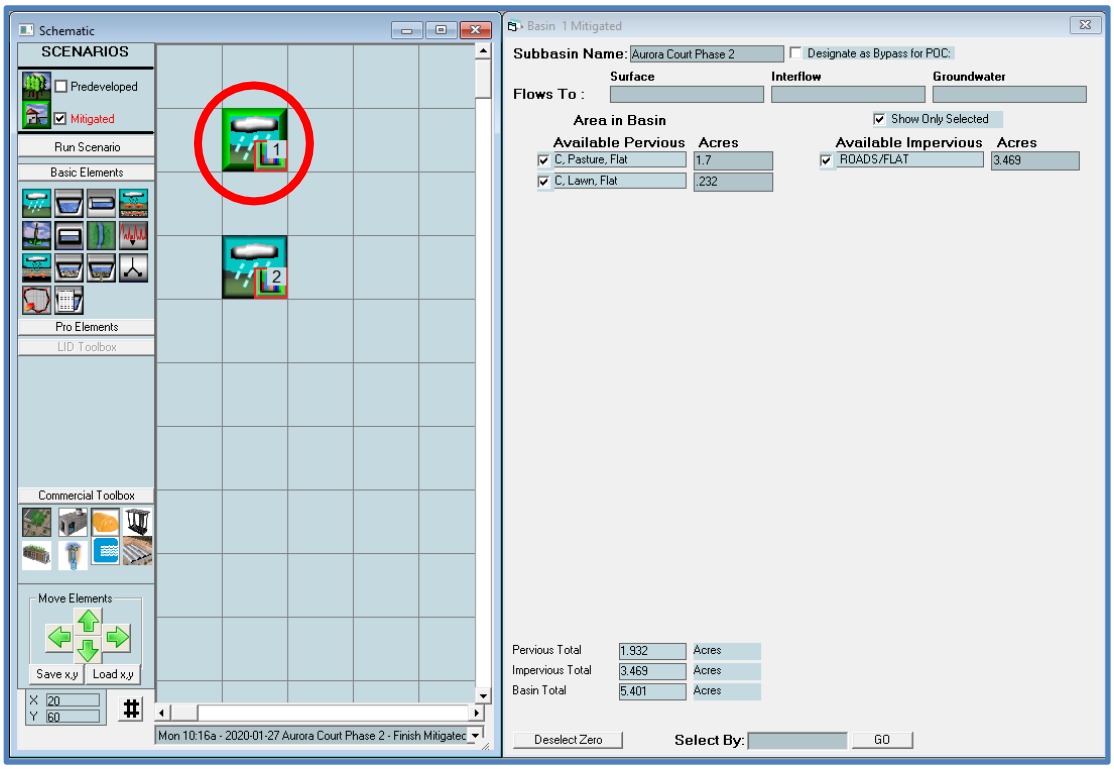


Figure C3: Water Quality Volume Calculation

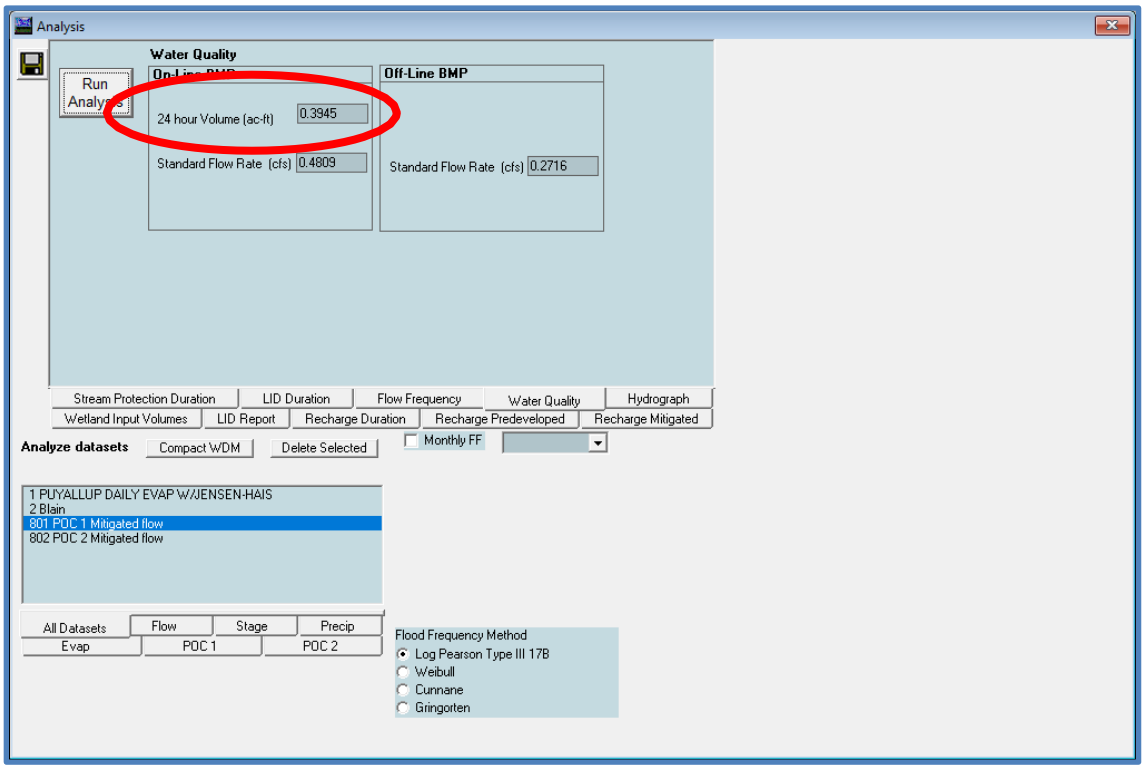


Figure C4: 15 Acre Basin

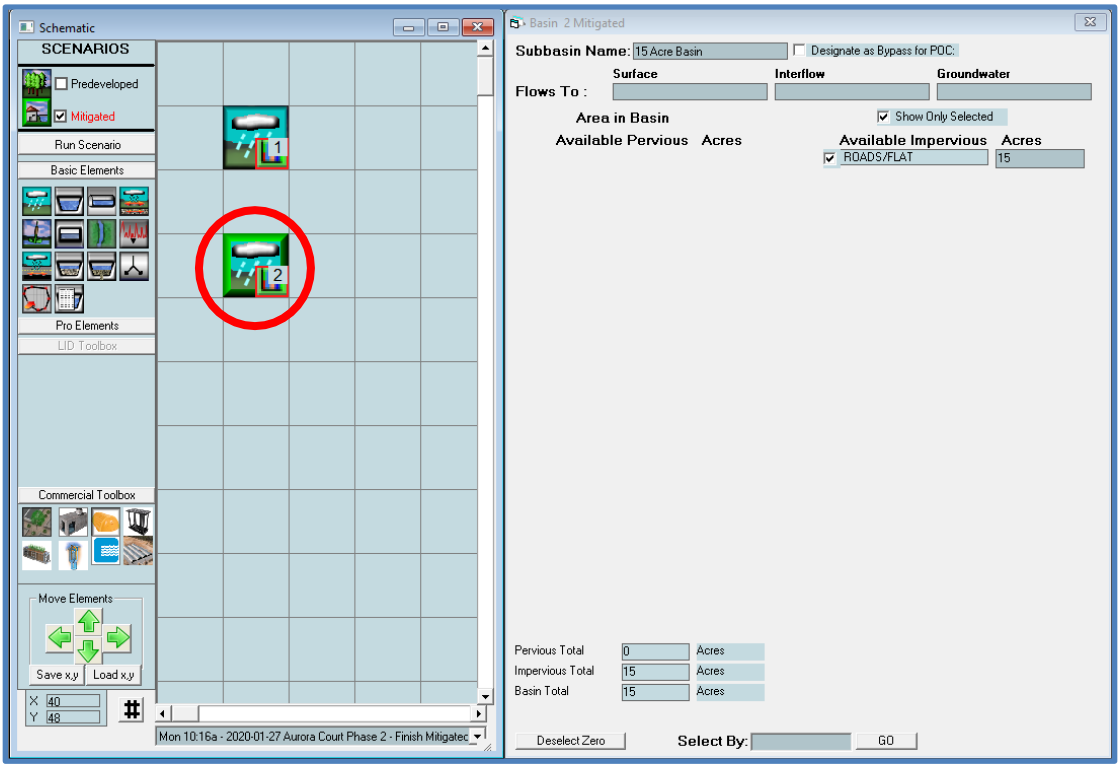


Figure C5: 15 Acre Basin Treatment Volume

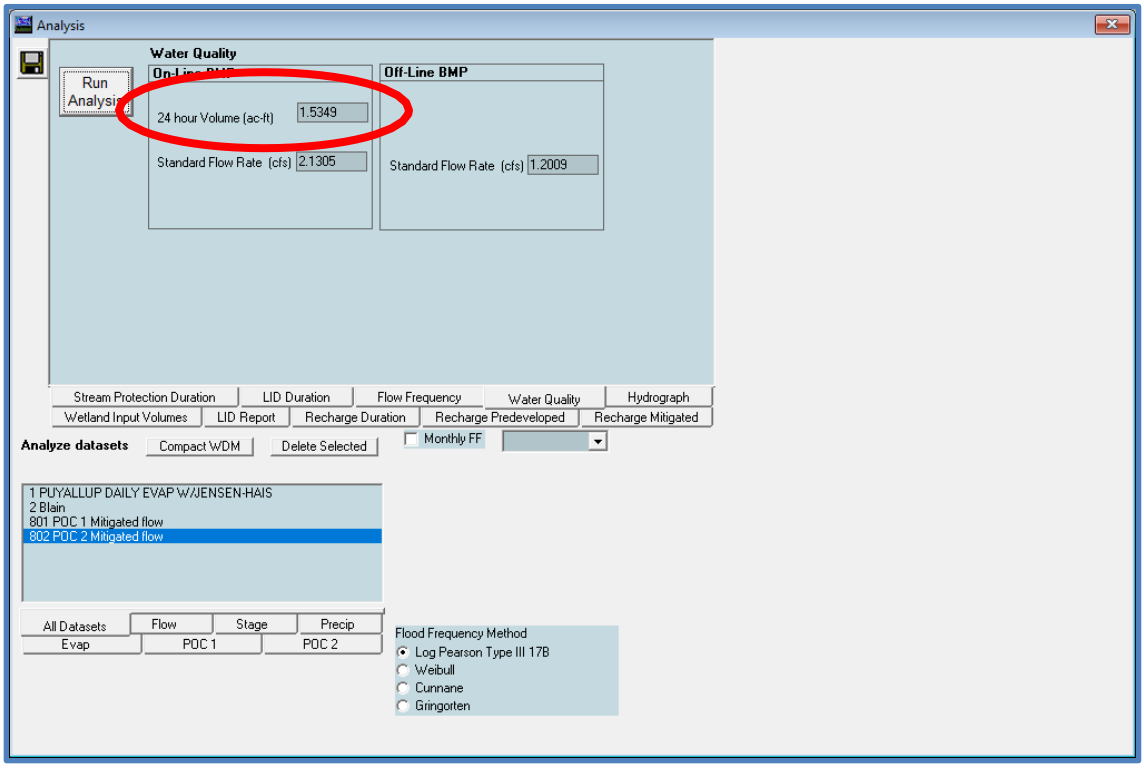
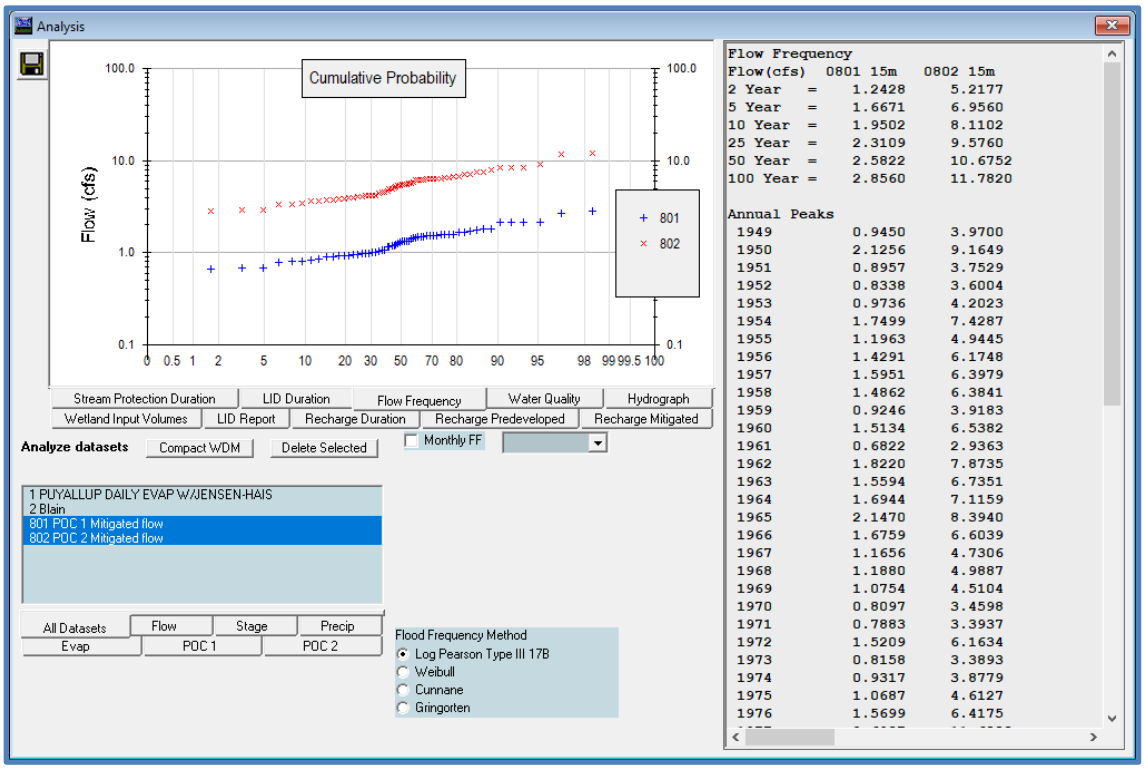


Figure C6: Flow Frequency Analysis

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Flow Frequency
Flow(cfs)   0801 15m    0802 15m
2 Year   =     1.2428      5.2177
5 Year   =     1.6671      6.9560
10 Year  =     1.9502      8.1102
25 Year  =     2.3109      9.5760
50 Year  =     2.5822     10.6752
100 Year =     2.8560     11.7820

Annual Peaks
 1949          0.9450      3.9700
 1950          2.1256      9.1649
 1951          0.8957      3.7529
 1952          0.8338      3.6004
 1953          0.9736      4.2023
 1954          1.7499      7.4287
 1955          1.1963      4.9445
 1956          1.4291      6.1748
 1957          1.5951      6.3979
 1958          1.4862      6.3841
 1959          0.9246      3.9183
 1960          1.5134      6.5382
 1961          0.6822      2.9363
 1962          1.8220      7.8735
 1963          1.5594      6.7351
 1964          1.6944      7.1159
 1965          2.1470      8.3940
 1966          1.6759      6.6039
 1967          1.1656      4.7306
 1968          1.1880      4.9887
 1969          1.0754      4.5104
 1970          0.8097      3.4598
 1971          0.7883      3.3937
 1972          1.5209      6.1634
 1973          0.8158      3.3893
 1974          0.9317      3.8779
 1975          1.0687      4.6127
 1976          1.5699      6.4175
```

APPENDIX

Geotechnical Report

December 30, 2019

Ian Smith, RJ Group
Project Manager
222 Grand Avenue, Suite B
Bellingham, WA 98225

RE: Report of Geotechnical Investigation and Engineering
Proposed Multi-family Housing Construction (Aurora Court, Ph. 2)
Traverse Drive and Arctic Avenue
Bellingham, Washington

MTC Project No.: 18B236-01

Dear Mr. Smith:

This letter transmits our Geotechnical Engineering Investigation and Engineering Report for the above-referenced project. Materials Testing & Consulting, Inc. (MTC) performed this geotechnical study in accordance with our Bid for Geotechnical Services, dated August 15, 2019.

We would be pleased to continue our role as your geotechnical engineering consultants during the project planning and construction. We also have a keen interest in providing materials testing and special inspection during construction of this project. We will be pleased to meet with you at your convenience to discuss these services.

We appreciate the opportunity to provide geotechnical services to you for this project. If you have any questions regarding this report, or if we can provide assistance with other aspects of the project, please contact us at (360) 755-1990.

Respectfully Submitted,
MATERIALS TESTING & CONSULTING, INC.

Medhanie Tecle, P.E
Engineering Manager

Mike Furman, G.I.T.
Project Geologist

Attachment: Geotechnical Investigation and Engineering Report

GEOTECHNICAL INVESTIGATION AND ENGINEERING REPORT

PROPOSED MULTI-FAMILY HOUSING DEVELOPMENT

(AURORA COURT PHASE 2)
TRAVERSE DRIVE AND ARCTIC AVENUE
BELLINGHAM, WASHINGTON

Ian Smith, RJ Group
Project Manager
222 Grand Avenue, Suite B
Bellingham, WA 98225

Prepared by:

12/30/2019

Medhanie Tecle, P.E.
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December 30, 2019
MTC Project Number: **18B236-01**

Table of Contents

1.0 INTRODUCTION

1.1 GENERAL

This report presents the findings and recommendations of Materials Testing & Consulting, Inc.'s (MTC) geotechnical engineering study conducted for the design and construction of multi-story apartment-style buildings and associated site development. The project site consists of one lot totaling approximately 4.17 acres located north of Traverse Drive and west of the extension of Arctic Avenue, within north Bellingham. The site location and vicinity are presented in Figure 1 of Appendix A. Exploration locations are shown in Figure 2 of Appendix A1.

In summary, the results of MTC's investigation indicate:

- Soil bearing capacity of 2500 pounds per square foot on shallow medium dense or stiff weathered glacial drift. Soil bearing capacity of 3000 pounds per square foot on deeper very stiff or hard unweathered glacial drift or on a minimum of 18 inches of compacted Gravel Borrow over weathered glacial drift. These values can be used provided included recommendations are followed.

- The predominance of shallow fine-dominant native soils and mottling indicate that onsite infiltration of stormwater is infeasible with traditional infiltration systems. Seasonal perched groundwater should be anticipated in design and construction.

- Site appears to have a very low risk of liquefaction.

The subsurface conditions consist of shallow cover soils (topsoil and local fill) overlying native weathered and unweathered glacial drift soils. The weathered and unweathered native glacial drift soils appear generally suitable for supporting the proposed structure by following the recommendations provided in Sections 5.0 and 6.0. Due to the variability of weathered soils, MTC recommends that we are enlisted to verify that medium dense or stiff soils have been encountered shallowly. Typical depth to suitably medium dense or stiff native soil conditions is approximately 2.0 to 4.0 feet below present grade (BPG), and can range up to 6.5 feet locally.

1.2 PROJECT DESCRIPTION

MTC understands that the project will consist of developing a heavily forested lot north of Traverse Drive and west of the extension of Artic Avenue. A wetland is delineated at the southern end of the site and is included in the currently proposed development area. Preliminary site plans have been provided for general building locations. We expect that construction will utilize shallow perimeter- and column-style footings to support typical loads near present grades.

MTC should be allowed to review the final plans and specifications for the project to ensure that the recommendations presented herein are appropriate. These recommendations and conclusions will need to be re-evaluated in the event that significant changes to the proposed construction are made.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of our study was to explore surface and subsurface conditions at the site and provide geotechnical recommendations for design and construction of the proposed developments. This study includes a brief discussion of site infiltration potential. To evaluate the subsurface soil and water conditions, MTC directed and logged excavator test pits and obtained soil samples. Our scope of services is consistent with that presented in our Bid, dated August 15, 2019.

2.0 SITE EXPLORATION AND LABORATORY TESTING

2.1 SITE EXPLORATION

Site exploration activities were performed on November 5, 2019. The primary exploration involved the observation of fourteen (14) excavator-dug test pits dispersed among the proposed building areas. Test pit locations were chosen on-site by an MTC project geologist in efforts to focus on the developments proposed foundation locations.

Test pits were excavated to depths of 6.9 to 10.5 feet BPG and were terminated at planned depths in generally very stiff or hard soil conditions. Test pit locations are shown on Proposed Site Plans provided in Appendix A1, Figure 2. Approximate exploration locations are based on direct measurements, pacing and compass mapping of existing site features. Additional information on the site exploration program is discussed with our exploration logs in Appendix B of this report.

2.2 LABORATORY TESTING

Laboratory tests were performed on selected soil samples in accordance with ASTM standards to determine index and engineering properties of the site soils. Tests included supplementary soil classification, grain-size distribution analysis, and Atterberg Limit analysis. Laboratory test results are presented on test reports included in Appendix C.

3.0 EXISTING SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The project site is located within the northwest exterior of the City of Bellingham and is currently accessible via Arctic Ave near the Costco Wholesale. The property is currently undeveloped but is adjacent to a multi-family housing development that is currently under construction and just south of the proposed site. More forested land is mapped to the north and no development is present in that area. To the east, Northwest Ave. runs along some semi-developed residences. To the west, the site is bounded by more forested land, before reaching local shipping and sales businesses along Pacific Hwy. The topography within the site is generally flat but has minor undulatory changes across the site. There is a small creek mapped in the site area as well, however, no surface water flow was observed during MTC's initial visit, suggesting seasonal flow could possibly be encountered.

Photo A. Photo showing the generally well-vegetated conditions with slight undulating topography encountered on site.

3.2 AREA GEOLOGY

The *Geologic Map of Western Whatcom County 1:62,500, Washington* published by the U.S. Geological Survey (Easterbrook, 1976) indicates that the site geology is mapped as Bellingham Drift from the Everson Interstade (Q_b). The glacial drift deposits include unsorted, compacted mixtures of pebbly sandy silt and pebbly clay deposited and consolidated by overriding glacial ice.

Shallow soils are mapped by the USDA NRCS *Web Soil Survey* as Urban land-Whatcom-Labounty silt loams with 0 to 8 percent slopes for the entirety of the project site. Theses soils form hillslopes and are formed from volcanic ash and loess deposited over glaciomarine deposits. The soils consist of ashy silt loam becoming loam at depths greater than 16 inches. Depth to the seasonal water table (perched) is typically 18 to 36 inches and the depth to a restrictive feature is typically greater than 80 inches. The soils belong to Hydrologic Soil Group C, with a moderately high capacity to transmit water (Ksat 0.20 to 0.57 in/hr).

Conditions encountered at the study area consisting of fine-grained poorly-sorted blocky soils primarily with sandy upper soils are generally consistent with the available mapped geologic and soil literature which indicate that the site consists of glaciomarine drift.

3.3 SOIL CONDITIONS

A general characterization of on-site soil units encountered during our exploration is presented below. The exploration logs in Appendix B present details of soils encountered at each exploration location.

The on-site soils are generally characterized as follows in stratigraphic order to depth:

- **Organic-Rich Topsoil or Wetland Deposits – Sandy Silt to Silty Sand (SM-ML)**
  Observed in all test pits from the surface down to a maximum depth of 4.1 feet BPG. These soils were consistently organic-rich, damp and soft. In TP-2, 2.7 feet of potentially local fill was observed over an apparent relic topsoil.

- **Weathered Glacial Drift Deposits –Silty Sand with Gravel, (SM, ML, CL):**
  Variable upper native soils interpreted as weathered glacial drift begins at approximately 0.5 to 3.0 feet BPG, is about 1.25 to 3.0 feet thick and was observed in all test pits. This upper soil was encountered above the lower fine-grained drift deposit in all test pits. Weathered drift tended to be light brown in color and had a variable gravel content. Moisture conditions ranged from moist

to very moist and were primarily medium dense or stiff with loose or soft areas. In all test pits, these soils were weathered as indicated by oxidation and scattered orange mottling.

- **Unweathered Glacial Drift Deposits – Sandy Silt, Silty Sand, Sandy Lean Clay with Silt (ML, SM, CL):**
  An unsorted predominantly fine-grained glacial drift was encountered beginning at depths ranging from 2.2 to 6.5 feet BPG to the maximum depths explored in all test pit locations. The soils were generally moist, very-stiff to hard, and had a blocky texture indicating consolidation. The average depth to this unit was about 3.0 to 3.5 feet. TP-2, where shallow local fill was observed had the deepest at 6.5 feet and TP-4 had the shallowest unweathered unit observed. Orange mottling was generally present in the upper 0.5 feet.

3.4 GROUNDWATER CONDITIONS

No surface water was observed on site or nearby, however, a small stream is mapped onsite and is interpreted to be seasonal. Surface conditions were dry with no signs of saturated soils. Additionally, a wetland is delineated in the southern area of the proposed development within the property boundaries. This wetland feature was not inundated with water during our field visit and MTC understands that it will be included in the development area.

A pervasive groundwater table was not encountered in the test pits at the time of the explorations in the mid-fall season. Based on the time of this investigation, it is likely that observed conditions are not indicative of full wet season conditions.

We observed for evidence of seasonal saturation to estimate wet season conditions including potential perched water. Moderate orange-brown oxidation and mottling was observed within the majority of the weathered glacial drift unit and generally within the upper 0.5 feet of the underlying unweathered glacial drift soils. These patterns are interpreted to indicate water infiltration and *seasonal perched water table above a relatively impermeable fine-grained glacial drift soil horizon*. We interpret that seasonal saturation reaches the weathered glacial drift soils due the consistent presence of mottling within this upper deposit.

MTC's scope of investigation did not include direct determination or long-term monitoring of seasonal groundwater elevation variations, conclusive measurement of groundwater elevations at the time of exploration, or deep explorations that may have encountered the regional groundwater table at greater depths past the extent of concern for the proposed construction.

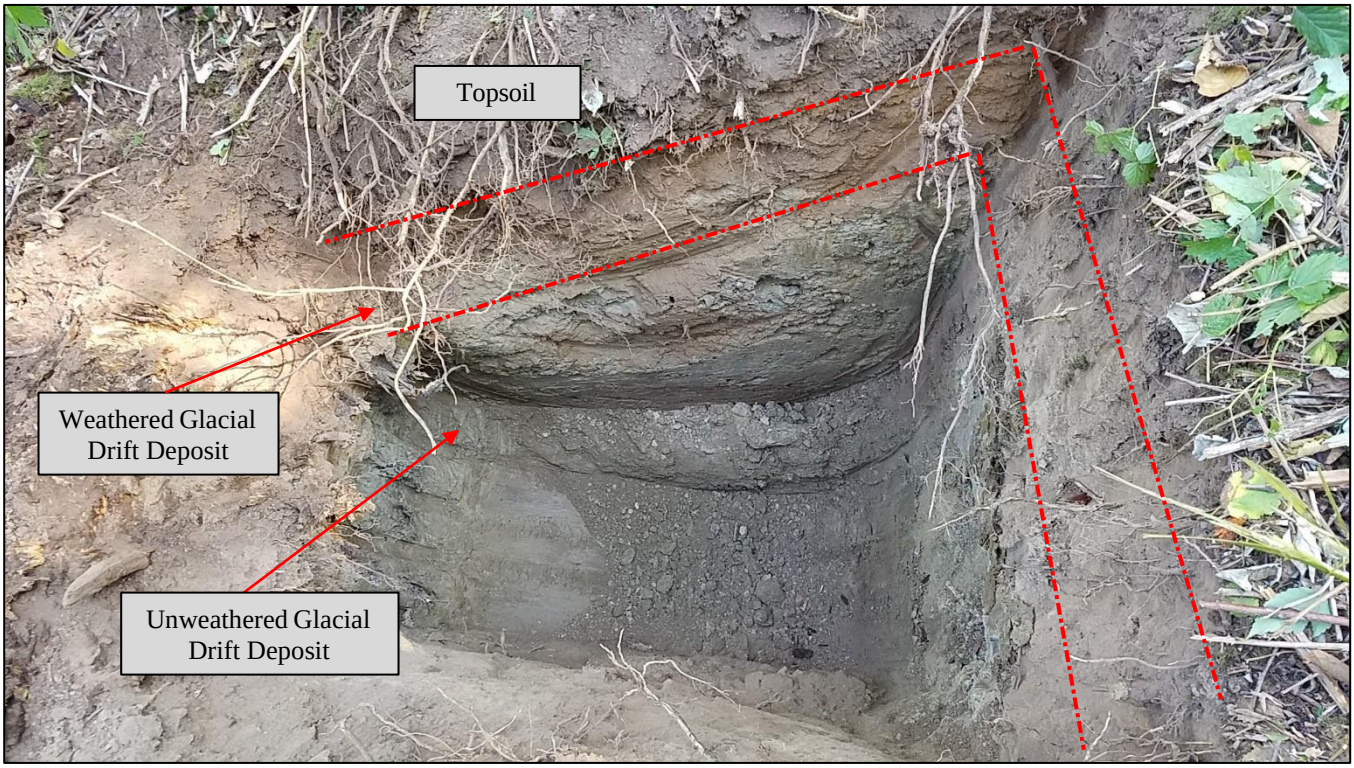

Photo B. Photo showing the general subsurface soil conditions encountered on site. Note the presence of organic native topsoil overlying a light brown weathered glacial drift soil with predominantly gray unweathered glacial drift soils encountered at the base of all excavations.

4.0 KEY GEOLOGIC CONSIDERATIONS

This section discusses geotechnical considerations for project planning and design. This information forms the basis for the geotechnical design recommendations in Section 5.0 and construction recommendations in Section 6.0.

4.1 GENERAL SITE SOIL CONDITIONS

Investigation results indicate that subsurface conditions consist of a medium dense or very stiff shallow weathered glacial deposit overlying a very stiff to hard unweathered glacial drift deposit to maximum depths explored. The upper weathered glacial drift was observed to be highly variable in soil type. About half of these deposits were logged as silty sand, and the remaining half were observed to be primarily fine-grained silt or clay with sand. These upper soils are native to the site and appear weathered due to their consistent mottling and somewhat softer conditions than the underlying unweathered deposit. The weathered deposit was generally stiff or medium dense, though was locally soft (notably in TP-5). The unweathered drift deposit was encountered by 2.2 to 6.5 feet BPG and was generally very stiff to hard.

Generally, these native soil conditions indicate that traditional shallow preparation and construction methods are feasible for the proposed development. Foundation design specifications were not available at the time of this report. MTC assumes that the building will employ continuous perimeter footings as well as isolated interior spread footings with a slab-on-grade floor. The final grade is assumed to be similar to existing grade; therefore, shallow conditions of the existing site soil including existing fill conditions are relevant to slab-on-grade construction.

On-site infiltration does not appear suitable due to the generally fine-grained and/or consolidated soils encountered. The upper weathered drift deposit exhibits orange-brown mottling indicative of shallow perched water conditions above the relatively impermeable fine-grained glacial drift.

4.2 SCOPE OF SITE GRADING

A grading plan was not available to MTC at the time of this report. However, based on discussions with the client and provided conceptual plans as well as observation of existing topography, this study assumes finished site grade will be approximately equal to current grade. Therefore, depths referred to in this report are considered roughly equivalent to final grade.

4.3 TEMPORARY EXCAVATION CUT SLOPES, SHORING, AND DEWATERING

Plans for excavation including temporary cut slopes and proposed shoring methods were not available to MTC at the time of our field exploration and preparation of this report. Excavations are anticipated to be generally shallow and range from approximately 1.5 to 5.0 feet BPG. Section 6.3 of this report provides general recommendations for site-specific treatment of temporary excavations. MTC can provide further consultation, design, and evaluation services for cut slopes if desired. If shoring is required beyond typical OSHA standards, MTC can provide geotechnical engineering services for shoring design upon request.

Dewatering would likely be necessary for shallow excavations if construction occurs in the wet season or during prolonged wet weather due to the potential for perched transient stormwater and restricting native fine-grained drift soil at shallow depths. General recommendations for site preparation and wet weather construction are addressed in section 6.1.3 of this report. This study did not include a hydrogeologic evaluation necessary for an accurate appraisal of site flow conditions or volume estimates. It is only generally suitable for planning and design of dewatering methods.

4.4 HYDROGEOLOGIC CONSIDERATIONS FOR STORMWATER DESIGN

The results of MTC's investigation of the shallow subsurface conditions indicates significant limiting factors are present at the site which are interpreted to impede water transmission. The major site limitations recorded or interpreted include: 1) the likely occurrence of seasonal shallow perched groundwater, and 2) the consistent presence of the very low permeability fine-grained glacial drift below the upper variable drift soils and persisting through maximum depths explored across the site. Due to

these prevalent limitations, the site is interpreted to be infeasible for infiltration by means of traditional infiltration systems. Per current *Department of Ecology SMMWW* standards, full infiltration systems may require 3 to 5 feet of vertical separation between facility base depth and restricting soil or groundwater conditions, both of which are not present at the subject site. Uncontrolled fills are also generally excluded from use for typical infiltration facilities, including the 2.8 feet of fill in TP-2. The site is also considered to be infeasible for smaller LID features such as rain gardens or bioswales that are commonly permitted for use with as little as 1 foot of separation for the same reasons, unless final grade was to be significantly raised from the current level to increase separation which appears unlikely given the proposed redevelopment plan.

Additionally, permeable pavement surfacing appears to be broadly infeasible due to the same reasons listed above. *DOE SMMWW* (2012/2014) standards and feasibility guidelines adopted by the City of Bellingham call for a minimum of 1 foot of relatively conductive native subgrade soils beneath pavement base course material for pervious applications. Restrictive conditions including high perched groundwater during winter months appear present at or just below the surface of the site and preclude the use of permeable pavement at this site.

5.0 DESIGN RECOMMENDATIONS

5.1 FOUNDATION FEASIBILITY

Two requirements must be fulfilled in the design of foundations. First, the loads must be limited to the allowable bearing capacity of the foundation soils to maintain stability. And second, the differential settlement must not exceed an amount that will produce adverse behavior of the structure. Allowable bearing pressure is determined while addressing settlement considerations that include differential settlement. Both shallow and deep soils must be considered because either can cause excess settlement.

At appropriate depths, native soils appear suitable for foundation placement after proper preparation. This assumes loads are typical for the type and materials of construction, appropriate preparation measures are applied, and subgrade soils are verified as suitable at any given foundation location and grade (See Section 5.2). Shallow cover soils consisting of organic-rich topsoil and local fill *are not suitable* to remain below foundations. Pocket Penetrometer results indicate that shallow weathered soils are slightly variable and range between soft to medium dense and or medium-stiff to stiff. Due to the variable and predominantly medium dense nature of the weathered glacial drift, *we recommend that 18 inches of structural backfill (see section 6.2.1) be placed beneath footing elements and that geotextile stabilization fabric be placed prior to backfill below footings placed at shallow depths*. MTC recommends that we are enlisted to verify that medium dense or stiff soils have been encountered following the removal of organic-rich cover soils and local fills and prior to backfill. Typical depth to suitably medium dense or stiff native soil conditions is approximately 1.5 to 2.0 feet BPG, though can range up to about 6.5 feet in areas (TP-5).

We assume the structures will employ a combination of continuous perimeter and interior spread footings with elevated or slab-on-grade interior floors. Foundations and floors are assumed to be placed over structural fills with foundations stepped as needed to accommodate changes in grade. Therefore, shallow soil conditions are directly relevant to footing and slab-on-grade construction. In our opinion, this foundation appears suitable for use given the site conditions encountered and by following the recommendations herein.

Explorations of this study were limited to test pit excavations and Pocket Penetrometer testing. Given the anticipated building loads and style of construction, the suitably very stiff to hard glacial drift conditions present to the maximum depth explored, settlement from deeper conditions is *not* considered a tangible risk to the proposed development. The recommendations presented in the remainder of this report pertain to shallow foundation construction and standard earthwork preparations. These recommendations are provided based on the results of site investigation to date and our understanding of the project scope at this time.

5.2 FOUNDATION RECOMMENDATIONS

Topsoil and uncontrolled organic-rich fill were encountered in the immediate vicinity of the proposed building locations down to a depth of 1.0 to 4.1 feet BPG. These variable surface deposits and low-strength and organic-rich shallow native soils, where present, are unsuitable for direct support of foundations. We recommend these materials be removed from foundation locations and alignments prior to preparing footing subgrades. If any additional uncontrolled fills are encountered, they are also unsuitable and should be stripped and replaced with structural fill material below building locations. Appropriate medium dense or stiff bearing soils were present at different depths around the site.

After excavating to the recommended minimum depth below the footing (18-inches), exposed native subgrade should be carefully evaluated for suitability. Local areas of unsuitably soft or loose subgrade should be additionally over-excavated as needed to establish a suitably firm (medium dense/stiff or greater) subgrade, followed by structural fill placement and compaction (see Table 3 and Section 6.2.2.). In excessively soft areas a geotextile fabric may be used below structural fill for additional stabilization. We recommend that MTC be contacted to observe and verify subgrades at planned cut elevations, and to consult on further spot over-excavation or stabilization measures as necessary.

Following these recommendation, we believe that the prepared conditions will be suitable for bearing shallow perimeter and spread foundation elements.

Assuming site preparations are completed as described herein, we recommend the following:

- **Allowable Soil Bearing Capacity:**
  2,500 pounds per square foot (psf) for footings placed on placed over suitable medium dense or stiff native soils. Additional compacted structural fill placed over these soils per the recommendations presented herein for *Structural Fill Materials and Compaction* is also permitted.

  3,000 pounds per square foot (psf) for footings placed on suitably dense or very stiff unweathered soils Additional compacted structural fill placed over these soils per the recommendations presented herein for *Structural Fill Materials and Compaction* is also permitted.

  The allowable bearing capacity may be increased by 1/3 for transient loading due to wind and seismic events.

- **Minimum Footing Depth:**
  For a perimeter and spread footing system, all exterior footings shall be embedded a minimum of 18 inches and all interior footings shall be embedded a minimum of 12 inches below the lowest adjacent finished grade, but not less than the depth required by design. However, all footings must penetrate to the prescribed bearing stratum cited above, and no footing should be founded in or above organic or loose soils.

- **Minimum Footing Width:**

  Footings should be proportioned to meet stated bearing capacity and/or IBC 2018 (or current) minimum requirements. For a shallow foundation system, continuous strip footings should be at minimum 16 inches wide and interior or isolated column footings at minimum 24 inches wide.

- **Estimated Settlements:**

  We estimate that the maximum total settlements will be approximately 1 inch or less, with a differential settlement of ½ inch or less, over 50 linear feet. Settlement is anticipated to occur primarily when loads are applied during construction.

- **Lateral Load Resistance:**

  Lateral loads can be resisted by passive pressure against buried portions of the foundation elements and sliding resistance along its base. We recommend an allowable lateral pressure equal to that generated by a fluid with an equivalent fluid weight of 200 pcf EFW. This value assumes footings are backfilled with structural fill and includes a factor of safety of two. The upper 18 inches of soil should be ignored unless the area is paved or covered with concrete, due to soil softening associated with freeze/thaw cycles. For footing elements placed directly against stiff shallow native soils, we recommend allowable lateral pressure be reduced to 100 pcf EFW.

  Sliding resistance between the footing base and subgrade soils can be accounted to lateral resistance. For footings placed over native glacial drift an allowable coefficient of friction of 0.20 may be applied. For footings placed over structural fill an allowable coefficient of friction of 0.35 may be applied. This value assumes concrete placed directly on structural fill and includes a factor of safety of at least 1.5.

- **Footing Drains:**

  Due to the fine-grained soils at the subject site and evidence for perched water conditions that develop during the winter season, MTC recommends exterior foundations employ footing drains to help maintain unsaturated subgrade. Footing drains should employ 4-inch minimum perforated pipe and be backfilled with free-draining material (as specified below for wall drainage) wrapped in filter fabric. Footing drains should be tightline piped separately from roof drains to a catch basin system or suitable discharge point at least 10 feet from the structure. A schematic illustration of a typical footing drain is shown in Illustration A.

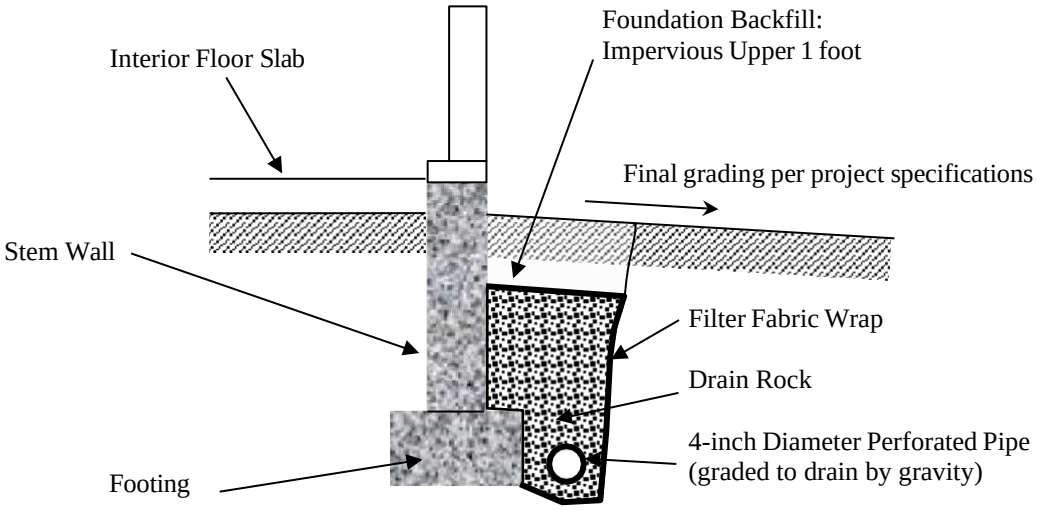

Illustration A. Footing Drain Schematic Profile

5.3 SLAB-ON-GRADE CONSTRUCTION

A slab-on-grade floor may be employed for building interior areas. Interior floors and ancillary walkways/loading areas are assumed to be subject to light live loading from foot traffic and typical dead loads. After stripping topsoil, uncontrolled fill soil, and other loose or soft soils (*if present*), shallow site conditions are anticipated to be glacial drift soils of generally suitable quality (medium dense or stiff). Slab subgrades should be verified as firm and unyielding during construction as localized soft weathered glacial drift soils may be encountered during site grading. Any disturbed coarse-grained soils should be recompacted prior to applying slab base fills. Any disturbed fine-grained soils should be removed and replaced with appropriate structural fill (Common Borrow). MTC recommends the following activities and parameters for slab-on-grade design and construction intended to provide reinforcement against shallow soil variations and potential adverse effects of differential settlement under typical light loading conditions.

- **Subgrade Modulus:**
  A Subgrade Modulus (k) of 100 pci is allowed for use in the design of slabs constructed over suitably stiff weathered native drift soils.

  A Subgrade Modulus (k) of 200 pci is allowed for use in the design of slabs constructed over very stiff or hard unweathered native drift soils or over imported, compacted structural fill of minimum 12-inch thickness following compaction of the underlying native soils.

- **Base Pad:**
  A 12-inch minimum section of structural fill base is recommended to be installed beneath all floor slabs. Base pad material may consist of gravel borrow, as recommended herein for general

structural fill application, or a similar material of equivalent function as approved by the geotechnical engineer. As noted below, capillary break material can account for a portion of this base fill section is composed of compacted angular material approved as structural fill.

The minimum base pad thickness assumes construction will occur in the dry season during good weather conditions. If work occurs in the spring or fall or during prolonged wet weather, the pad thickness may need to be increased for constructability over moisture-sensitive subgrades, and ground stabilization fabric may be needed. Because of these concerns, we recommend that slab construction is not conducted in the winter months if possible.

- **Proof Roll:**
  Prior to placement of capillary break material and slab construction, the proposed slab subgrade or structural fill pad, if installed, shall be proof-rolled to confirm no soft or deflecting areas are present. This is to ensure the existing base is evenly prepared and adequate for the support of the slab. MTC recommends that we are contacted for observation of the proof roll and final visual confirmation of prepared base suitability. Areas of excessive rutting, pumping, or yielding shall be excavated and backfilled with new structural fill as described herein. *In circumstances where this seems unfeasible, an MTC representative may use alternative methods for subgrade evaluation.*

- **Capillary Break:**
  A capillary break is recommended to maintain a dry slab floor and reduce the potential for floor damage resulting from shallow perched water. To provide a capillary moisture break, a 6-inch thick, properly compacted granular mat consisting of open-graded, free-draining angular aggregate is recommended below floor slabs. To provide additional slab structural support, and to substitute for a structural fill base pad where specified, MTC recommends the capillary break should consist of crushed rock all passing the 1-inch sieve and no more than 3 percent (by weight) passing the U.S. No. #4 sieve, compacted in accordance with Section 6.2.2 below.

- **Vapor Barrier:**
  A vapor retarding membrane such as 10-mil polyethylene film should be placed beneath all floor slabs to prevent transmission of moisture where floor coverings may be affected. Care should be taken during construction not to puncture or damage the membrane. To protect the membrane, a layer of sand no more than 2 inches thick may be placed over the membrane if desired.

- **Structural Design Considerations:**
  MTC assumes design and specifications of slabs will be assessed by the project design engineer or architect. We suggest a minimum unreinforced concrete structural section of 6.0 inches be considered to help protect against cracking and localized settlement, especially where traffic loads are anticipated. It is generally recommended that any floor slabs and annular exterior concrete

paving subject to vehicular loading be designed to incorporate reinforcing, and additional base fills as necessary to ensure support of design loads.

5.4 SEISMIC DESIGN PARAMETERS AND LIQUEFACTION POTENTIAL

According to the *Liquefaction Susceptibility Map of Whatcom County, Washington* and the accompanying *Seismic Site Class Map* (Palmer et al., 2004), the site location is identified as having a *low to moderate* liquefaction susceptibility. Liquefaction is a phenomenon associated with a subsurface profile of relatively loose, cohesionless (coarse-grained) soils saturated by groundwater. Under seismic shaking the pore pressure can exceed the soil's shear resistance and the soil 'liquefies', which may result in excessive settlements that are damaging to structures and disruptive to exterior improvements. The Seismic Site Class Map (Palmer et al., 2004) classifies the project area as Site Class D, representing a relatively moderate potential for the increased amplitude of ground shaking during a seismic event. Based on the results of site explorations, MTC interprets the site to have a low risk of liquefaction due to the presence of intact fine-grained glacial drift soils encountered at shallow depths.

The *OSHPD Seismic Design Maps Tool* (available online) was used to determine site-specific seismic design coefficients and spectral response accelerations for the project site assuming design Site Class D, representing a subsurface profile (upper 100 feet) of soil. Parameters in Table 1 were calculated using 2008 USGS hazard data and 2012/2015 International Building Code standards:

Table 1. Seismic Design Parameters – Site Class D

Mapped Acceleration Parameters (MCE horizontal)	S_S	0.953 g
	S_1	0.374 g
Site Coefficient Values	F_a	1.1119
	F_v	1.652
Calculated Peak SRA	S_{MS}	1.066 g
	S_{M1}	0.618 g
Design Peak SRA (*2/3 of peak*)	S_{DS}	0.711 g
	S_{D1}	0.412 g
Seismic Design Category – Short Period (0.2 Second) Acceleration		D
Seismic Design Category – 1-Second Period Acceleration		D

5.5 STORMWATER FEASIBILITY DISCUSSION

As discussed in the above Section 4.4, site conditions present limitations for use of traditional infiltration stormwater controls per the *Department of Ecology SMMWW* guidelines. Shallow field explorations yielded soil stratigraphy consisting of topsoil, local fills, or organic-rich wetland deposits encountered to 0.5 to 4.1 feet BPG. Below these cover soils, variable weathered native glacial soils extend to 2.2 to 7.0 feet BPG. The weathered deposits overlie consistently fine-grained native glacial drift soils. The upper

weathered glacial drift soils were characterized by their orange oxidation and mottling indicating regular interaction with perched water conditions at shallow depths. Our field investigation during the fall season did not encounter seepage or perched water. The low permeability fine-grained glacial drift soil and the consistent mottling patterns suggest that a perched water table likely develops within this horizon during wet, winter months and / or storm events. Due to these reasons, the site is considered infeasible for traditional infiltration design. From a geotechnical standpoint, tying into the public utility conveyance or construction of a detention facility would be most preferable.

6.0 CONSTRUCTION RECOMMENDATIONS

6.1 EARTHWORK

6.1.1 Excavation

Excavations can generally be performed with conventional earthmoving equipment such as bulldozers, scrapers, and excavators. Where possible, excavations made within about one foot of finished subgrade level should be performed with smooth-edged buckets to minimize subgrade disturbance and the potential for softening to the greatest extent practical.

6.1.2 Subgrade Evaluation and Preparation

After excavations have been completed to the planned subgrade elevations, but before placing fill or structural elements, the exposed subgrade soils should be evaluated under the full-time observation and guidance of an MTC representative. Where appropriate, the subgrade should be proof-rolled with a minimum of two passes with a fully loaded dump truck, water truck or scraper. *In circumstances where this seems unfeasible, an MTC representative may use alternative methods for subgrade evaluation.*

Any loose soil coarse-grained soil should be compacted to a firm and unyielding condition and at least to 95 percent of the modified Proctor maximum dry density per ASTM D1557. Any areas that are identified as being soft or yielding during subgrade evaluation should be over-excavated to a firm and unyielding condition or to the depth determined by the geotechnical engineer. Where over-excavation is performed below a structure, the over-excavation area should extend beyond the outside of the footing a distance equal to the depth of the over-excavation below the footing. The over-excavated areas should be backfilled with properly compacted structural fill.

6.1.3 Site Preparation, Erosion Control and Wet Weather Construction

The silty sand, silt, and clay native soils at proposed excavation depth are highly moisture sensitive and will become soft and difficult to compact or traverse with construction equipment when wet. During wet weather, the contractor should take measures to protect the exposed subgrades, limit construction traffic and minimize earthwork activities.

Once the geotechnical engineer has approved the subgrade, further measures should be implemented to prevent degradation or disturbance of the subgrade. These measures could include but are not limited to, placing a layer of crushed rock or lean concrete on the exposed subgrade, or covering the exposed subgrade with a plastic tarp and keeping construction traffic off the subgrade. Once subgrade has been approved, if any disturbance occurs because the subgrade was not protected, it should be repaired by the contractor.

During wet weather, earthen berms or other methods should be used to prevent runoff from draining into excavations. All runoff should be collected and disposed of properly. Measures may also be required to

reduce the moisture content of on-site soils in the event of wet weather. These measures can include but are not limited to, air-drying, soil amendment, etc.

Since the silt- and clay-rich native soils will be difficult to work with during periods of wet weather due to elevated soil moisture content, and frozen soil is not suitable for use as structural fill, we recommend that earthwork activities take place in late spring, summer or early fall. In addition, summer may be the most preferable time for major earthwork construction, corresponding to the period of generally lowest perched ground water occurrences. Native soils exhibited a very high moisture content and may require amendment in the summer months, if permitted for reuse.

Dewatering efforts may be required depending on total excavation depth, season of construction, and weather conditions during earthwork. MTC recommends major earthwork activities take place during the dry season if possible to minimize the potential for seasonal high groundwater levels near proposed excavation depth, and to reduce seepage occurrences from perched water conditions. It should be understood that some amount of water seepage from shallow sources or perched lenses may be unavoidable year-round.

6.2 STRUCTURAL FILL MATERIALS AND COMPACTION

6.2.1 Materials

All material placed below structures or pavement areas shall be free of deleterious material, have a maximum particle size of 6 inches, not contain organic soil or topsoil, and can be compacted to the required compaction level. Deleterious material includes wood, organic waste, coal, charcoal, or any other extraneous or objectionable material.

Structural material used beneath **footings** shall meet WSDOT 9-03.14(1) definition of **Gravel Borrow.** Aggregate for gravel borrow shall consist of granular material, either naturally occurring or processed, and shall meet the gradation requirements of Table 2.

Table 2. WSDOT Definition of Gravel Borrow

Gravel Borrow	
Sieve Size	% Passing by weight
4"	99-100
2"	75-100
No. 4	50-80
No. 40	30 max.
No. 200	7.0 max.
Sand Equivalent	50 min.

WSDOT 9-03.14(1)

Soil used beneath slabs, parking lots, and pavement shall meet WSDOT 9-03.14(3) definition of Common Borrow. Material for common borrow shall consist of granular or nongranular soil and/or aggregate. The material shall meet one of the options in Table 3.

Table 3. WSDOT Definition of Common Borrow

Soil Plasticity Table			
Option	Sieve Size	% Passing by weight	Plasticity Index
1	No. 200	0 – 12	N/A
2	No. 200	12.1 – 35	6 or less
3	No. 200	Above 35	0 (Non-plastic)

WSDOT 9-03.14(3)

Excavated native soils consisting primarily of silty sand, silt, and clay are not anticipated to be suitable for re-use as structural fill due to low gravel content and elevated fines content. Silty sand may be eligible for limited reuse, such as for utility trench backfill outside of paved areas, depending on project specifications and laboratory results.

The client may wish to create separate stockpiles of excavated native soil during construction for potential re-use on site as common borrow beneath slabs, pavement, and parking lots. The material can be retested against the WSDOT Common Borrow Spec 9-03.14(3). They may be eligible provided the materials are carefully removed and stored to prevent sediment cross-contamination, visually confirmed prior to placement, appropriate moisture content can be achieved, and placed in accordance with the recommendations provided below for Placement and Compaction. During warm, dry weather, it may be necessary to add water to these soils after residing in stockpiles. The condition and suitability of stockpiled on-site materials should be verified prior to reuse as common borrow. Material properties of re-used fill shall meet project specifications for the intended use.

Appropriate imported material can be used as structural fill. Imported structural fill material should conform to Section 9-03.14(1), Gravel Borrow, of the most recent edition (at the time of construction) of the State of Washington Department of Transportation *Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT Standard Specifications).*

Controlled-density fill (CDF) or lean mix concrete can be used as an alternative to structural fill materials, except in areas where free-draining materials are required or specified. Frozen soil is not suitable for use as structural fill. Fill material may not be placed on frozen soil.

The contractor should submit samples of each of the required earthwork materials to the geotechnical engineer for evaluation and approval prior to delivery to the site. The samples should be submitted at least 5 days prior to the materials' delivery to site and sufficiently in advance of the work to allow the contractor to identify alternative sources if the material proves unsatisfactory.

6.2.2 Placement and Compaction

Prior to placement and compaction, structural fill should be moisture conditioned to within 2 percentage points of its optimum moisture content for coarse-grained soils and 3 percentage points of its optimum moisture content for fine-grained and mixed soils. Individual lifts of structural fill shall not exceed 6 inches, in loose state, for compactive efforts using walk-behind or hand-operated compaction equipment, 8 inches using light to medium-duty rollers, and 12 inches using heavy-duty compaction equipment.

All structural fill shall be compacted to a dense and unyielding condition and to a minimum percent compaction based on its modified Proctor maximum dry density as determined per ASTM D1557. Structural fill placed beneath each of the following shall be compacted to the indicated percent compaction:

Foundation and Floor Slab Subgrades:	95 Percent
Pavement Subgrades (upper 2 feet):	95 Percent
Pavement Subgrades (below 2 feet):	90 Percent
Utility Trenches (upper 4 feet):	95 Percent
Utility Trenches (below 4 feet):	90 Percent

We recommend that fill placed on slopes steeper than 3:1 (H:V) be 'benched' in accordance with hillside terraces entry of section 2-03.3(14) of the WSDOT Standard Specifications.

We recommend structural fill placement and compaction be observed on a full-time basis by an MTC representative. A sufficient number of tests shall be performed to verify compaction of each lift. The number of tests required will vary depending on the fill material, its moisture condition and the equipment being used. Initially, more frequent tests will be required while the contractor establishes the means and methods required to achieve proper compaction.

6.3 TEMPORARY EXCAVATIONS AND SLOPES

All excavations and slopes must comply with applicable local, state, and federal safety regulations. Construction site safety is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing soil type information solely as a service to our client for planning purposes. Under no circumstances should the information be interpreted to mean that MTC is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not implied and should not be inferred.

Based on our soil characterization, the near-surface soils at the site classify as OSHA Type A soils. Temporary excavations in the glacial should be inclined no steeper than 1.5H:1V, although locally steeper grades may be approvable depending on actual conditions encountered, season of construction, and depth

of excavation. Soil stockpiles or other surcharge loads should not be allowed near the top of any excavation. Heavy construction equipment, building materials, excavated soil, and vehicular traffic should not be allowed near the top of any excavation. Where the stability of adjoining walls or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning may be required to provide structural stability and to protect personnel working within the excavation. Earth retention, bracing, or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Washington.

Temporary excavations and slopes should be protected from the elements by covering with plastic sheeting or some other similar impermeable material. Sheeting sections should overlap by at least 12 inches, sealed or curved to prevent water from passing between, and be tightly secured with sandbags, tires, staking, or other means to prevent wind from exposing the soils under the sheeting.

6.4 PERMANENT SLOPES

MTC recommends that new areas of permanent slopes including fill embankments be inclined no greater than 3H:1V. Permanent slopes should be planted with a deep-rooted, rapid-growth vegetative cover as soon as possible after completion of slope construction. Alternatively, the slope should be covered with plastic, straw, etc. until it can be landscaped.

6.5 UTILITY TRENCHES AND EXCAVATIONS

The contractor shall be responsible for the safety of personnel working in utility trenches. Given that steep excavations in soils on site may be prone to caving, we recommend all utility trenches, but particularly those greater than 4 feet in depth, be supported in accordance with state and federal safety regulations including trench-shield or shoring as appropriate. See slope recommendations in Section 6.3

Pipe bedding material should conform to the manufacturer's recommendations and be worked around the pipe to provide uniform support. Cobbles exposed in the bottom of utility excavations should be covered with pipe bedding or removed to avoid inducing concentrated stresses on the pipe.

Trench backfill should be placed and compacted as structural fill as recommended in Section 6.2. Particular care should be taken to insure bedding or fill material is properly compacted to provide adequate support to the pipe. Jetting or flooding is not a substitute for mechanical compaction and should not be allowed.

7.0 ADDITIONAL RECOMMENDED SERVICES

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during construction to verify compliance with these recommendations. Testing and observations performed during construction should include, but not necessarily be limited to, the following:

- Geotechnical plan review and engineering consultation as needed prior to construction phase,
- Observations and testing during site preparation, earthwork, structural fill, and pavement section placement,
- Consultation on temporary excavation cut slopes and shoring if needed,
- Testing and inspection of any concrete or masonry included in the final construction plans, and
- Consultation as may be required during construction.

We strongly recommend that MTC be retained for the construction of this project to provide these and other services. Our knowledge of the project site and the design recommendations contained herein will be of benefit in the event that difficulties arise and either modifications or additional geotechnical engineering recommendations are required or desired. We can also, in a timely fashion, observe the actual soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

We further recommend that project plans and specifications be reviewed by us to verify compatibility with our conclusions and recommendations.

Also, MTC retains fully accredited, WABO-certified laboratory and inspection personnel, and is available for this project's testing, observation and inspection needs. Information concerning the scope and cost for these services can be obtained from our office.

8.0 LIMITATIONS

Recommendations contained in this report are based on our understanding of the proposed development and construction activities, our field observations and explorations, and our laboratory test results. It is possible that soil and groundwater conditions could vary and differ between or beyond the points explored. If soil or groundwater conditions are encountered during construction that vary or differ from those described herein, we should be notified immediately in order to review and provide supplemental recommendations. If the scope of the proposed construction, including the proposed loads or structural locations, changes from that described in this report, we should be notified to review and provide supplemental recommendations.

We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty, expressed or implied, is made. The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be conducted by MTC during the construction phase in order to evaluate compliance with our recommendations.

This report may be used only by the Client and their design consultants and only for the purposes stated within a reasonable time from its issuance, but in no event later than 18 months from the date of the report. It is the Client's responsibility to ensure that the Designer, Contractor, Subcontractors, etc. are made aware of this report in its entirety. Note that if another firm assumes Geotechnical Engineer of Record responsibilities they need to review this report and either concur with the findings, conclusions, and recommendations or provide alternate findings, conclusions and recommendation under the guidance of a professional engineer registered in the State of Washington.

Land or facility use, on- and off-site conditions, regulations, or other factors may change over time, and additional work may be required. Based on the intended use of the report, MTC may recommend that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release MTC from any liability resulting from the use of this report. The Client, the design consultants, and any unauthorized party, agree to defend, indemnify, and hold harmless MTC from any claim or liability associated with such unauthorized use or non-compliance. We recommend that MTC be given the opportunity to review the final project plans and specifications to evaluate if our recommendations have been properly interpreted. We assume no responsibility for misinterpretation of our recommendations.

The scope of work for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

9.0 REFERENCES CITED

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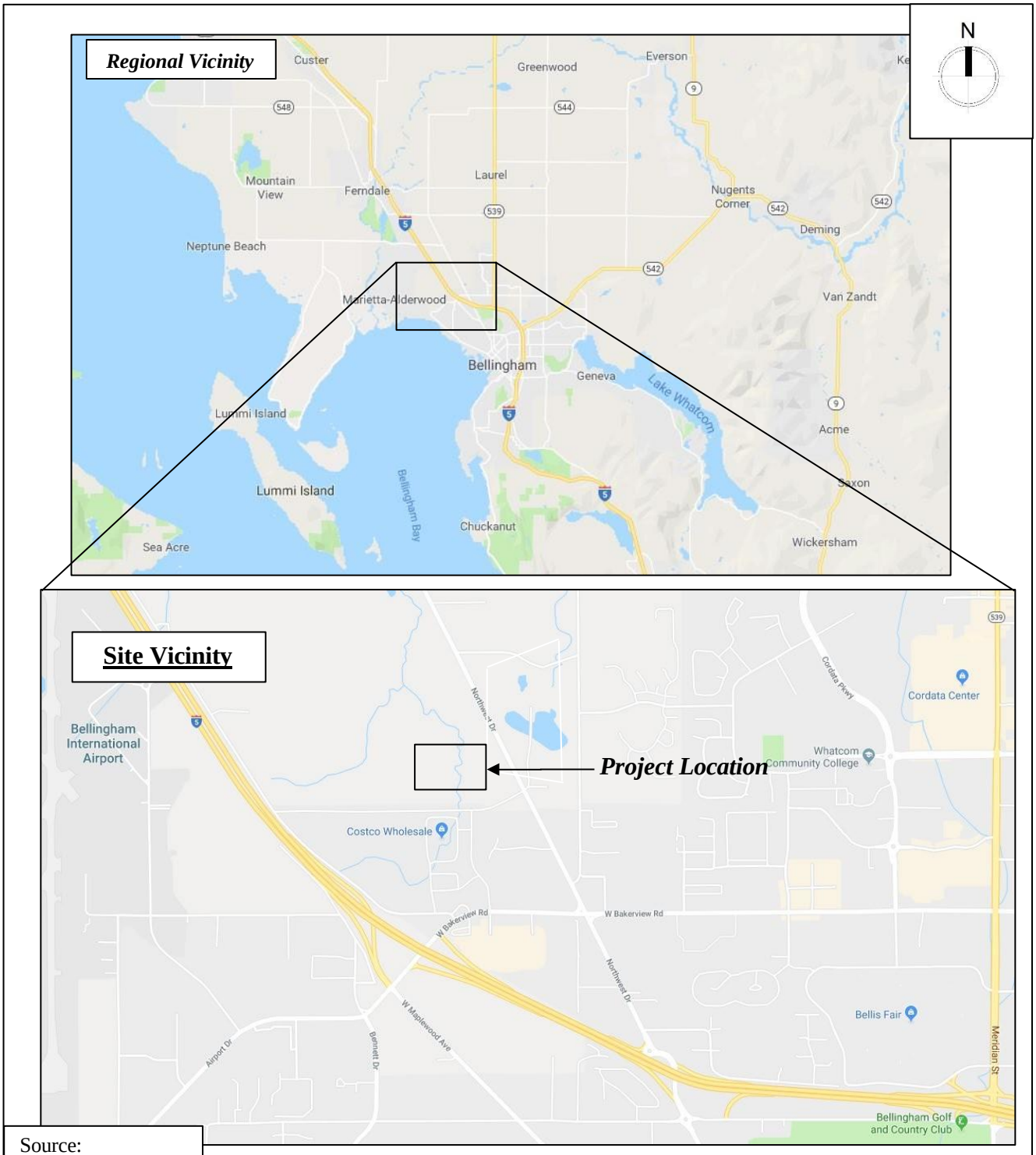
United States Department of Agriculture, 2018, Web Soil Survey: https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

Washington Department of Transportation, 2018, Standard Specifications for Road, Bridge, and Municipal Construction: M 41-10, Washington Department of Transportation.

Appendix A. SITE LOCATION AND VICINITY



Source:
Google Maps, 2018

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Site Location & Vicinity Maps** Aurora Court, Ph 2 Traverse Dr. & Arctic Ave. Bellingham, WA	**FIGURE** **1**

A. 1 EXPLORATION LOCATIONS

0 60

SCALE (FEET)
1" = 65' Approximate

N

Base Map: Proposed Site Development
Source: Freeland & Associates (8/13/19)
Modified by MTC: 12/5/19
NOT INTENDED FOR CONSTRUCTION

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Locations** Aurora Court, Ph 2 Traverse Dr. & Arctic Ave. Bellingham, WA	**FIGURE** **2**

Appendix B. EXPLORATION LOGS

Exploration logs are shown in full in this appendix for test pit exploration. The test pit excavations were monitored by our field geologist who examined and visually classified the materials encountered in accordance with the Unified Soil Classification System (USCS), obtained representative soil samples, and recorded pertinent information including soil sample depths, stratigraphy, soil engineering characteristics, and groundwater occurrence. Soil samples were placed in plastic bags to limit moisture loss, labeled, and returned to our laboratory for further examination and testing. Upon completion, test pits were backfilled with excavated soils.

The stratification lines shown on the individual logs represent the approximate boundaries between soil types; actual transitions may be either more gradual or more severe. The conditions depicted are for the date and location indicated only, and it should not necessarily be expected that they are representative of conditions at other locations and times.

USCS - UNIFIED SOIL CLASSIFICATION SYSTEM (per ASTM D2487)

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than half of material is larger than the #200 sieve Silt and / or Clay content as specified in log	GRAVEL Gravel > Sand More than half of coarse fraction is larger than #4 sieve	CLEAN GRAVEL with less than 5% fines	GW	WELL-GRADED GRAVEL < 5% fines
			GP	POORLY-GRADED GRAVEL < 5% fines
		GRAVEL with over 12% fines	GM	SILTY GRAVEL > 12% fines (Silt > Clay)
			GC	CLAYEY GRAVEL > 12% fines (Clay > Silt)
	SAND Sand > Gravel More than half of coarse fraction is smaller than #4 sieve	CLEAN SAND with less than 5% fines	SW	WELL-GRADED SAND < 5% fines
			SP	POORLY-GRADED SAND < 5% fines
		SAND with over 12% fines	SM	SILTY SAND > 12% fines
			SC	CLAYEY SAND > 12% fines
FINE-GRAINED SOILS More than half of material is fines (smaller than the #200 sieve) Sand and / or Gravel content as specified in log	SILT AND CLAY Lean: low to medium plasticity (Liquid limit less than 50)		ML	INORGANIC SILT lean, low-plasticity Silt
			CL	INORGANIC CLAY lean, low-plasticity Clay
			OL	ORGANIC SILT OR CLAY, lean, low-plasticity, retains high moisture
	SILT AND CLAY Fat: medium to high plasticity (Liquid limit greater than 50)		MH	INORGANIC SILT, high-plasticity, fat silt, may be micaceous
			CH	INORGANIC CLAY, high-plasticity, fat Clay
			OH	ORGANIC SILT OR CLAY, fat, high-plasticity, retains high moisture
HIGHLY ORGANIC SOILS			PT	PEAT, humus, swamp soils, predominantly organics

LOG SYMBOLS

SAMPLES
- SPT Standard Penetration Test
- Grab or bulk
- California or D&M (3.0" OD)
- Shelby Tube

WATER TABLE
- Groundwater Level (where first encountered)
- Groundwater Level (measured after completion)
- Perched Groundwater Level (during exploration)

STRATIGRAPHIC CONTACT (Field identified)
- Distinct stratigraphic contact between soil strata
- Gradual change between soil strata
- Approximate location of stratigraphic change

DENSITY OF COARSE-GRAINED SOIL

APPARENT DENSITY	SPT Blows / foot
Very Loose	< 4
Loose	4 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

CONSISTENCY OF FINE-GRAINED SOIL

ESTIMATED CONSISTENCY	SPT Blows / foot
Very Soft	< 2
Soft	2 - 4
Medium Stiff	4 - 8
Stiff	8 - 15
Very Stiff	15 - 30
Hard	> 30

DEFINITIONS OF SOIL SIZES

SOIL COMPONENT	GRAIN SIZE (inch)	GRAIN SIZE (mm)
Boulder	> 12 in.	> 305
Cobbles	3 in. to 12 in.	75 to 305
Gravel	3 in. to # 4	75 to 4.75
Coarse Gravel	3 in. to 3/4 in.	75 to 19
Fine Gravel	3/4 in. to # 4	19 to 4.75
Sand	# 4 to # 200	4.75 to 0.075
Coarse Sand	# 4 to # 10	4.75 to 2.00
Medium Sand	# 10 to # 40	2.00 to 0.425
Fine Sand	# 40 to #200	0.425 to 0.075
Fines (Silt or Clay)	< #200	< 0.075

MODIFIERS (see USCS and Notes)

DESCRIPTION	%
Trace	<5%
With Clay, With Silt	5 - 12% Fines
Clayey, Silty	>12% Fines
Some (in general)	5 - 15%
With Sand, With Gravel	15 - 30% Coarse
Sandy, Gravelly	>30% Coarse

NOTES
- USCS evaluated by field observations and by laboratory analyses if conducted.
- Poorly-Graded (GP or SP) indicate inequal content of grain size within subgroup (e.g. coarse, medium, fine sand). Calculated using 10%, 30%, and 60% grain size.
- Combination names (e.g. SP-SM Poorly-Graded SAND with silt) represent fines content between 5% and 12%. Fines content is dominantly either clay (C) or silt (M).
- CL-ML represents Silty Clay upon similar percent of each per Atterberg test.
- A soil description of "with Sand" or "with Gravel" represents greater than 15% coarse material, and dominant coarse soil is the one specified.

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98226	**USCS Classification Chart** Aurora Court Ph 2 Traverse Dr. & Arctic Ave. Bellingham, WA	**FIGURE** **3**

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Log of Test Pit TP-1

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : NE corner Building 11
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SANDY SILT, minor to trace gravel up to 1", soft, dry. Heavy organics (roots) DARK BROWN **TOPSOIL**				
1	SM-ML		SILTY SAND to SANDY SILT, minor gravel up to 1", medium dense or stiff to dense or hard with depth, dry to moist, some organic matter from 2.1'-3.2'. LIGHT BROWN **3.0 t/sf (pocket pen)** **Weathered Glacial Drift**		X		
2							
3					X	59.2%	7.6%
4	ML		SANDY SILT w/ clay, some gravel up to 2", blocky, very stiff to hard, moist. GRAY. **3.5-4.0 t/sf (pocket pen)** Blocky texture observed in spoils. **Unweathered Glacial Drift**				
5							
6					X		
7							
8							
9			T.D.@ 8.3' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				
10							
11							

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Log of Test Pit TP-2

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : NE center Building 12
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0–2	ML-SM		SANDY SILT to SILTY SAND, some gravel up to 2", dense to hard, dry to slightly moist. Some scattered organic content (roots, woody debris, charcoal). LIGHT BROWN **TOPSOIL / POTENTIAL LOCAL FILL**		⊠		
3–4	ML		SILT with some SAND, soft, moist. Some roots with heavy organic silt. DARK BROWN **1.5 t/sf (pocket pen)** **Relic Topsoil**				
4–6	SM		SILTY SAND with some gravel up to 2", medium dense, moist. GRAY with some scattered mottling and about ~40% fines. **Weathered Glacial Drift**		⊠		
7–8	ML		SANDY SILT with clay and some gravel up to 2", hard, moist, GRAY. Blocky texture observed in spoils. **Unweathered Glacial Drift**				
9–11			T.D.@ 8.8' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

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Log of Test Pit TP-3

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : SE center Building 13
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SILT with some SAND, soft, moist, strong organic content (roots, tree stump remains). DARK BROWN **TOPSOIL**				
1	SM		SILTY SAND with some gravel up to 2", medium dense to dense, moist. LIGHT BROWN with some scattered mottling from 2.0'-2.7'.				
2			Slight blocky texture observed. **4.0 t/sf (pocket pen)** **Weathered Glacial Drift**				
3	CL		SANDY CLAY with silt and some gravel up to 1.5", hard, moist. GRAY with faint orange mottling in upper 0.5'. **4.5 t/sf (pocket pen)**				
4			Blocky texture observed throughout. **PL/Ip: 16.7% / 16.5%** **Unweathered Glacial Drift**			60.0%	13.5%
5							
6							
7							
8			T.D.@ 7.5' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				
9							
10							
11							

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Log of Test Pit TP-4

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : SE corner Building 14
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SANDY SILT, trace gravel up to 3/4", soft, moist. Strong organic content (roots). DARK BROWN **TOPSOIL**				
1	SM		SILTY SAND with some gravel up to 1.5", medium dense to dense, moist. Minor organics including roots. LIGHT GRAY with some scattered mottling and ~30-40% fines. **4.0 t/sf (pocket pen)** **Weathered Glacial Drift**		☒		
2							
3	CL		SANDY LEAN CLAY, some gravel up to 2", trace cobbles up to 3", hard, moist. GRAY with minor orange mottling in upper 0.5' **4.0-4.5 t/sf (pocket pen)** **Unweathered Glacial Drift**				
4					☒		
5			Blocky texture observed throughout.				
6							
7							
8							
9			T.D.@ 8.3' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				
10							
11							

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Geotechnical Engineering Services

Log of Test Pit TP-5

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : SE center Building 10
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SILT, soft, moist, strong organic content (roots). DARK BROWN **ORGANIC WETLAND DEPOSITS** Ashy lenses observed at 2.3' BPG.				
4	CL		LEAN CLAY with SAND and some gravel up to 2", soft, very moist. LIGHT BROWN to GRAY **PL/lp: 18.2% / 14.1%** **Weathered Glacial Drift** **0-0.5 t/sf (pocket pen)**		☒	80.8%	31.5%
7	CL		LEAN CLAY with SAND and some gravel up to 2", very stiff, moist. GRAY Blocky texture observed throughout. 3' boulder observed at 8' BPG increase in gravel & cobbles to ~10% **3.0-3.5 t/sf (pocket pen)** **Unweathered Glacial Drift**		☒		
11			T.D.@ 10.5' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

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Log of Test Pit TP-6

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 5
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0–2	ML		SILT, soft, moist, strong organic content (roots). DARK BROWN **TOPSOIL**				
2–4	SM		SILTY SAND with trace gravel up to 1", medium dense, moist. Minor organics including roots. Light GRAY w/ some scattered mottling ~30-40% fines. **3.5 t/sf (pocket pen)** **Weathered Glacial Drift**		☒		
4–9	ML		SANDY SILT with some clay and minor to trace gravel up to 1", very stiff to hard, moist. GRAY **3.75-4.25 t/sf (pocket pen)** **Unweathered Glacial Drift**		☒		
9			T.D.@ 9.0' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

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Burlington, WA
Geotechnical Engineering Services

Log of Test Pit TP-7

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 4
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SANDY SILT, soft, moist, strong organic content (roots). DARK BROWN **TOPSOIL**				
1	SM-ML		SILTY SAND to SANDY SILT, very stiff or medium dense, moist, some organics. LIGHT BROWN with orange mottling throughout ~50% fines **3.5 t/sf (pocket pen)** **Weathered Glacial Drift**		☒		
3	ML		SANDY SILT with some clay and minor gravel up to 1.5", very stiff to hard, moist. GRAY with some scattered orange mottling in upper 1.0'. **4.0 t/sf (pocket pen)** Blocky texture observed throughout. **Unweathered Glacial Drift**		☒		
9			T.D.@ 8.5' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

12-30-2019 Z:\Burlington Office\Geotechnical Services\2 Bham\2019\Aurora Court P2 Geotech\TP logs\TP-7.bor

Materials Testing And Consulting
Burlington, WA
Geotechnical Engineering Services

Log of Test Pit TP-8

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 3
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0–1	ML		SILT, soft, moist, strong organic content (roots). DARK BROWN **TOPSOIL**				
2–3	SM		SILTY SAND, trace gravel up to 1", medium dense, moist, some organics. LIGHT BROWN with scattered orange mottling **Weathered Glacial Drift**		☒	37.3%	12.6%
4–8	ML		SANDY SILT with some clay and trace gravel up to 1", very stiff to hard, moist. GRAY with some scattered orange mottling in upper 1.0'. **4.0 t/sf (pocket pen)** Blocky texture observed throughout. **Unweathered Glacial Drift**		☒		
9			T.D.@ 8.5' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

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Materials Testing And Consulting
Burlington, WA
Geotechnical Engineering Services

Log of Test Pit TP-9

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 2
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SANDY SILT with trace gravel up to 1", soft, dry to moist. Strong organic content (roots). DARK BROWN **TOPSOIL**				
1	SM		SILTY SAND with minor gravel up to 2", medium dense, moist. LIGHT BROWN with scattered orange mottling and ~40-50% fines. **Weathered Glacial Drift** Slight blocky texture observed throughout.		☒		
3	ML		SANDY SILT with clay and some gravel up to 2", hard, moist. LIGHT GRAY to GRAY. **4.0-4.5 t/sf (pocket pen)**		☒		
5			Blocky texture observed throughout. **Unweathered Glacial Drift**				
8			T.D.@ 8.1' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

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Materials Testing And Consulting
Burlington, WA
Geotechnical Engineering Services

Log of Test Pit TP-10

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 1
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SANDY SILT, trace gravel up to 1", soft, dry to moist. Strong organic content (roots). DARK BROWN **TOPSOIL**				
1	SM-ML		SILTY SAND to SANDY SILT with minor gravel up to 2", medium dense, moist. LIGHT BROWN with scattered mottling. Slight blocky texture observed throughout. **Weathered Glacial Drift**		☒		
2							
3	ML		SANDY SILT with clay and some gravel up to 2", hard, moist. LIGHT GRAY to GRAY **Unweathered Glacial Drift**		☒	69.5%	20.2%
4			Blocky texture observed throughout.				
5							
6							
7			T.D.@ 6.9' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				
8							
9							
10							
11							

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Materials Testing And Consulting
Burlington, WA
Geotechnical Engineering Services

Log of Test Pit TP-11

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 8
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SANDY SILT with trace gravel up to 1/2", soft, dry to moist. Strong organic content (roots). DARK BROWN **TOPSOIL**				
1	SM		SILTY SAND with minor gravel up to 1.5", medium dense, dry to moist. Organics including minor tree roots. LIGHT BROWN with scattered orange mottling. **Weathered Glacial Drift** Increase in mottling observed at 4.5' BPG.		☒		
6	ML		SANDY SILT with some gravel up to 1.5", stiff to hard, moist. LIGHT GRAY to GRAY. Slight blocky texture observed throughout. **Unweathered Glacial Drift**		☒		
9			T.D.@ 9.0' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

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Materials Testing And Consulting
Burlington, WA
Geotechnical Engineering Services

Log of Test Pit TP-12

Aurora Court PH.2
Traverse Drive & Arctic Ave
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 9
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SANDY SILT, trace gravel up to 1/2", soft, dry to moist, strong organic content (roots). DARK BROWN **TOPSOIL**				
1	SM-ML		SILTY SAND to SANDY SILT, medium dense, dry to moist. Minor organics. LIGHT BROWN with scattered orange mottling. Blocky texture observed in spoils. **Weathered Glacial Drift**		☒		
3	ML		SANDY SILT, medium stiff to hard, moist. LIGHT GRAY to GRAY Blocky texture observed in spoils. **Unweathered Glacial Drift**		☒		
6					☒		
9			T.D.@ 8.8' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				

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Materials Testing And Consulting Burlington, WA Geotechnical Engineering Services	Log of Test Pit TP-13
Aurora Court PH.2 Traverse Drive & Arctic Ave Bellingham, WA	Date Started : 9\5\2019 Date Completed : 9\5\2019 Sampling Method : Grab Samples Location : Building 7 Logged By : Cass Dimitroff
MTC Project No. 18B236-01	

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SILT with some SAND, soft, dry to moist. Strong organic content (roots). DARK BROWN **TOPSOIL**				
1	ML-CL		SANDY SILT to LEAN CLAY with SAND, very stiff to hard, moist. Some roots. LIGHT BROWN with scattered orange mottling and ~50% fines. Slight blocky texture observed throughout. **PL/Ip: 20.1% / 8.4%** **Weathered Glacial Drift**		☒	71.5%	18.3%
4	ML		SANDY SILT with minor clay and some gravel up to 2", trace boulders up to 3', hard, moist. GRAY Slight blocky texture observed throughout. **Unweathered Glacial Drift**		☒		
8			T.D.@ 8.3' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				
11							

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Materials Testing And Consulting
Burlington, WA
Geotechnical Engineering Services

Log of Test Pit TP-14

Aurora Court PH.2
Mahogany Ave & June Rd
Bellingham, WA

MTC Project No. 18B236-01

Date Started : 9\5\2019
Date Completed : 9\5\2019
Sampling Method : Grab Samples
Location : Building 6
Logged By : Cass Dimitroff

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Water Level	Sample	% Finer than #200	% Moisture
0	ML		SILT with some SAND, soft, dry to moist. Strong organic content (roots). DARK BROWN **TOPSOIL**				
1	SM-ML		SILTY SAND to SANDY SILT, minor gravel up to 1", medium dense, moist. LIGHT BROWN with scattered orange mottling **Weathered Glacial Drift**		☒		
2							
3							
4	SM-ML		SILTY SAND to SANDY SILT with some gravel up to 2" and trace cobbles up tp 8", hard, moist. GRAY Light blocky texture observed throughout. **Unweathered Glacial Drift** **4.5 t/sf (pocket pen)**		☒	49.5%	18.6%
5							
6							
7					☒		
8							
9			T.D.@ 8.3' Excavation terminated at planned cut depth. No seepage observed. No regional groundwater or perched water table encountered during excavation.				
10							
11							

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Appendix C. LABORATORY TEST RESULTS

Laboratory tests were conducted on several representative soil samples to better identify the soil classification of the units encountered and to evaluate the material's general physical properties and engineering characteristics. A brief description of the tests performed for this study is provided below. The results of laboratory tests performed on specific samples are provided at the appropriate sample depths on the individual boring logs. However, it is important to note that these test results may not accurately represent in situ soil conditions. All of our recommendations are based on our interpretation of these test results and their use in guiding our engineering judgment. MTC cannot be responsible for the interpretation of these data by others.

Soil samples for this project will be retained for a period of 3 months following completion of this report, unless we are otherwise directed in writing.

SOIL CLASSIFICATION

Soil samples were visually examined in the field by our geologist at the time they were obtained. They were subsequently packaged and returned to our laboratory where they were reexamined and the original description checked and verified or modified. With the help of information obtained from the other classification tests, described below, the samples were described in general accordance with ASTM Standard D2487. The resulting descriptions are provided at the appropriate locations on the individual exploration logs, located in Appendix C, and are qualitative only.

GRAIN-SIZE DISTRIBUTION

Grain-size distribution analyses were conducted in general accordance with ASTM Standard D422 on representative soil samples to determine the grain-size distribution of the on-site soil. In addition, soil liquid and plastic limits and plasticity index were determined with ASTM Standard D4318 on representative fine-grained samples. The information gained from these analyses allows us to provide a description and classification of the in-place materials. In turn, this information helps us to understand engineering properties of the soil and thus how the in-place materials will react to conditions such as heavy seepage, traffic action, loading, potential liquefaction, and so forth. The results are presented in this Appendix.

PLASTICITY INDEX

Soil liquid and plastic limits and plasticity index were determined with ASTM Standard D4318 on representative fine-grained samples. Atterberg Limits results are employed in better understanding the site materials anticipated behavior in terms of its plasticity state, moisture sensitivity and compressibility. The limits results are also used to classify fine-grained soils per ASTM Standard D2487. In addition, the liquid limit test initially determines whether the soil is plastic or non-plastic, and therefore its eligibility for plasticity testing.

Project:	Aurora Ct Ph.2	**Client:**	The RJ Group
Project #:	18B236-01		
Date Received:	October 2, 2019	**Sampled by:**	C. Dimitroff
Date Tested:	October 4, 2019	**Tested by:**	M. Carrillo

Amount of Materials Finer Than #200 Sieve - ASTM C-117, ASTM D-1140 & AASHTO T-11

Sample #	Location	Tare	Before Wash + Tare	After Wash + Tare	Amount of Loss	% -#200
B19-0957	TP-10 @ 3.5'	379.6	625.5	454.7	170.8	69.5%
B19-0958	TP-13 @ 2.5'	429.1	619.7	483.4	136.3	71.5%
B19-0959	TP-14 @ 4.0'	392.1	577.0	485.5	91.5	49.5%

Reviewed by: Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**#200 Wash Data** Aurora Court Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **4**

Sieve Report

Project: Aurora Ct Ph2
Project #: 18B236-01
Client: The RJ Group
Source: TP-1 @ 3.0'
Sample#: B19-0953

Date Received: 2-Oct-19
Sampled By: C. Dimitroff
Date Tested: 7-Oct-19
Tested By: J. Acuna

Visual Identification
Sandy Silt
Sample Color:
light brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

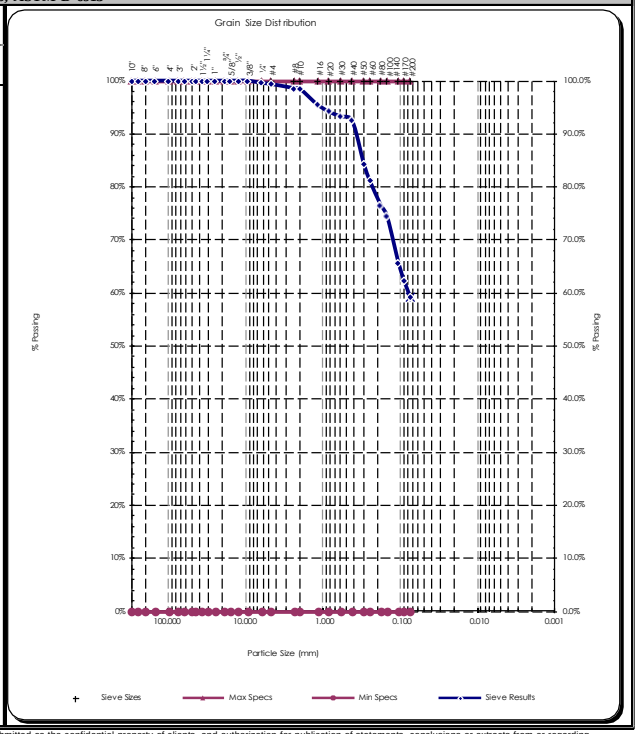
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.006 mm	% Gravel =	0.6%	Coeff. of Curvature, C_C =	1.44
$D_{(10)}$ =	0.013 mm	% Sand =	40.2%	Coeff. of Uniformity, C_U =	6.23
$D_{(15)}$ =	0.019 mm	% Silt & Clay =	59.2%	Fineness Modulus =	0.55
$D_{(30)}$ =	0.038 mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.063 mm	Plasticity Index =	n/a	Moisture %, as sampled =	7.6%
$D_{(60)}$ =	0.079 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.386 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	55/86	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	99%	99%	100.0%	0.0%
#8	2.36		99%	100.0%	0.0%
#10	2.00	98%	98%	100.0%	0.0%
#16	1.18		95%	100.0%	0.0%
#20	0.850		94%	100.0%	0.0%
#30	0.600		93%	100.0%	0.0%
#40	0.425	93%	93%	100.0%	0.0%
#50	0.300		84%	100.0%	0.0%
#60	0.250		81%	100.0%	0.0%
#80	0.180		76%	100.0%	0.0%
#100	0.150	75%	75%	100.0%	0.0%
#140	0.106		66%	100.0%	0.0%
#170	0.090		62%	100.0%	0.0%
#200	0.075	59.2%	59.2%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-1 at 3.0 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **5**

Sieve Report

Project: Aurora Ct Ph2
Project #: 18B236-01
Client: The RJ Group
Source: TP-3 @ 4.0'
Sample#: B19-0954

Date Received: 2-Oct-19
Sampled By: C. Dimitroff
Date Tested: 7-Oct-19
Tested By: J. Acuna

ASTM D-2487 Unified Soils Classification System
CL, Sandy Lean Clay
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

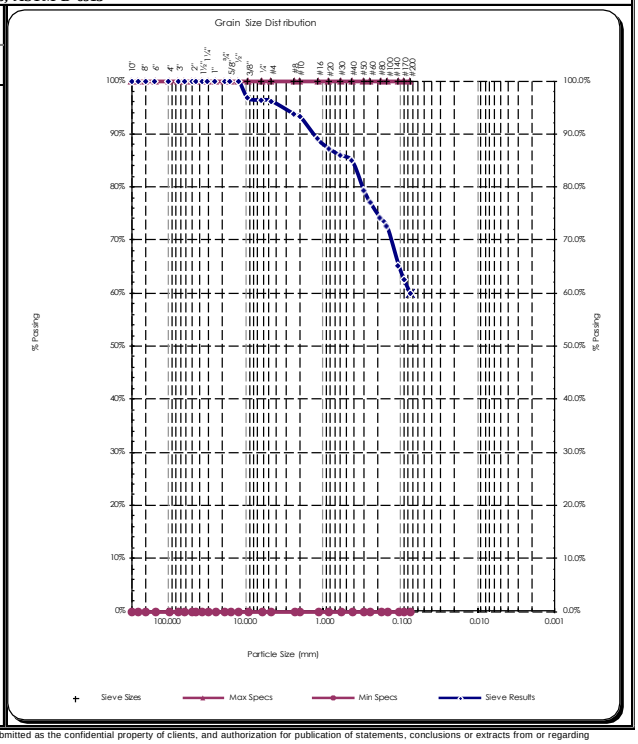
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.006 mm	% Gravel =	3.8%	Coeff. of Curvature, C_C =	1.50
$D_{(10)}$ =	0.013 mm	% Sand =	36.2%	Coeff. of Uniformity, C_U =	6.01
$D_{(15)}$ =	0.019 mm	% Silt & Clay =	60.0%	Fineness Modulus =	0.87
$D_{(30)}$ =	0.038 mm	Liquid Limit =	33.2%	Plastic Limit =	16.7%
$D_{(50)}$ =	0.063 mm	Plasticity Index =	16.5%	Moisture %, as sampled =	13.5%
$D_{(60)}$ =	0.075 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.380 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	12/17	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	97%	97%	100.0%	0.0%
1/4"	6.30		96%	100.0%	0.0%
#4	4.75	96%	96%	100.0%	0.0%
#8	2.36		94%	100.0%	0.0%
#10	2.00	93%	93%	100.0%	0.0%
#16	1.18		89%	100.0%	0.0%
#20	0.850		87%	100.0%	0.0%
#30	0.600		86%	100.0%	0.0%
#40	0.425	85%	85%	100.0%	0.0%
#50	0.300		79%	100.0%	0.0%
#60	0.250		77%	100.0%	0.0%
#80	0.180		74%	100.0%	0.0%
#100	0.150	73%	73%	100.0%	0.0%
#140	0.106		65%	100.0%	0.0%
#170	0.090		63%	100.0%	0.0%
#200	0.075	60.0%	60.0%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-3 at 4.0 Feet** Aurora Court Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **6a**

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Aurora Ct Ph2	**Date Received:**	2-Oct-19
Project #:	18B236-01	**Sampled By:**	C. Dimitroff
Client:	The RJ Group	**Date Tested:**	7-Oct-19
Source:	TP-3 @ 4.0'	**Tested By:**	A. Eifrig
Sample #:	B19-0954		

Unified Soils Classification System, ASTM D-2487
CL, Sandy Lean Clay
Sample Color
brown

Liquid Limit Determination

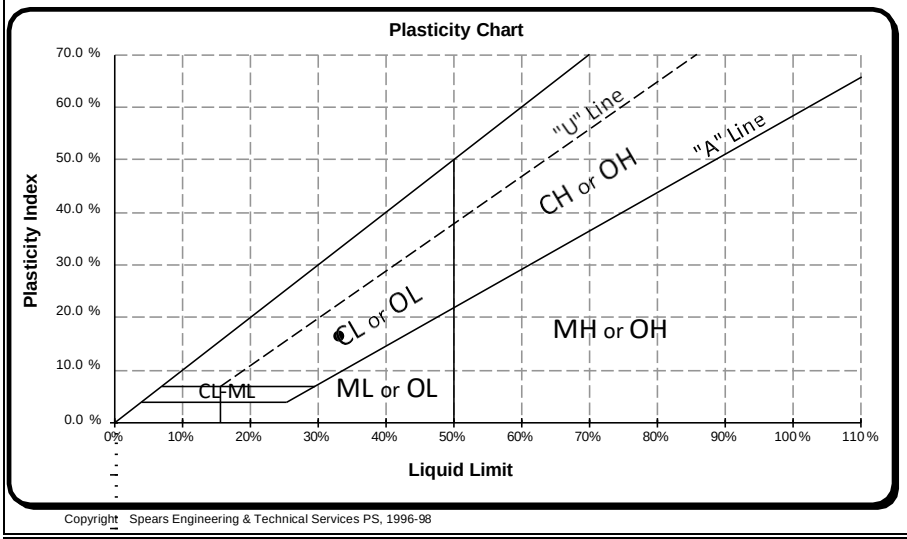
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	30.48	27.84	23.35			
Weight of Dry Soils + Pan:	24.95	22.88	18.84			
Weight of Pan:	8.68	8.65	6.30			
Weight of Dry Soils:	16.27	14.23	12.54			
Weight of Moisture:	5.53	4.96	4.51			
% Moisture:	34.0 %	34.9 %	36.0 %			
Number of Blows:	21	15	10			

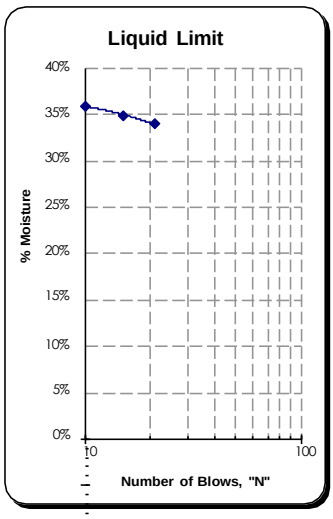
Liquid Limit @ 25 Blows: 33.2 %
Plastic Limit: 16.7 %
Plasticity Index, I_P: 16.5 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	37.35	40.63				
Weight of Dry Soils + Pan:	36.32	39.13				
Weight of Pan:	30.12	30.23				
Weight of Dry Soils:	6.20	8.90				
Weight of Moisture:	1.03	1.50				
% Moisture:	16.6 %	16.9 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-3 at 4.0 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **6b**

Sieve Report

Project: Aurora Ct Ph2
Project #: 18B236-01
Client: The RJ Group
Source: TP-5 @ 4.5'
Sample#: B19-0955

Date Received: 2-Oct-19
Sampled By: C. Dimitroff
Date Tested: 7-Oct-19
Tested By: J. Acuna

ASTM D-2487 Unified Soils Classification System
CL, Lean Clay with Sand
Sample Color:
gray

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

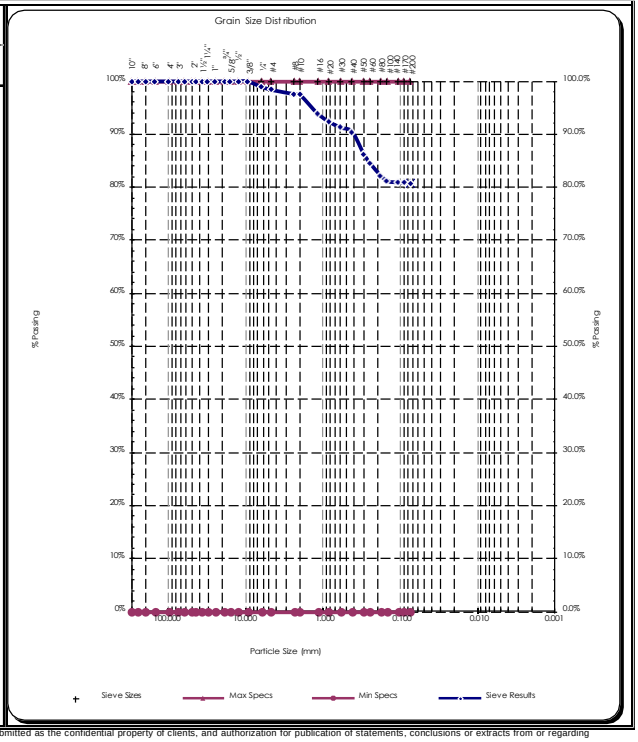
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.005 mm	% Gravel =	1.6%	Coeff. of Curvature, C_C =	1.50
$D_{(10)}$ =	0.009 mm	% Sand =	17.6%	Coeff. of Uniformity, C_U =	6.00
$D_{(15)}$ =	0.014 mm	% Silt & Clay =	80.8%	Fineness Modulus =	0.51
$D_{(30)}$ =	0.028 mm	Liquid Limit =	32.3%	Plastic Limit =	18.2%
$D_{(50)}$ =	0.046 mm	Plasticity Index =	14.1%	Moisture %, as sampled =	31.5%
$D_{(60)}$ =	0.056 mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	0.410 mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	25/28	Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		98%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		94%	100.0%	0.0%
#20	0.850		92%	100.0%	0.0%
#30	0.600		91%	100.0%	0.0%
#40	0.425	91%	91%	100.0%	0.0%
#50	0.300		86%	100.0%	0.0%
#60	0.250		85%	100.0%	0.0%
#80	0.180		82%	100.0%	0.0%
#100	0.150	81%	81%	100.0%	0.0%
#140	0.106		81%	100.0%	0.0%
#170	0.090		81%	100.0%	0.0%
#200	0.075	80.8%	80.8%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-5 at 4.5 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **7a**

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Aurora Ct Ph2	**Date Received:** 2-Oct-19	**Unified Soils Classification System, ASTM D-2487**
Project #: 18B236-01	**Sampled By:** C. Dimitroff	CL, Lean Clay with Sand
Client: The RJ Group	**Date Tested:** 7-Oct-19	**Sample Color**
Source: TP-5 @ 4.5'	**Tested By:** A. Eifrig	gray
Sample #: B19-0955		

Liquid Limit Determination

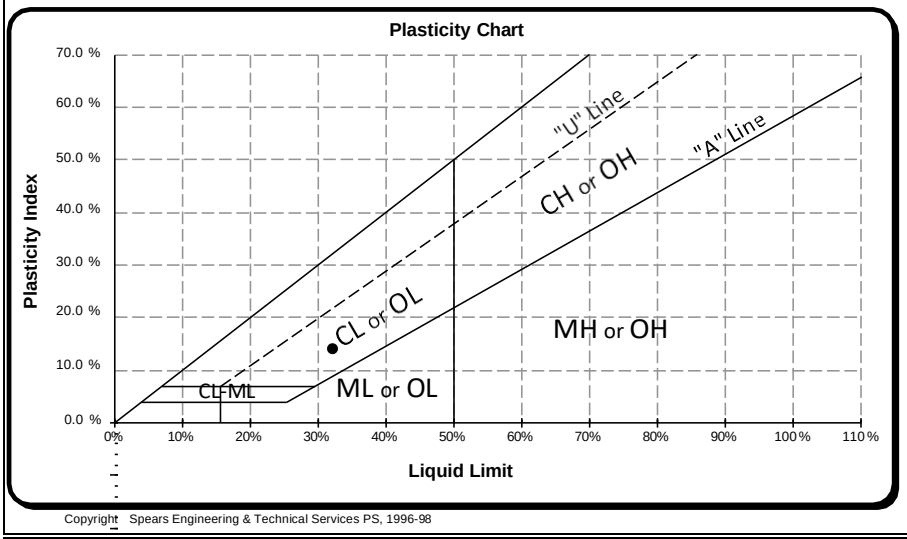
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	39.20	36.46	34.14			
Weight of Dry Soils + Pan:	34.48	32.36	30.46			
Weight of Pan:	20.09	20.20	20.03			
Weight of Dry Soils:	14.39	12.16	10.43			
Weight of Moisture:	4.72	4.10	3.68			
% Moisture:	32.8 %	33.7 %	35.3 %			
Number of Blows:	23	15	11			

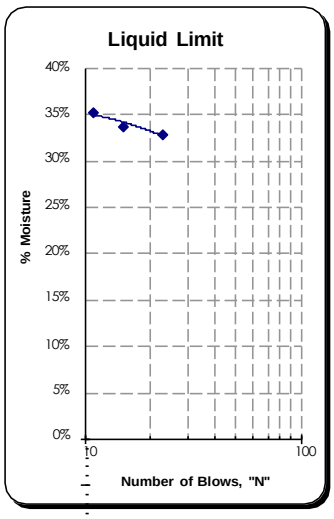
Liquid Limit @ 25 Blows: 32.3 %
Plastic Limit: 18.2 %
Plasticity Index, I_P: 14.1 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	30.17	38.61				
Weight of Dry Soils + Pan:	28.75	36.98				
Weight of Pan:	20.89	28.07				
Weight of Dry Soils:	7.86	8.91				
Weight of Moisture:	1.42	1.63				
% Moisture:	18.1 %	18.3 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-5 at 4.5 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **7b**

Sieve Report

Project: Aurora Ct Ph2
Project #: 18B236-01
Client: The RJ Group
Source: TP-8 @ 2.3'
Sample#: B19-0956

Date Received: 2-Oct-19
Sampled By: C. Dimitroff
Date Tested: 7-Oct-19
Tested By: J. Acuna

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand
Sample Color:
grayish-brown

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04

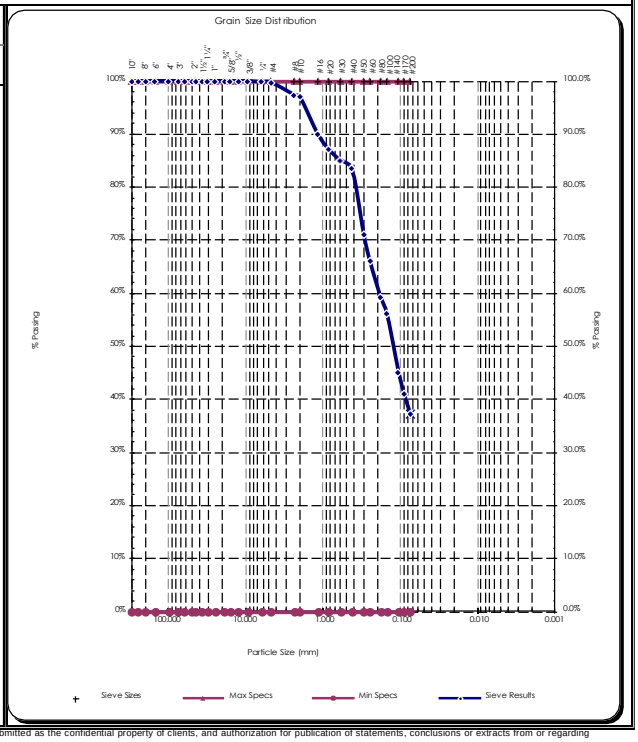
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.010	mm	% Gravel =	0.3%	Coeff. of Curvature, C_C =	0.96
$D_{(10)}$ =	0.020	mm	% Sand =	62.5%	Coeff. of Uniformity, C_U =	9.39
$D_{(15)}$ =	0.030	mm	% Silt & Clay =	37.3%	Fineness Modulus =	1.01
$D_{(30)}$ =	0.060	mm	Liquid Limit =	n/a	Plastic Limit =	n/a
$D_{(50)}$ =	0.126	mm	Plasticity Index =	n/a	Moisture %, as sampled =	12.6%
$D_{(60)}$ =	0.189	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =	
$D_{(90)}$ =	1.186	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =	
Dust Ratio =	21/47		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		97%	100.0%	0.0%
#10	2.00	97%	97%	100.0%	0.0%
#16	1.18		90%	100.0%	0.0%
#20	0.850		87%	100.0%	0.0%
#30	0.600		85%	100.0%	0.0%
#40	0.425	83%	83%	100.0%	0.0%
#50	0.300		71%	100.0%	0.0%
#60	0.250		66%	100.0%	0.0%
#80	0.180		59%	100.0%	0.0%
#100	0.150	56%	56%	100.0%	0.0%
#140	0.106		45%	100.0%	0.0%
#170	0.090		41%	100.0%	0.0%
#200	0.075	37.3%	37.3%	100.0%	0.0%



Comments: _____

Reviewed by: _____

Meghan Blodgett-Carrillo

Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-8 at 2.3 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **8**

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Aurora Ct Ph2	**Date Received:**	2-Oct-19
Project #:	18B236-01	**Sampled By:**	C. Dimitroff
Client:	The RJ Group	**Date Tested:**	7-Oct-19
Source:	TP-10 @ 3.5'	**Tested By:**	A. Eifrig
Sample #:	B19-0957		

Unified Soils Classification System, ASTM D-2487
CL, Sandy Lean Clay
Sample Color
brown

Liquid Limit Determination

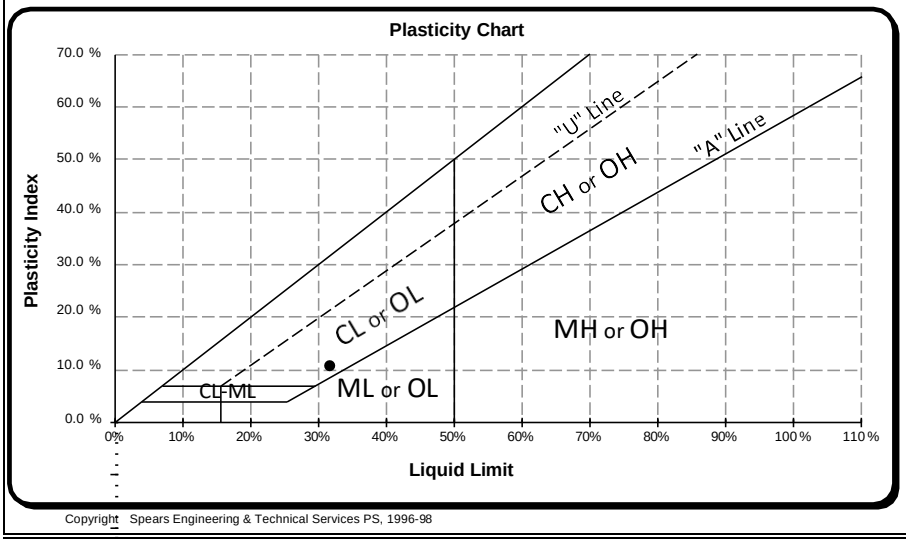
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	32.89	39.83	46.13			
Weight of Dry Soils + Pan:	28.73	34.93	39.43			
Weight of Pan:	14.72	19.54	19.64			
Weight of Dry Soils:	14.01	15.39	19.79			
Weight of Moisture:	4.16	4.90	6.70			
% Moisture:	29.7 %	31.8 %	33.9 %			
Number of Blows:	33	25	17			

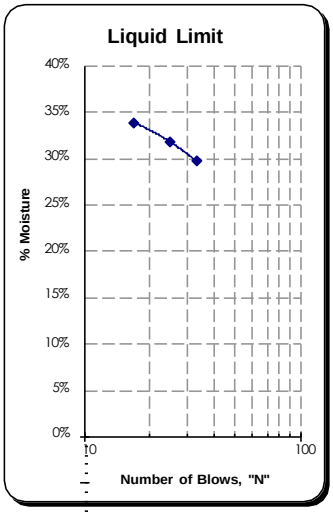
Liquid Limit @ 25 Blows: 31.8 %
Plastic Limit: 21.0 %
Plasticity Index, I_P: 10.8 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	36.89	37.32				
Weight of Dry Soils + Pan:	35.43	35.73				
Weight of Pan:	28.50	28.13				
Weight of Dry Soils:	6.93	7.60				
Weight of Moisture:	1.46	1.59				
% Moisture:	21.1 %	20.9 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-10 at 3.5 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **9**

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project:	Aurora Ct Ph2	**Date Received:**	2-Oct-19
Project #:	18B236-01	**Sampled By:**	C. Dimitroff
Client:	The RJ Group	**Date Tested:**	7-Oct-19
Source:	TP-13 @ 2.5'	**Tested By:**	A. Eifrig
Sample #:	B19-0958		

Unified Soils Classification System, ASTM D-2487
CL, Lean Clay with Sand
Sample Color
grayish-brown

Liquid Limit Determination

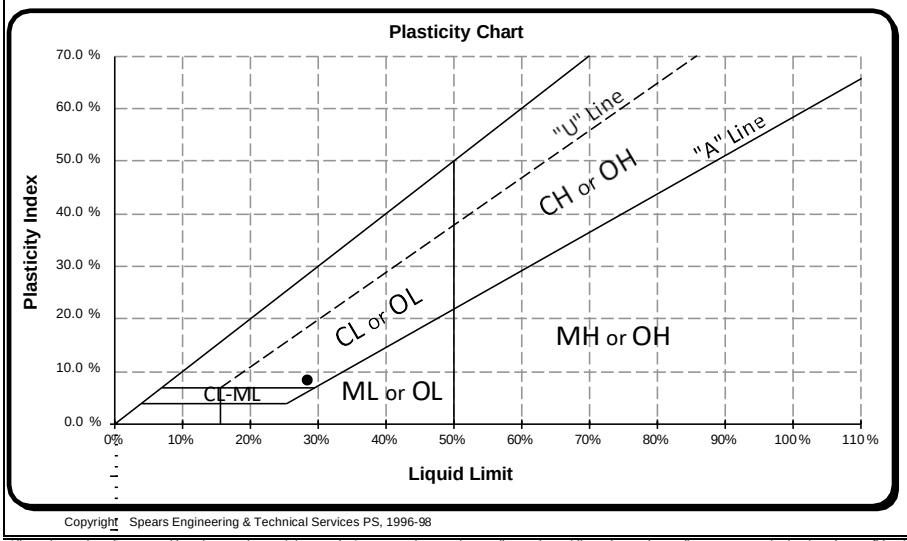
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	35.16	36.70	37.87			
Weight of Dry Soils + Pan:	31.88	32.98	33.60			
Weight of Pan:	19.80	19.78	19.43			
Weight of Dry Soils:	12.08	13.20	14.17			
Weight of Moisture:	3.28	3.72	4.27			
% Moisture:	27.2 %	28.2 %	30.1 %			
Number of Blows:	31	27	18			

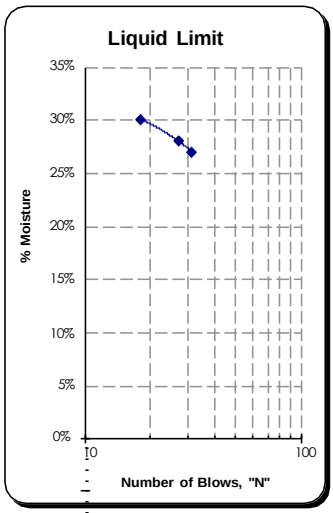
Liquid Limit @ 25 Blows: 28.6 %
Plastic Limit: 20.1 %
Plasticity Index, I_P: 8.4 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	38.29	38.02				
Weight of Dry Soils + Pan:	36.59	36.36				
Weight of Pan:	28.14	28.12				
Weight of Dry Soils:	8.45	8.24				
Weight of Moisture:	1.70	1.66				
% Moisture:	20.1 %	20.2 %				

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-13 at 2.5 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **10**

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Aurora Ct Ph2	**Date Received:** 2-Oct-19	**Unified Soils Classification System, ASTM D-2487**
Project #: 18B236-01	**Sampled By:** C. Dimitroff	SM , Silty Sand
Client: The RJ Group	**Date Tested:** 7-Oct-19	**Sample Color**
Source: TP-14 @ 4.0'	**Tested By:** A. Eifrig	grayish-brown
Sample #: B19-0958		

Liquid Limit Determination

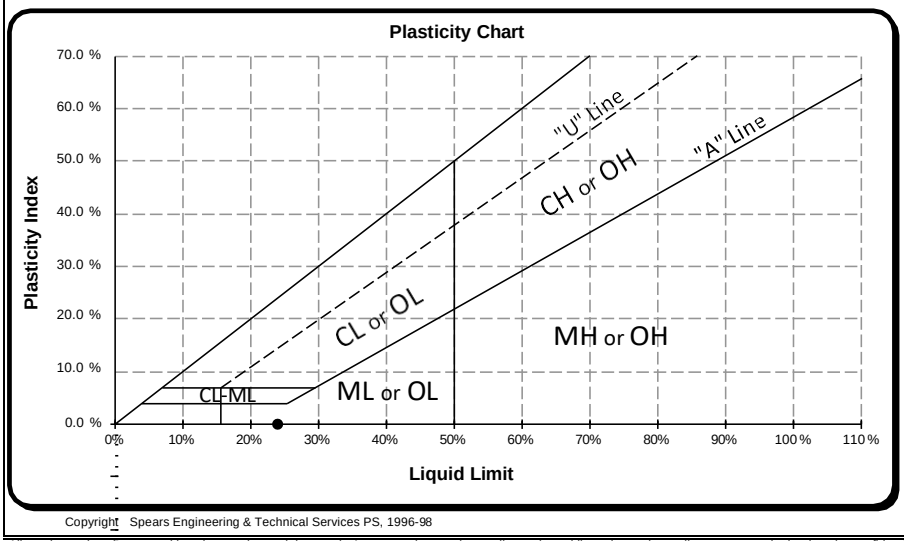
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	35.80	39.49	41.49			
Weight of Dry Soils + Pan:	31.98	35.74	37.10			
Weight of Pan:	14.87	19.66	19.66			
Weight of Dry Soils:	17.11	16.08	17.44			
Weight of Moisture:	3.82	3.75	4.39			
% Moisture:	22.3 %	23.3 %	25.2 %			
Number of Blows:	34	27	20			

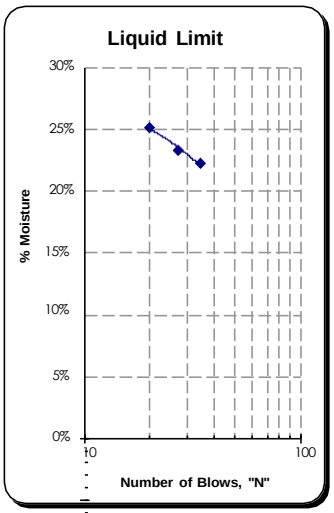
Liquid Limit @ 25 Blows: 24.0 %
Plastic Limit: N/A
Plasticity Index, I_P: N/A

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:		non-plastic				
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

ACCREDITED
Certificate #: 1366.01, 1366.02 & 1366.04





Materials Testing & Consulting, Inc. **777 Chrysler Drive** Burlington, WA 98233	**TP-14 at 4.0 Feet** Aurora Court, Phase 2 Traverse Dr. & Arctic Ave. Bellingham, WA	FIGURE **11**

NERP Purchase and Sale Agreement

CITY OF BELLINGHAM
CONTRACT#
2013-0232

REAL ESTATE PURCHASE AND SALE AGREEMENT

This REAL ESTATE PURCHASE AND SALE AGREEMENT (this "Agreement") is entered into as of May 17th, 2013 between the CITY OF BELLINGHAM, a first class municipal corporation ("Buyer") and Mersey LLC, a Washington limited liability corporation ("Seller").

RECITALS

WHEREAS, Seller is the owner of certain real property more particularly described in Section 1, below.

WHEREAS, Buyer desires to purchase from Seller, and Seller desires to sell to Buyer the real property on the terms and conditions set forth herein.

NOW THEREFORE, in consideration of the mutual covenants contained in this Agreement and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Seller and Buyer agree as follows:

AGREEMENT

1. Real Property. Seller agrees to sell and convey to Buyer and Buyer agrees to purchase from Seller, subject to the terms and conditions set forth in this Agreement, thirteen (13) acres of real property located in Whatcom County, Washington, more particularly described in **Exhibit A** attached hereto and made a part hereof, together with all right, title and interest in and to all rights licenses, privileges, reversions and easements pertinent to the real property, including without limitation, all minerals, oil, gas and other hydrocarbon substances on and under the real property as well as all development rights, air rights, water rights, water and water stock relating to the real property and any other easements rights of way or appurtenances used in connection with the beneficial use and enjoyment of the real property (collectively, the "Property").

2. Deposit. Buyer shall deliver to Whatcom Land Title Company in Bellingham, Washington (the "Title Company"), as escrow agent for the closing of this transaction, an earnest money deposit in the amount of Fifty Thousand U.S. Dollars ($50,000) (the "Deposit") as part payment of the purchase price of the Property. The Deposit will be held by the Title Company for the benefit of the parties pursuant to the terms of this Agreement. Any interest that accrues on the Deposit will be for the benefit of Buyer and fully applicable to the Purchase Price (defined at section 3, below) at closing; provided, however, that if Buyer forfeits the Deposit to Seller pursuant to the terms of this Agreement, then all interest accrued on the Deposit will be paid to Seller. Buyer will deliver the Deposit to the Title Company by May 31, 2013.

3. Purchase Price. The total purchase price for the Property (the "Purchase Price") will be Eight Hundred Eighty-two Thousand Five Hundred U.S. Dollars ($882,500), of which the Deposit is a fully applicable part. The Purchase Price will be paid to Seller in cash through escrow at closing.

4. Title to Property.

4.1 Conveyance. At closing Seller shall convey to Buyer marketable fee simple title to the Property by duly executed and acknowledged statutory warranty deed (the "Deed"), subject only to those encumbrances that Buyer approves pursuant to Section 4.3 below (the "Permitted Encumbrances").

4.2 Preliminary Commitment. Upon execution of this Agreement, Seller authorizes Buyer to order a preliminary commitment for an owner's standard coverage policy of title insurance (or, at Buyer's election, an owner's extended coverage policy of title insurance) in the amount of the Purchase Price to be issued by the Title Company and accompanied by copies of all documents referred to in the commitment (the "Preliminary Commitment").

4.3 Condition of Title. Buyer shall advise Seller by written notice what encumbrances to title, if any, are disapproved by Buyer ("Disapproved Encumbrances") by the expiration of the Feasibility Study Period (as defined in Section 5.2, below). All monetary encumbrances other than non-delinquent ad valorem property taxes will be deemed to be disapproved. Seller will have ten (10) business days after receipt of Buyer's notice to give Buyer notice that (i) Seller will remove Disapproved Encumbrances, or (ii) Seller elects not to remove Disapproved Encumbrances. If Seller fails to give Buyer notice before the expiration of the ten (10) day period, Seller will be deemed to have elected to remove Disapproved Encumbrances. Notwithstanding anything to the contrary in this Agreement, Seller shall remove from title on or before the Closing Date all monetary encumbrances other than those approved by Buyer. If Seller elects not to remove any Disapproved Encumbrances, Buyer will have fifteen (15) business days to notify Seller of Buyer's election either to proceed with the purchase and take the Property subject to those encumbrances, or to terminate this Agreement. If Buyer elects to terminate this Agreement pursuant to this section, the escrow will be terminated, the Deposit will be returned immediately to Buyer, all documents and other funds will be returned to the party who deposited them, and neither party will have any further rights or obligations under this Agreement, except as otherwise expressly provided for in this Agreement. If this Agreement is terminated through no fault of Seller, then Seller and Buyer shall share equally any costs of terminating the escrow and any cancellation fee for the Preliminary Commitment.

4.4 Title Policy. Seller shall cause the Title Company to issue to Buyer at closing a standard coverage owner's policy of title insurance insuring Buyer's title to the Property in the full amount of the Purchase Price subject only to the Permitted Encumbrances (the "Title Policy"). The Title Policy must be dated as of the Closing Date.

4.5 Special Use Designation. If the Property currently has a special use tax designation (such as forest land or open space) as described by Chapter 84.33 and Chapter 84.34 of the Revised Code of Washington, any compensating taxes or fees that become due as a result of this transaction will be paid by Seller at closing.

5. Conditions to Closing.

5.1 City Council Approval. This Agreement, and the transaction contemplated hereby, must be duly approved by the Bellingham City Council prior to closing. If Bellingham City Council approval is not obtained, this Agreement will terminate, and the Deposit will be returned immediately to Buyer, all documents and other funds will be returned to the party who deposited them, and neither party will have any further rights or obligations under this Agreement, except as otherwise expressly provided for in this Agreement.

5.2 Feasibility Study. Buyer will have until July 1, 2013 (the "Feasibility Study Period") to conduct a review of the Property and satisfy itself with respect to the condition of and other matters related to the Property and its suitability for Buyer's intended use (the "Feasibility Study"). The Feasibility Study may include all inspections and studies Buyer deems reasonably necessary or desirable. Buyer and Buyer's agents,

representatives, consultants, architects and engineers will have the right, from time to time, from and after the date of this Agreement to enter onto the Property and make borings, drive test piles and conduct any other reasonable tests and studies that may be necessary or desirable to ascertain the condition and suitability of the Property for Buyer's intended use. Such tests and inspections are to be performed in a manner not disruptive to the operation of the Property. Buyer shall protect, defend and indemnify Seller from and against any construction or other liens or encumbrances arising out of or in connection with its exercise of this right of entry and shall cause any such liens or encumbrances to be promptly released. Buyer shall not, however, be liable for any claims or diminution in value arising or resulting from (i) Buyer's discovery of any pre-existing condition (including, without limitation, the existence of Hazardous Materials as defined in Section 7.4) in, on, under or about the Property, or (ii) any exacerbation of a pre-existing condition in, on, under or about the Property, except to the extent, if any, said exacerbation results from the willful or negligent act or omission of Buyer, its agents, contractors or employees.

5.3 Non-Suitability. Buyer will have the right to terminate this Agreement if, in Buyer's good faith judgment, the Property is not suitable for Buyer's intended use. Buyer's right to terminate must be exercised by delivering written notice of its election to Seller on or before the expiration of the Feasibility Study Period. In the event Buyer does not complete the purchase, Buyer shall return the Property as near as is practicable to its original condition. If Buyer terminates this Agreement pursuant to this section, the Deposit will be returned to Buyer, this Agreement will terminate, and Seller and Buyer will be released from all further obligation or liability hereunder, except as otherwise specified by this Agreement and except for Buyer's obligations to indemnify Seller under Section 5.2. Failure by Buyer to notify Seller in writing of any matters affecting the suitability of the Property, whether or not an inspection has been carried out, shall deem Buyer to have waived this contingency.

6. Condition of the Property.

6.1 Seller's Covenant to Operate and Maintain. Seller shall maintain, repair, manage and operate the Property in a businesslike manner in accordance with Seller's prior practices. Seller agrees that it will not damage, dissipate, nor commit waste on any portion of the Property between the date of acceptance of this Agreement and the date of closing. Seller shall surrender the Property to Buyer in as good condition (normal wear and tear excepted) as exists on the date of this Agreement.

6.2 Inspections. Buyer agrees that it will rely on its own inspections and evaluations of the Property, with the exception of Seller's representations and warranties listed in Section 7, below, and of written documentation, including, but not limited to any disclosures required by law, provided to it by Seller, to determine the suitability of the Property for Buyer's intended use.

7. Seller's Representations and Warranties. Seller represents and warrants to Buyer as follows:

7.1 Claims or Litigation. To the best of Seller's knowledge, there is no litigation pending or threatened against Seller (or any basis for any claim) that arises out of the ownership of the Property and that might materially and/or detrimentally affect (i) the use or operation of the Property for Buyer's intended use, or (ii) the ability of Seller to perform its obligations under this Agreement, or (iii) the value of the Property.

7.2 Defaults. Seller has received no notice of any default or breach by Seller under any covenants, conditions, restrictions, rights of way or easements that may affect Seller

in respect to the Property or may affect the Property or any portion thereof and no such default or breach now exists.

7.3 Organization. Seller is a limited liability company duly organized and validly existing under the laws of the State of Washington. This Agreement and all documents executed by Seller that are to delivered to Buyer at closing are, or at the time of closing will be, (i) duly authorized, executed and delivered by Seller, (ii) legal, valid and binding obligations of Seller, (iii) sufficient to convey title (if they purport to do so), and (iv) in compliance with all provisions of all agreements and judicial orders to which Seller is a party or to which Seller or all or any portion of the Property is subject.

7.4 Hazardous Substances. Seller has no actual knowledge of the release of or presence of any hazardous materials on, in from or onto the Property ("hazardous materials" meaning any hazardous or toxic substance, petroleum product or wastes that are regulated or subject to cleanup authority under any state, federal or local statute, regulation or ordinance).

8. Closing. This transaction will be closed in escrow by the Title Company acting as escrow agent ("Escrow Agent"). The closing will be held at the office of the Title Company as early as July 5, 2013, but in no event later than August 15, 2013 (the "Closing Date"), unless affected by the provisions set forth in Section 5.2, above. If closing does not occur on or before the Closing Date, or any later date mutually agreed to in writing by Seller and Buyer, Escrow Agent will immediately terminate the escrow, forward the Deposit to the party entitled to receive it as provided in this Agreement and return all documents to the party that deposited them. When notified by Escrow Agent, Buyer and Seller will deposit with Escrow Agent without delay all instruments and moneys required to complete the transaction in accordance with this Agreement. "Closing," for the purpose of this Agreement, is defined as the date that all documents are executed, the sale proceeds are available for disbursement to the Seller, and legal title passes to the Buyer.

9. Closing Costs and Prorations. Seller shall pay the premium for a standard coverage owner's policy of title insurance in the full amount of the Purchase Price, State of Washington real estate excise taxes applicable to the sale, and one-half of the Escrow Agent's escrow fee. Buyer shall pay the additional premium, if any, attributable to an extended coverage owner's policy of title insurance (if elected by Buyer at Buyer's sole discretion) and any endorsements required by Buyer, the cost of recording the deed, and one-half of the Escrow Agent's escrow fee. Property taxes and assessments for the current year, water and other utility charges, if any, shall be prorated as of the Closing Date unless otherwise agreed. Buyer is a property tax exempt organization pursuant to R.C.W. 84.36.010, and therefore Escrow Agent is directed, to the extent possible, to apply to Whatcom County for a change in tax status for the Property, so that property taxes do not have to be collected from Buyer at closing.

10. Casualty Loss. Seller shall promptly notify Buyer of any event prior to the Closing Date which causes damage to or destruction of any portion of the Property. If Buyer and Seller cannot come to an agreement regarding any such damage to or destruction of the Property, including the settlement of any insurance claims, then Buyer and Seller will each have the right to terminate this Agreement by giving written notice of termination to the other party within twenty (20) days after receipt of actual notice of such casualty loss. Upon exercise of such termination election by either party, this Agreement will terminate, and the Deposit will be returned to Buyer.

11. Possession. Seller shall deliver possession of the Property to Buyer on the Closing Date. Seller shall remove any and all personal property or debris from the Property on or before the Closing Date, unless specifically authorized in writing by Buyer.

12. Events of Default. In the event Buyer fails, without legal excuse or authorization under this Agreement, to complete the purchase of the Property, then that portion of the Deposit which

does not exceed five percent (5%) of the Purchase Price shall be forfeited to Seller as the sole and exclusive remedy available to Seller for such failure. In the event Seller fails, without legal excuse or authorization under this Agreement, to complete the sale of the Property, Buyer shall be entitled to immediate return of its Deposit, and may pursue any remedies available to it in law or equity, including specific performance.

13. Notices. Any notice under this Agreement must be in writing and be personally delivered, delivered by recognized overnight courier service, given by mail or via facsimile. E-mail transmission of notice shall not be effective. All notices must be addressed to the parties at the following addresses, or at such other addresses as the parties may from time to time direct in writing:

Buyer: Patty Fernandez
Real Property Manager
Public Works Department
City of Bellingham
210 Lottie Street
Bellingham, WA 98225
Phone: 360-778-7980
Facsimile: 360-778-7901
Email: pferndanez@cob.org

Seller: Jeffrey J. Miller
Perkins Coie LLP
1201 Third Avenue, Suite 4900
Seattle, WA 98101-3099
Phone: 206-359-8350
Cell: 206-298-9850
Facsimile: 206-359-9350
Email: jmiller@perkinscoie.com

Any notice will be deemed to have been given, when personally delivered, and if delivered by courier service, one business day after deposit with the courier service, and if mailed, two business days after deposit in the U.S. mail, and if delivered by facsimile, the same day as verified.

14. Counterparts. This Agreement may be executed in any number of counterparts, each of which counterpart when so executed shall have the same force and effect as if that party had signed all other counterparts.

15. Brokers and Finders. Each party represents and warrants to the other that, to such party's knowledge, no broker, agent or finder is involved in this transaction. In the event any broker or other person makes a claim for a commission or finder's fee based upon the transaction contemplated by this Agreement, the party through whom said broker or other person makes its claim shall indemnify and hold harmless the other party from said claim and all liabilities, costs and expenses related thereto, including reasonable attorneys' fees, which may be incurred by such other party in connection with such claim. This indemnity shall survive the closing of this transaction.

16. Amendments. This Agreement may be amended or modified only by a written instrument executed by Seller and Buyer.

17. Continuation and Survival of Representations and Warranties. All representations and warranties by the respective parties contained in this Agreement or made in writing pursuant to this Agreement are intended to and will remain true and correct as of the time of closing, will be deemed to be material and will survive the execution and delivery of this Agreement and the

delivery of the Deed and transfer of title. Such representations and warranties, however, are not assignable and do not run with the land, except as may be expressly provided herein or contained in a written instrument signed by the party to be charged.

18. Governing Law. This Agreement will be governed and construed in accordance with the laws of the State of Washington without recourse to any principles of Conflicts of Laws.

19. Attorney Fees. If either party fails to perform any of its obligations under this Agreement or if a dispute arises concerning the meaning or interpretation of any provision of this Agreement, the defaulting party or the party not prevailing in the dispute, as the case may be, shall pay any and all costs and expenses incurred by the other party in enforcing or establishing its rights under this Agreement, including without limitation, court costs and reasonable attorney fees incurred in connection with any federal, state or bankruptcy proceeding.

20. Time of the Essence. Time is of the essence of this Agreement and of all acts required to be done and performed by the parties hereto.

21. FIRPTA. The Escrow Agent is instructed to prepare a certification or equivalent that Seller is not a "foreign person" within the meaning of the Foreign Investment in Real Property Tax Act ("FIRPTA"), and Seller agrees to sign this certification. If Seller is a "foreign person" as the same is defined by FIRPTA, and this transaction is not otherwise exempt from FIRPTA, Escrow Agent is instructed to withhold and pay the required amount to the Internal Revenue Service.

22. Waiver. Neither Seller's nor Buyer's waiver of the breach of any covenant or obligation under this Agreement will be construed as a waiver of the breach of any other covenants or obligations or as a waiver of a subsequent breach of the same covenant or obligation.

23. Nonmerger. The terms and provisions of this Agreement, including without limitation, all indemnification obligations, will not merge in, but will survive, the closing of the transaction contemplated under the Agreement.

24. Assignment. Buyer shall not assign this Agreement without Seller's prior written consent, which consent may not be unreasonably withheld, conditioned or delayed.

25. Negotiation and Construction. This Agreement and each of its terms and provisions are deemed to have been explicitly negotiated between the parties, and the language in all parts of this Agreement will, in all cases, be construed according to its fair meaning and not strictly for or against either party.

26. Additional Acts. Except as otherwise provided herein, in addition to the acts and deeds recited herein and contemplated to be performed, executed and/or delivered by any party hereto, the parties agree to perform, execute and/or deliver, or cause to be performed, executed and/or delivered, any and all such further acts, deeds and assurances, which may reasonably be required to effect the Agreement contemplated herein.

27. Additional Conditions of the Purchase and Sale Agreement. If the Buyer constructs a regional stormwater facility on the Property:

27.1 The Buyer agrees to provide the Seller a copy of the Buyer's design plans for the regional stormwater facility prior to construction of the facility. Seller may provide comments to the Buyer on the design plans; however, Buyer retains full control over the design and construction of the regional stormwater facility.

27.2 The Buyer agrees to reserve capacity in the regional stormwater facility for the treatment and detention of stormwater from 15 acres of impervious surface from Seller's property in the area. The Buyer shall reserve this capacity for a period of seven years

from the Closing Date. Seller shall pay the City its proportionate share of the cost of the regional stormwater facility upon the Buyer completing construction of the regional stormwater facility.

27.3 The conditions in Section 27.1 and 27.2 are intended to and will remain true and correct as of the time of closing, will be deemed to be material and will survive the execution and delivery of this Agreement and the delivery of the Deed and transfer of title in accordance with Section 17 above.

28. Entire Agreement. This Agreement constitutes the entire agreement between the parties with respect to the purchase and sale of the Property, and supersedes all prior agreements and understandings, oral or written, between the parties relating to the subject matter of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date set forth above.

BUYER:

CITY OF BELLINGHAM, a first class municipal corporation

5/17/13

~~Kelli Linville, Mayor~~ Stan Snapp, Mayor Pro Tempore

Attest:

John R. Carter
Finance Director

Department Approval:

Ted A. Carlson
Public Works Director

Approved as to form:

Office of City Attorney

SELLER:

MERSEY LLC, a Washington limited liability company

Robert W. Janicki

Exhibit A - Legal Description of the Property

ALL THAT PART OF TRACT A , IN BLOCK 35, LYING SOUTH OF THE NORTH LINE OF LOT 4 OF SAID BLOCK 35, PRODUCED EASTERLY IN A STRAIGHT LINE TO THE EAST LINE OF SAID BLOCK 35, ALL IN "BAKER VIEW ADDITION TO THE CITY OF BELLINGHAM," WHATCOM COUNTY, WASHINGTON, AS PER THE MAP THEREOF, RECORDED IN BOOK 7 OF PLATS, PAGES 40 TO 45, INCLUSIVE, IN THE AUDITOR'S OFFICE OF SAID COUNTY AND STATE. ALSO AND TOGETHER WITH THE WEST 200 FEET OF THE SOUTH ONE-HALF OF BLOCK 36, "BAKER VIEW ADDITION TO THE CITY OF BELLINGHAM," WHATCOM COUNTY, WASHINGTON, AS PER THE MAP THEREOF, RECORDED IN BOOK 7 OF PLATS, PAGES 40 TO 45, INCLUSIVE IN THE AUDITOR'S OFFICE OF SAID COUNTY AND STATE, EXCEPT BEGINNING AT A POINT ON THE EAST LINE OF SAID BLOCK 36, 30.0 FEET SOUTHERLY OF THE NORTHEAST CORNER OF BLOCK 36, THENCE NORTH 89°34'48" WEST, PARALLEL TO AND 30.0 FEET SOUTHERLY OF THE NORTH LINE OF BLOCK 36, 135.0 FEET; THENCE SOUTHEASTERLY IN A STRAIGHT LINE TO A POINT ON THE EAST LINE OF BLOCK 36 THAT IS THE SOUTHWEST CORNER OF LOT 4, BLOCK 1, "AMENDED MAP OF THE CANFIELDS 3rd ADDITION TO WHATCOM," WHATCOM COUNTY, WASHINGTON, AS PER THE MAP THEREOF, RECORDED IN BOOK 2 OF PLATS, PAGE 48, IN THE AUDITOR'S OFFICE OF SAID COUNTY AND STATE; THENCE NORTHERLY ALONG THE EAST LINE OF BLOCK 36, 540.0 FEET, MORE OR LESS, TO THE POINT OF BEGINNING.

SITUATE IN WHATCOM COUNTY, WASHINGTON.