PRAKASH MODI
STREAM AND WETLAND ASSESSMENT REPORT AND BUFFER REDUCTION PLAN

ACERA LLC
Advanced Concepts in Environmental Regulatory Assistance

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EXECUTIVE SUMMARY

The findings and conclusions presented in this report are based on an interpretation of information currently available to ACERA. This summary is for introductory purposes and should be used only with the full text of this report.

ACERA has completed a stream assessment, Ordinary High Water Mark (OHWM) determination, and wetland delineation and assessment for proposed site development located at King County Parcel 0622100060 (Site), located within the City of Woodinville, Washington. The Site was investigated January 27, 2014 and resulted in the OHWM determination of Little Bear Creek and the delineation of one on-site wetland (Wetland A) that contained indicators of wetland hydrology, hydric soils, and a predominance of hydrophytic vegetation which satisfied the criteria set forth in the 1987 U.S. Army Corps of Engineers' *Wetlands Delineation Manual* (Corps 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region v2.0* (Corps 2010). Tables 1 and 2 below summarize the wetland(s) delineated at the Site. Table 3 provides a stream classification summary. Appendix A contains wetland delineation maps.
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Table 1. Wetland Size, Category, and Buffer Width Summary

Wetland ID	Size (Sq. Ft.)	Size (Acres)	Wetland Category[1]	Wetland Class[2]	Buffer Width[3]	Reduced Buffer Width[4]
A	1,800	0.04	IV	3	50 feet	25 feet

1. Washington State Wetland Rating System for Western Washington – revised, Hruby 2004.
2. City of Woodinville *WMC 21.24.320 Wetlands – Designation and rating*
3. City of Woodinville Required Buffer Widths for Wetlands *WMC 21.24.330*
4. City of Woodinville Required Buffer Widths for Wetlands with Enhancement *WMC 21.24.330*

Table 2. Wetland Classification Summary

Wetland ID	Cowardin Class[1]	HGM Class[2]	Dominant Vegetation
A	PSS1B	Slope	Salmonberry (FAC), Nine Bark (FACW)

1. Classification of Wetlands and Deepwater Habitats of the United States, Cowardin 1979.
2. Hydrogeomorphic Classification - Washington State Wetland Rating System for Western Washington – Revised, Hruby 2004.

Table 3. Stream Classification Summary

Stream ID	Stream Type[1]	Stream Type[2]	Buffer Width[3]	Reduced Buffer Width[4]
Little Bear Creek	Type 1	Type F	150 feet	100 feet

1. City of Woodinville *WMC 21.24.370 Streams – Designation and rating*
2. WA State Forest Practices Board - *WAC 222-16-030*
3. City of Woodinville Required Buffer Widths for Streams *WMC 21.24.380*
4. City of Woodinville Required Buffer Widths for Stream with Enhancement *WMC 21.24.380*

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1.0 INTRODUCTION

ACERA LLC has completed a stream assessment, Ordinary High Water Mark (OHWM) determination, and wetland delineation and assessment for proposed site development located at King County Parcel 0622100060 (Site) in Woodinville, Washington. The Site is located within Section 03, Township 26N, Range 05E, Willamette Meridian. The center of the Site is at Latitude 47°46'04.53"N and Longitude 122°09'27.98"W (Figure 1). Figures are provided in Appendix A, Wetland Determination Forms in Appendix B, and Wetland Rating Sheets in Appendix C.

1.1 Applicant

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1.2 Scope of Services

The scope of work for this study was limited to the following tasks:

- A review of documents readily available, including national and local wetland inventory maps and the *Soil Survey of the King County Area* (1952).
- A visual assessment to observe existing site conditions and to identify wetland(s) and streams located on or within 300 feet of the Site. Methods defined in the *U.S. Army Corps of Engineers Wetland Delineation Manual* (1987), and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region v2.0* (2010) were used to determine the presence and extent of wetlands on the Site.
- Review federal, state, and local regulations pertaining to the wetlands identified on the Site. The review was used to classify the on-site wetlands.
- An assessment of on-site wetland functions and values.
- Delineation of wetland boundaries located within the Site.
- Stream Typing and determination of stream OHWM.
- A report documenting the methods, results, and conclusions of this wetland assessment.
- Buffer reduction and enhancement plan.

1.3 Site Description

The Site consists of one parcel that is approximately 1.54 acres in size and is zoned R/6. The Site address is 19400 136th Avenue NE, Woodinville, WA 98072. The nearest cross road is 195th Street. The Site is currently undeveloped and comprised of a young mixed native forest and invasive shrub species. Current access to the Site is from 136st Avenue NE. Adjacent properties to the north, south, and west are developed with single family residents. SR 522 is located to the east. The site slopes down from 136th Avenue NE to Little Bear Creek, then up towards SR 522.

1.4 Project Description

The current plan is for the western portion of the Site to be divided into 3 Lots and developed with single family residences. The remainder of the Site will remain undeveloped and designated as a critical areas tract (Figure 2).

2.0 WETLAND DELINEATION / STREAM OHWM DETERMINATION METHODS

The following section discusses the methods used to identify, delineate, and categorize wetlands and streams at the Site.

2.1 Preliminary Review

Prior to field work, background research of existing information was completed. Documents and websites reviewed included, but were not limited to: National and local wetland inventory maps; The Natural Resource Conservation Service's (NRCS) Web Soil Survey; Google Earth Aerial Photographs; and a preliminary review for threatened, endangered, and sensitive plant and animal species.

2.2 Field Methodology

An assessment of existing site conditions and visual observations were made to identify wetland(s) and streams located on or within accessible areas 300 feet of the study area boundary. Methods defined in the *U.S. Army Corps of Engineers Wetland Delineation Manual* (Corps 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region v2.0* (Corps 2010) were used to determine the presence and extent of wetlands on and near the site. Please note that *The Washington State Wetlands Identification and Delineation Manual* (Ecology 1997), was repealed March 14, 2011 and is not used by ACERA. The methods in the Corps manuals recognize that the three parameters of hydrology, hydric soils, and hydrophytic vegetation are found in wetlands and that these parameters are important in the establishment and maintenance of wetland communities. The methods evaluate each of the three parameters to determine if a wetland is present and to establish wetland boundaries.

Specific on-site methods included transecting the property at approximately 50-foot intervals, establishing formal data plots in and adjacent to areas where surface water or saturated soils were observed, as well as numerous test pits to evaluate near-surface water levels. Vegetation, soil, and hydrology data were collected at formal and informal data plots and recorded on *WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region v2.0* (Appendix B). Test pits were routinely excavated adjacent to the wetland boundary and prior to determining the actual boundary location by incorporating the criteria above.

The methods for stream OHWM determination were followed in the publication: *Determining the Ordinary High Water Mark on Streams in Washington State. Second Review Draft. Washington State Department of Ecology, Shorelands & Environmental Assistance Program, Lacey, WA. Ecology Publication # 08-06-001.* (Olson, P. and E. Stockdale. 2010). This publication uses the OHWM definition from the Shoreline Management Act:

> "Ordinary high water mark" on all lakes, streams, and tidal water is that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on June 1, 1971, as it may naturally change thereafter, or as it may change thereafter in accordance with permits issued by a local government or the department: PROVIDED, that in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining salt water shall be the line of mean higher high tide and the ordinary high water mark adjoining fresh water shall be the line of mean high water.

The site assessment was performed on January 27, 2014. To mark the boundary between wetlands and uplands, pink surveyor's flagging labeled "WETLAND DELINEATION" was numerically labeled and tied to vegetation or placed in the substrate along the wetland boundary. To mark the points where data was

collected, white/pink polka dot flagging was numerically labeled and placed at each sampling location. To mark the OHWM, orange surveyor's flagging was tied to vegetation at the OHWM.

2.3 Hydrophytic Vegetation

The USFWS and the NWI have established a rating system that has been applied to commonly occurring plant species on the basis of their frequency of occurrence in wetlands (Table 4). Species indicator status expresses the range in which plants may occur in wetlands and non-wetlands (uplands). Under this system, vegetation is considered hydrophytic when there is an indicator status of facultative (FAC), facultative wetland (FACW) or obligate wetland (OBL). *The National Wetland Plant List: 2013 Wetland Ratings* (Lichvar 2013) was used to determine vegetation indicator status.

Table 4. Definitions for USFWS Plant Indicator Status

Plant Indicator Status Category	Indicator Status Abbreviation	Definition (Estimated Probability of Occurrence)
Obligate Upland	UPL	Occur rarely (<1 percent) in wetlands, and almost always (>99 percent) in uplands
Facultative Upland	FACU	Occur sometimes (1 percent to <33 percent) in wetlands, but occur more often (>67 percent to 99 percent) in uplands
Facultative	FAC	Similar likelihood (33 percent to 67 percent) of occurring in both wetlands and uplands
Facultative Wetland	FACW	Occur usually in wetlands (>67 percent to 99 percent), but also occur in uplands (1 percent to 33 percent)
Obligate Wetland	OBL	Occur almost always (>99 percent) in wetlands, but rarely occur in uplands (<1 percent)
No Indicator	NI	Not an Indicator due to insufficient information to determine status
Not Listed	NL	Not listed - either non-native species or does not occur in wetlands (UPL)

Indicators of Hydrophytic Vegetation include: 1 Rapid Test for Hydrophytic Vegetation; 2 Dominance Test; 3 Prevalence Index; 4 Morphological Adaptions; and 5 Wetland Non-Vascular Plants. Indicator 1 is met when all dominant species across all strata are FACW and/or OBL. Indicator 2 is met when ***more than*** 50 percent of the dominant species in the plant community are FAC or wetter. Indicator 3 is an index of weighted-average wetland indicator status of all plant species within the sampling plot. This indicator is met when the Prevalence index equals 3 or less ***and*** indicators of wetland hydrology and hydric soils are also met. Indicator 4 allows for conversion of FACU plants to FAC if morphological adaptions to wetland hydrology are observed on those plants; the plot is then reassessed and must meet either Indicator 2 or 3. Indicator 5 is used for bryophyte dominant plant communities. This indicator is met when more than 50 percent of the total coverage of bryophytes consists of species known to be highly associated with wetlands.

2.4 Wetland Hydrology

Hydrologic conditions identifying wetland characteristics occur during those periods when the soils are inundated permanently or periodically, or the soil is continuously saturated to the surface for sufficient duration to develop hydric soils and support vegetation typically adapted for life in periodically anaerobic conditions. Research has indicated that the duration of soil saturation and inundation during the growing season is more influential on the plant community than the frequency of soil saturation and inundation during the growing season. For the purposes of this wetland delineation, the wetland hydrology criterion was considered to be satisfied if it appeared that wetland hydrology was present for

a minimum of 14 or more days during the growing season at a minimum frequency of five years in ten. The growing season begins when the soil reaches a temperature of 41 degrees Fahrenheit at 19.7" below the surface, or observable plant biological activity has begun at the Site (bud burst, seed sprout, emergence of herbaceous plants, etc.).
Wetland Hydrology indicators are split into four groups (A through D). These include: A. direct observations of surface or ground water; B. evidence that the site is subject to flooding or inundation (water marks, drift deposits, etc.); C. evidence that the soil is saturated or was saturated recently (oxidized rhizospheres, the presence of reduced iron or sulfur in the soil profile, etc.); and D. landscape, soil, and vegetation features that indicate contemporary wet conditions. Each indicator group is further divided into primary and secondary indicators. Wetland hydrology is met when one primary or two secondary indicators are observed.

Hydrology is evaluated by direct visual observation of surface inundation or soil saturation within 16 inches below the existing ground surface in data plots. According to the 1987 Corps Manual, *"for soil saturation to impact vegetation, it must occur within a major portion of the root zone (usually within 12 inches of the surface) of the prevalent vegetation."* Therefore, if saturated soils or indicators were observed within 12 inches of the surface, positive indicators of wetland hydrology are noted. The area near each data plot is also examined for indicators of wetland hydrology. It was not possible to observe conditions during the entire growing season. Areas where several positive indicators of hydrology were observed, and other indicators of wetland conditions were observed, it is assumed that wetland hydrology occurs for a sufficient period of the growing season to meet the wetland criteria.

2.5 Hydric Soils

The National Technical Committee for Hydric Soils (NTCHS) defines a hydric soil as "*a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part*" (USDA Soil Conservation Service 1994). These conditions favor the growth and regeneration of hydrophytic vegetation. Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment. As a result of anaerobic conditions, hydric soils exhibit characteristics directly observable in the field, including high organic matter content, greenish or bluish gray color (gley formation), accumulation of sulfidic material, spots of orange or yellow color (redoximorphic features), and dark soil colors (low chromas).

Soil observations were completed within soil data plots dug with a shovel to a depth of at least 16 inches below the existing ground surface. Soil organic content was estimated visually and textually. The presence of sulfidic material was determined by the presence of sulfide gases (i.e., a "rotten egg" odor). Soil colors were recorded after being determined through use of the three aspects of color in the Munsell® Soil Color Chart: hue, value, and chroma (e.g., a soil designated as 10YR 6/2 has a hue of 10YR, a value of 6, a chroma of 2, and a soil color name of light brownish gray) (Munsell 2000).

Soil samples were then examined for a match of color and texture characteristics with hydric soil indicators listed in the manual: *Field Indicators of Hydric Soils in the United States v7.0* (USDA 2010). Hydric soil indicators used in this region include: A1 Histosol; A2 Histic Epipedon; A3 Black Histic; A4 Hydrogen Sulfide; A11 Depleted Below Dark Surface; A12 Thick Dark Surface; S1 Sandy Mucky Mineral; S5 Sandy Redox; S6 Stripped Matrix; F1 Loamy Mucky Mineral; F2 Loamy Gleyed Matrix; F3 Depleted Matrix; F6 Redox Dark Surface; F7 Depleted Dark Surface; and F8 Redox Depressions.

2.6 Wetland Categorization and Buffers

Wetlands were rated during the site assessment using Ecology's *Washington State Wetlands Rating System for Western Washington – Revised* (Hruby 2004), as well as the wetland classification guidelines in *WMC 21.24.320.* Wetland Rating Sheets are provided in Appendix C. Wetland buffers were assigned to each wetland based on the criteria set forth in *WMC 21.24.330.*

2.7 Stream Typing and Buffers

Streams were assessed and typed based on the stream type definitions of *WA State Forest Practices Board - WAC 222-16-030,* current online WDNR Forest Practices database Water Type Maps, and *WMC 21.24.370.* Stream buffer widths were determined based on the requirements of *WMC 21.24.380.*

3.0 BACKGROUND INFORMATION AND DOCUMENT REVIEW

The preparation of this report included review of several existing sources of documentation, review of agency databases and maps, and correspondence with resource agency staff. A field reconnaissance was conducted to review habitat conditions and verify written documentation. The review of existing information includes, but was not limited to, the following documents and information sources:

3.1 Aerial Photograph Review

Google Earth (2014) and King County iMAP (2009) were accessed to review aerial imagery of the Site and surrounding areas. According to the aerial imagery, the site is currently undeveloped and a mix of young deciduous forest and shrub plant communities (Figure 1). Little Bear Creek is visible in the eastern portion of the Site. Parcels to the north, south, and west are developed with single family residences. SR 522 abuts the eastern property boundary.

3.2 U.S. Fish and Wildlife Service's National Wetland Inventory Map

The U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) was queried to determine if previously identified wetlands are present on or near the Site (USFWS 2014). According to the NWI Interactive Online Mapper three wetlands are located within the vicinity of the Site (Figure 3). A Palustrine Unconsolidated Bottom Permanently Flooded (PUBH) wetland is present approximately 200 feet west of the Site. A Palustrine Scrub-Shrub Seasonally Flooded (PSSC) wetland is present approximately 600 feet southeast of the Site. A Palustrine Forested Seasonally Flooded/Palustrine Scrub-Shrub Semipermanently Flooded (PFOC)/(PSSF) wetland is present approximately 700 feet southwest of the Site. No previously identified wetlands are mapped on the Site itself.

3.3 Soil Survey Information

The Natural Resource Conservation Service's (NRCS 1952) Soil Survey of The King County Area, Washington was reviewed to determine areas likely to contain Hydric Soils indicative of wetland conditions. The soil survey identifies two soil types within the Site and immediately adjacent properties (Figure 4). Everett gravelly sandy loam (Nonhydric), 5 to 15 percent slopes (Map Symbol: **EvC**) is mapped within the western portion of the Site and Norma Sandy Loam (Predominantly Hydric) (Map Symbol: **No**) is mapped within the eastern portion of the Site.

3.4 Topographical Information

The Bothell, WA 1981, USGS 7.5 Minute Topographical Map was reviewed to determine the presence of large depressions and general drainage patterns of the Site and surrounding areas (Figure 5). The Topographical Map shows that the Site slopes down east and is situated on the western valley wall of the Little Bear Creek valley. Drainage generally flows east to Little Bear Creek, then south down this valley to the confluence of the Sammamish River, and then west to Lake Washington.

3.5 DNR and Fish and Wildlife Database Reviews

The Washington Department of Fish and Wildlife's (WDFW) Priority Habitats and Species (PHS) database was queried on April 29th, 2014 to determine if state or federally listed fish or wildlife species or their habitats occur on or within a 1/4 mile of the Site. The results from the PHS database are summarized below in Table 5.

Table 5. Priority Habitats and Species

Scientific Name	Common Name	Priority Area	Location	Federal Status	State Status
Oncorhynchus kisutch	Coho Salmon	Breeding Area, Occurrence	Little Bear Creek	Candidate	N/A
Oncorhynchus nerka	Kokanee Salmon	Occurrence, Migration	Little Bear Creek	N/A	N/A
Oncorhynchus nerka	Sockeye Salmon	Breeding Area, Occurrence	Little Bear Creek	N/A	N/A
Oncorhynchus tshawytscha	King Salmon	Occurrence	Little Bear Creek	Threatened	N/A
Oncorhynchus clarki	Coastal Resident Cutthroat Trout	Occurrence, Migration	Little Bear Creek	N/A	N/A

The Washington Department of Natural Resources' (WDNR) Natural Heritage Information System was queried to determine if the Site occurs in a location reported to contain high quality natural heritage wetland occurrences or occurrences of natural heritage features commonly associated with wetlands. According to WDNR data dated February 4th, 2014, there are no records of rare plants or high quality native ecosystems occurring in the vicinity of the Site.

In addition, the WDNR Forest Practices data base was consulted April 29th, 2014 to determine if water bodies occur on or in the vicinity of the Site that are previously mapped and classified under the water typing system detailed in *WAC 222-16-030*. According to the Water Type Map (Figure 6), several such water bodies are mapped on and in the vicinity of the Site. Little Bear Creek (Type F) is mapped within the eastern portion of the site. Two unnamed Type N tributaries to Little Bear Creek and what appears to be a system of several Type N drainage ditches are mapped east of the Site. The same off-site wetlands mapped by the National Wetlands Inventory discussed in Section 3.2 of this report are also presented on the Water Type Map.

4.0 RESULTS

An assessment for the presence of wetlands was performed on January 27, 2014. The OHWM of Little Bear Creek was determined and one unnamed wetland (Wetland A) was delineated as a result (Figure 2). Indicators of wetland hydrology, hydric soil characteristics, and dominant hydrophytic vegetation observed at Wetland A is summarized in Table 6 below.

Table 6. Wetland Indicator Summary

Wetland ID	Hydric Soil Indicators	Wetland Hydrology Indicators	Hydrophytic Vegetation (FAC, FACW, or OBL)
A	Histosol (A1)	Saturation (A3)	Salmonberry (FAC), Nine Bark (FACW)

4.1 Wetland A

Wetland A is located within the north-central portion of the Site (Figure 2). It is a slope wetland approximately 1,800 square feet (0.04 acre) in size and has a Cowardin Classification of Palustrine Scrub-Shrub Broad-Leaved Deciduous Saturated (PSS1B) (Cowardin 1979). This wetland is rated Category IV (Hruby 2004). Rating forms are included in Appendix C.

Hydrologic support for Wetland A is from surface runoff from adjacent upslope buffer areas and seasonal high ground water. Additional hydrologic input is stormwater runoff form the driveway on the adjacent property to the north of the Site. The dominant hydrologic regime is seasonally saturated.

Soils within Wetland A are black organic mucks.

Vegetation within Wetland A is a scrub-shrub plant community dominated by Nine Bark and Salmonberry of moderate cover. Little understory vegetation is present, mainly scant patches of slough sedge.

Although this wetland is adjacent to Little Bear Creek, it is neither proximal (in the center of the creek); nor is it hydrologically influenced by Little Bear Creek. Wetland A therefore does not meet the requirements of a Class 1 Wetland. Wetland A does not provide any hydrologic functions such as flood attenuation or habitat functions such as fish rearing habitat for Little Bear Creek. Little Bear Creek was at flood stage during the site visit and was well below the elevation of Wetland A.

Due to its small size (1,800 square feet) and its low category rating (IV), which reflects minimal functions for hydrology, water quality, and habitat, Wetland A meets the criteria of WMC 21.24.340(1)(a). Therefore, the requirements of 21.24.340(1)(b-d) do not need to be addressed.

Wetland A is designated as Class III (WMC 21.24.320). The Class III designation is the closest equivalent to the rating of Category IV. Wetland A is rated Category IV, the lowest possible category using the Best Available Science, i.e. Ecology's Washington State Wetlands Rating System for Western Washington – Revised (Hruby 2004). Wetland A was rated low for water quality function (8), low for hydrologic function (2), and low for habitat function (13).

According to *WMC 21.24.330,* the standard regulated buffer for Class III wetlands is 50 feet and this buffer width may be reduced to 25 feet with enhancement.

Both Wetland A and its buffer are situated within the proposed stream buffer. Enhancement of Wetland A and its buffer will occur as part of the mitigation actions proposed for the stream buffer reduction.

4.2 Little Bear Creek

Little Bear Creek is within WRIA 8. It originates north of Woodinville, in Snohomish County and flows south through the center of the Site (Figure 2). It eventually flows into the Sammamish River, and then west into Lake Washington. It is classified as a Type F Stream (perennial, fish habitat) under the definitions of *WAC 222-16-030*. The WDFW PHS Database documents the occurrence of several species of salmonid fish within this reach of Little Bear Creek. It also documents use of this reach by these species for breading and migration habitat (Section 3.5, Table 5).

According to *WMC 21.24.370 Streams – Designation and rating,* Little Bear Creek is classified as a Type 1 Stream. According to *WMC 21.24.380,* the standard buffer width for a Type 1 stream is 150 feet measured from the Ordinary High Water Mark (OHWM). Type 1 Streams with degraded buffers may

have their buffers reduced to 115 feet with buffer enhancement and may be further reduced to 100 feet if the same buffer functions can be achieved.

City of Woodinville Ordinance 375 § 3, 2004 states:

> *"according to the science, effective buffer widths for riparian functions vary considerably; the literature is not definitive in identifying one buffer width for each function studied. The ranges for buffer widths vary in size for a particular function, according to scientific studies. Water temperature, sediment and pollution retention, healthy benthic communities and habitat for some species may be achieved in 100 feet of restored and enhanced riparian stream corridors"*

This references the best available science as adopted by the City of Woodinville. Existing baseline of stream buffer function and value and the net improvement with the proposed enhancement measures are provided in Table A., Appendix D. Baseline and Enhancement Functions Analysis.

5.0 FLORA OBSERVATIONS

Major plant species were noted during the site assessment. These observations are not intended to provide a complete inventory, but a basic list of common flora found at the Site and its vicinity. Table 7 provides a summary of these plant species observations.

Table 7. Plant Species List

Common Name	Scientific Name	Wetland Indicator Status
Trees		
Big-leaved Maple	*Acer macrophyllum*	FACU
Black Cottonwood	*Populus balsamifera*	FAC
Cascara	*Frangula purshiana*	FAC
Douglas Fir	*Pseudotsuga menziesii*	FACU
Oregon Ash	*Fraxinus latifolia*	FACW
Red Alder	*Alnus rubra*	FAC
Western Hemlock	*Tsuga heterophylla*	FACU
Western Red Cedar	*Thuja plicata*	FAC
Shrubs		
Beaked Hazelnut	*Corylus cornuta*	FACU
Crab Apple	*Malus fusca*	FACW
Cut-Leave Blackberry	*Rubus laciniatus*	FACU
Douglas Spiraea	*Spiraea douglasii*	FACW
Himalayan Blackberry	*Rubus armeniacus*	FACU
Knotweed	*Polygonum spp.*	NI (Invasive)
Low Oregon Grape	*Mahonia nervosa*	FACU
Nine Bark	*Physocarpus capitatus*	FACW
Oceanspray	*Holodiscus discolor*	FACU
Red Elderberry	*Sambucus racemosa*	FACU
Red Huckleberry	*Vaccinium parvifolium*	FACU
Salal	*Gaultheria shallon*	FACU
Salmonberry	*Rubus spectabilis*	FAC
Scotch Broom	*Cytisus scoparious*	NL(UPL)
Sitka Willow	*Salix sitchensis*	FACW

Common Name	Scientific Name	Wetland Indicator Status
Snow Berry	*Symphoricarpos albus*	FACU
Trailing Blackberry	*Rubus ursinus*	FACU
Vine Maple	*Acer circinatum*	FAC
Herbs, grasses, sedges, rushes, and ferns		
Common plantain	*Plantago major*	FACU
Creeping buttercup	*Ranunculus repens*	FACW
Dandelion	*Taraxacum officinale*	FACU
Dewey Sedge	*Carex deweyana*	FAC
Inside Out Flower	*Vancouveria hexandra*	NL (UPL)
Lady fern	*Athyrium filix-femina*	FAC
Reed Canarygrass	*Phalaris arundinacea*	FACW
Slough Sedge	*Carex obnupta*	OBL
Stinging Nettle	*Urtica dioica*	FAC
Sword fern	*Polystichum munitum*	FACU
Velvet Grass	*Holcus lanatus*	FAC
Water parsley	*Oenanthe sarmentosa*	OBL
This listing represents the major plant species identified by ACERA in January 2014. There may be other species present on the Site that are not listed.		

6.0 PROPOSED WETLAND AND STREAM BUFFERS

The onsite stream, wetland and standard buffer widths make the development of the Site economically impracticable. Wetland and stream buffer reduction are proposed as the only feasible way to complete the proposed short plat and bring the Site into a zoning density consistent with the adjacent properties. The proposed stream buffer will be reduced from 150 feet to 100 feet measured from the OHWM of Little Bear Creek. The western portion of Wetland A buffer will be reduced to the extent of the proposed stream buffer (Figure 2). The stream buffer will be identified and marked per the requirements of *WMC 21.24.160 Critical area markers and signs.*

6.1 Existing Stream and Wetland Buffer Condition

Currently on-site stream and wetland buffers are degraded because of infestations on highly invasive Knotweed (*Polygonum spp.*) and Himalayan Blackberry (*Rubus armeniacus*). The Knotweed is primarily located along the banks of Little Bear Creek and the Himalayan Blackberry is dispersed throughout the buffer and fairly dense in some areas. Refer to Table A., Appendix D. for a Baseline and Enhancement Functions Analysis.

Native plants within the buffer are of low diversity. Red Alder (*Alnus rubra*) and Salmonberry (*Rubus spectabilis*) make up the majority of these. These species are deciduous and provide minimal screening of Little Bear Creek and Wetland A from urban disturbance from adjacent residences and SR 522.

Herbaceous vegetation is also minimal within the buffer areas. This is primarily due to the presence of invasive Knotweed and Blackberry. Buffer functions including sediment and pollutant filtration and

flood water attenuation, stormwater runoff infiltration and attenuation, slope stabilization, and wildlife habitat are all reduced as a result.

6.2 Wetland Enhancement Plan

The Applicant proposes to reduce the western portion of the 50 foot regulated wetland buffer to the western limits of the proposed 100 foot stream buffer for Little Bear Creek. The reduced wetland buffer will average between 35-45 feet along this edge. The remainder of the standard 50 foot buffer is located entirely within the proposed stream buffer (Figure 2). Mitigation for the wetland buffer reduction will include wetland enhancement, wetland buffer enhancement, and best management practices (BMPs).

The emergent plant community within Wetland A will be enhanced by the planting of additional native plants within the understory of the existing scrub-shrub plant community (Table 8). This will improve water quality functions within the wetland including sediment and pollutant filtration. Wildlife habitat functions will also be increased by these plantings by providing additional cover and forage for a variety of wildlife species. Refer to Table A., Appendix D for a Baseline and Enhancement Functions Analysis.

6.3 Stream and Wetland Buffer Enhancement Plan

The stream and wetland buffer will be enhanced by first the removal and continued maintenance of the invasive Knotweed and Blackberry species, and then the establishment of native tree, shrub, and herbaceous plants. The Stream and Wetland Buffer Enhancement Plan will substantially increase the following buffer functions:

- Wildlife Habitat
- Water Quality
- Flood Control and Stormwater Attenuation
- Ground Water Recharge
- Erosion Control

These enhanced buffer functions will provide comparable functions to those achieved in 100 feet equal to the functions achieved in 115 feet for the site as required by *WMC 21.24.380* (1*).

This proposal meets *WMC 21.24.400(1)(a & c).* Little Bear Creek is primarily degraded due the construction of SR 522 within much of its historical floodplain. Upstream of the site, this creek flows between SR 522 and commercially developed industrial properties. These are significant sources of disturbance and pollution. Infestations of invasive knotweed and blackberry species are degrading the stream buffer. Enhancement measures detailed in Table A will significantly improve current onsite buffer functions and will not further degrade the stream.

This proposal meets *WMC 21.24.400(1)(b-d).* Existing baseline of stream buffer function and value and the net improvement with the proposed enhancement measures are provided in Table A., Appendix D.

6.4 Removal and Maintenance of Invasive Species

Control and removal of all invasive Knotweed and Blackberry species will take place prior to installation of restoration plantings. It is anticipated that this will take place during the growing season of 2015. A WA State Licensed Herbicide Application Professional with specific experience working with Knotweed and Blackberry control adjacent to aquatic areas will be hired by the applicant to perform this task. Care will be taken to avoid damage to existing native vegetation and aquatic environments. Annual control and removal of all invasive Knotweed and Blackberry species will take place throughout the 5 year monitoring period.

6.5 Planting Specifications

All enhancement plant materials will be native to the northwest, and preferably the Puget Sound Region. Plant materials will be propagated from native stock; no cultivars or horticultural varieties will be allowed. All plants shall be high quality restoration grade vigorous stock. It may be necessary to acquire plant material through several nurseries and some species may be unavailable. See Tables 8 and 9 for a complete list of plant species and quantities. ACERA recommends the following licensed regional nurseries for procurement of native plants.

- Black Lake Organic Nursery, Olympia, WA (360) 786-0537
- Bog foot Environmental, Olympia, WA (360) 866-7068
- Inside Passage, Port Townsend, WA (360) 385-6114
- Direct Seed Sales, Issaquah, WA (425) 466-1350
- Sound Native Plants, Olympia, WA (360) 352-4122
- Watershed Garden Works, Longview, WA (360) 423-6456
- Woodbrook Nursery, Gig Harbor, WA (253) 265-6271

Plant species have been selected that are adapted to grow within the wetland restoration areas based on moisture tolerances, habitat adaption, and the desired plant community. The landscape contractor/applicant shall make a good faith effort to secure all species specified in this plan. Native plant species substitutions may be authorized by the project biologist.

Table 8. Wetland ENHANCEMENT PLANTS

Wetland Enhancement Area: 1,800 Square Feet					
SCIENTIFIC NAME	**COMMON NAME**	**SIZE**	**CONDITION**	**SPACING**	**QUANTITY**
Carex obnupta	Slough Sedge	n/a	Seed (Inside Passage)	3-5 pounds per acre	2 oz

Carex obnupta	Slough Sedge	Plug	Plug	Random ~1-2' o/c	100
Glyceria elata	Tall mannagrass	Plug	Plug	Random ~1-2' o/c	100

Table 9. BUFFER RESTORATION PLANTS

SCIENTIFIC NAME	COMMON NAME	SIZE	CONDITION	SPACING	QUANTITY	
					Area #1	Area #2
Trees					**3,700 sf**	**22,000 sf**
Acer macrophyllum	Big-leaved Maple	1-gallon	container or bare root	Random ~10'-15' O/C	0	20
Thuja plicata	Western Red Cedar	1-gallon	container or bare root	Random ~10' -15' O/C	10	30
Tsuga heterophylla	Western Hemlock	1-gallon	container or bare root	Random ~10' -15' O/C	10	30
Shrubs						
Acer circinatum	Vine Maple	1-gallon	container or bare root	Random ~5'-8' O/C	20	50
Amelanchier alnifolia	Serviceberry	1-gallon	container or bare root	Random ~5'-8' O/C	5	50
Cornus sericea	Red-osier Dogwood	1-gallon	container or bare root	Random ~5'-8' O/C	20	50
Oemleria cerasiformis	Indian Plum	1-gallon	container or bare root	Random ~5'-8' O/C	5	50
Rosa pisocarpa	Pea-fruit Rose	1-gallon	container or bare root	Random ~5'-8' O/C	10	50
Salix sitchensis	Sitka Willow	1-gallon	container or stake	Random ~5'-8' O/C	20	50
Sambucus racemosa	Red Elderberry	1-gallon	container or bare root	Random ~5'-8' O/C	5	50
Symphoricarpos albus	Snowberry	1-gallon	container or bare root	Random ~5'-8' O/C	5	50
Emergents/Herbaceous						
n/a	Native Riparian Seed Mix	n/a	Seed (Direct Seed Sales)	6 pounds per acre	1/2 lb	3 lbs

Planting will occur between fall 2014 and early spring 2015. Site conditions permitting, the optimum time for planting most native woody plant material appears to be the later part of winter and early spring (February-March). Plants are to be placed randomly and interspersed within existing native vegetation at the approximate densities outlined in Tables 8 and 9. Seed mixes are to be scattered immediately after all restoration plants have been properly installed. Planting instructions are provided in Figure 8.

6.6 Removal and Maintenance of Invasive Species

Maintenance shall consist of supplemental irrigation as necessary and replacement of dead or dying plants with appropriate vegetation specified in the planting plan. Irrigation of native plantings is recommended twice monthly from June 15th – October 15th of the first two years post installation.

7.0 MONITORING PLAN

A monitoring program will be established for the project in order to evaluate installation, establishment, and survivorship of mitigation plantings, and the successful control and maintenance of invasive blackberry and knotweed species. Monitoring inspections and reports will be prepared by a qualified biologist or City of Woodinville staff, and will follow the Monitoring Schedule detailed below.

- At the time of plant installation
- At the end of the growing season of first, second, and third years after plant installation
- At the end of the growing season of the fifth year after plant installation

7.1 Installation Inspection and Monitoring

Compliance monitoring will consist of evaluating the mitigation plantings immediately after installation to confirm the plan was followed and plants were installed appropriately and invasive knotweed and blackberry species have been removed. A walk-through survey will be conducted by the project biologist or qualified City Staff to serve as the "as-built survey", including inspection of all planted vegetation to verify that all design features agreed to in this plan have been correctly and fully implemented. Any changes made in the field will be consistent with the overall objective of the plan. Fixed points will be established and permanently marked within the mitigation site to be used as a transect end for vegetation monitoring and a photo-point during long-term monitoring.

Following completion of the Installation Inspection and Monitoring, a summary technical memorandum will be prepared verifying that all design features have been correctly implemented. Any changes to the planting plan will also be discussed in the technical memorandum.

7.2 Long Term Monitoring

The purpose of the long-term monitoring program will be to evaluate the establishment and maintenance of the plant communities within the enhancement areas to determine if the goals and objectives of the Plan have been met. The plots and/or transects established during the post-construction inspection will be utilized for monitoring development of the enhancement plantings over the course of the long-term monitoring period. Photos will be taken at each transect end-point to document the status of the plantings.

Monitoring will be conducted using quantifiable sampling techniques to determine the survival, relative health and growth of plant material, as well as the successful establishment of the desired plant communities within the enhancement areas. Long term monitoring will be conducted following the Monitoring Schedule described above, with the monitoring report describing and quantifying the status

of the mitigation submitted following each monitoring visit. The City of Woodinville will be responsible for inspecting and approving the monitoring reports.

7.3 Performance Standards

Performance standards provide a clear means of evaluating the success of a mitigation action. The following performance standards have been developed to reflect the goals and functional objectives of this Plan. Success of the enhancement plantings will be based upon their survival rate. Permanent vegetation sampling plots and/or transects will be established to monitor survival rates and cover within each enhancement area. They will be established at the time of the installation inspection. Volunteer native, non-invasive species will naturally establish as invasive knotweed and blackberry is removed and controlled. Therefore, these volunteer native plants will be included as acceptable components of the enhancement plantings.

In the event the site fails a Performance Standard, the project biologist and/or appropriate regulatory staff will evaluate the potential causes for the failing Performance Standard(s) and determine an appropriate contingency action or actions.

Table 10. Performance Standards

Mitigation Goal	Performance Standard	Parameter Measured	Year Inspected	Sampling Method
Removal of invasive Knotweed and Blackberry species	At least 95% of invasive Knotweed and Blackberry species are removed from enhancement areas prior to plant installation	Percent coverage	Installation Inspection	Visual estimation of invasive Knotweed and Blackberry cover within the enhancement areas
Control of invasive Knotweed and Blackberry species	Invasive Knotweed and Blackberry species cover less than 10% of enhancement area	Percent coverage	1,2,3,5	Visual estimation of invasive Knotweed and Blackberry cover within the enhancement areas
Install enhancement plants properly per plan	Native plants are healthy, the appropriate species, and are properly installed	Visual Inspection	Installation Inspection	Visual Inspection
Establish additional native trees to enhance buffer functions	80% survival of enhancement trees	Survival	1, 2, 3, 5	Belt transect count of surviving and dead trees.

Mitigation Goal	Performance Standard	Parameter Measured	Year Inspected	Sampling Method
Establish additional native shrubs to enhance buffer functions	80% survival of restoration shrubs	Survival	1, 2, 3, 5	Belt transect count of surviving and dead shrubs.
Establish emergent plant community within Wetland A	Presence of native emergent vegetation	Presence/Absence*	1, 2, 3, 5	Visual Walk-Through

7.4 Contingency Plan

A contingency plan may be implemented if necessary. Contingency plans can include additional plant installation, additional seeding, erosion control, and plant substitutions including type, size, and location.

If the monitoring results indicate that any of the 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. If any portion of the site fails to meet the success criteria, a contingency plan will be developed and implemented with City of Woodinville approval. Such plans are prepared on a case-by-case basis to reflect the failed mitigation characteristics.
Contingency/maintenance activities may include, but are not limited to:

1. Replacing plants lost to drought, disease, and wildlife damage as necessary.
2. Replacing any plant species with a 20% or greater mortality rate with a different, but similarly functioning native species approved by the project biologist.
3. Increased irrigating the mitigation area only as necessary during dry weather if plants appear to be too dry, with an appropriate quantity of water.
4. Reseeding the enhancement areas with an approved seed mixture as necessary.

8.0 BEST MANAGEMENT PRACTICES

The following Best Management Practices (BMPs) will be utilized during Site development and long term use of the Site to avoid unnecessary impacts to Critical Areas and buffers.

<u>DURING CONSTRUCTION</u>

- Clearly mark out established buffer with permanent signs and/or fencing protective to prevent impacts
- Install silt fencing around the work area to prevent erosion and siltation of adjacent water bodies
- Minimize amount of erodible soils at any given time to the maximum extent feasible.

- Check all equipment daily for leaks. Refueling and lubrication of equipment should be conducted in a designated area away from adjacent water bodies and storm drains
- Do not apply any chemicals when there is a possibility of rain

LONG TERM RESIDENTIAL USE

- Control pets and keep them out of buffer areas and Little Bear Creek. Domestic animals can serve as predators against wildlife or damage critical plant species. Dogs can spook breeding/migrating salmon. Clean up outdoor pet waste immediately. Little Bear Creek currently is listed by WA State Ecology as having elevated levels of fecal coliform.
- All lighting on the eastside of homes will be downward facing.
- Within residential landscaped areas, limit the use of herbicides or pesticides particularly near the areas of berry, fruit or mast producing shrubs or trees. This will help ensure the availability of foraging for wildlife. Even fertilizing lawns can degrade nutrients available to animals.
- Limit the use of insecticides. Insect populations are important on many ecological levels particularly as a food source for insectivores.

9.0 CONCLUSION

The Site assessment conducted during winter of 2014 resulted in the OHWM determination of Little Bear Creek and the delineation of one on-site wetland (Wetland A). The standard buffer widths of these protected areas make the development of the Site economically impracticable. The stream buffer reduction from 150 feet to 100 feet and the reduction of the western portion of Wetland A buffer to the extent of the stream buffer allow for the site to be developed at a density consistent with adjacent properties. The wetland enhancement and stream and wetland buffer enhancement measures detailed in this report adequately mitigate for the proposed buffer reduction by restoring the degraded buffer to a natural condition.

The findings and conclusions documented in this report have been prepared for specific application to this 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 Site may need to be revised wholly or in part.

Wetland boundaries identified by ACERA are considered preliminary until the flagged wetland boundaries are validated by the regulating agency(ies). Validation of the wetland boundaries by the regulating agency(ies) provides a certification, usually written, that the wetland boundaries verified are the boundaries that will be regulated by the agency(ies) until a specific date or until the regulations are modified. Only the regulating agency(ies) can provide this certification.

Since wetlands are dynamic communities affected by both natural and human activities, changes in wetland boundaries may be expected; therefore, wetland delineations cannot remain valid for an indefinite period of time. Local agencies typically recognize the validity of wetland delineations for a period of 5 years after completion of a wetland delineation report. Development activities on a site 5 years after the completion of this wetland delineation report may require revision of the wetland delineation. 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.

10.0 QUALIFICATIONS OF AUTHOR

Mike Layes is a Wildlife Biologist with 19 years professional experience. He is also a Professional Wetland Scientist (#2157) certified through the Society of Wetland Scientists. Mr. Layes has extensive training and experience in wetland science, aquatic habitat restoration and mitigation project design, wetland delineation, stream assessments, fishery survey techniques, ordinary high water mark (OHWM) determinations, near-shore marine habitat assessments, eelgrass bed delineation, aquatic ecology, and threatened and endangered species survey and monitoring techniques, and environmental permitting.

Mr. Layes earned a Bachelor of Science Degree in Wildlife Biology/Forest Ecology from The Evergreen State College in 1995. He has previously worked as a wildlife biologist for several Federal and State agencies, Universities, and Environmental Consulting Firms throughout his career on a wide range of projects dealing with threatened and endangered species and their habitats. Mr. Layes' experience in both wetland and wildlife science gives him the ability to prepare combined wetland and fish and wildlife habitat assessments as needed for any given project.

Mr. Layes is an experienced SCUBA diver with over 300 logged dives. He conducts underwater field work for fisheries surveys, shoreline, outfall, marina and shellfish farm development and restoration projects.

11.0 REFERENCES

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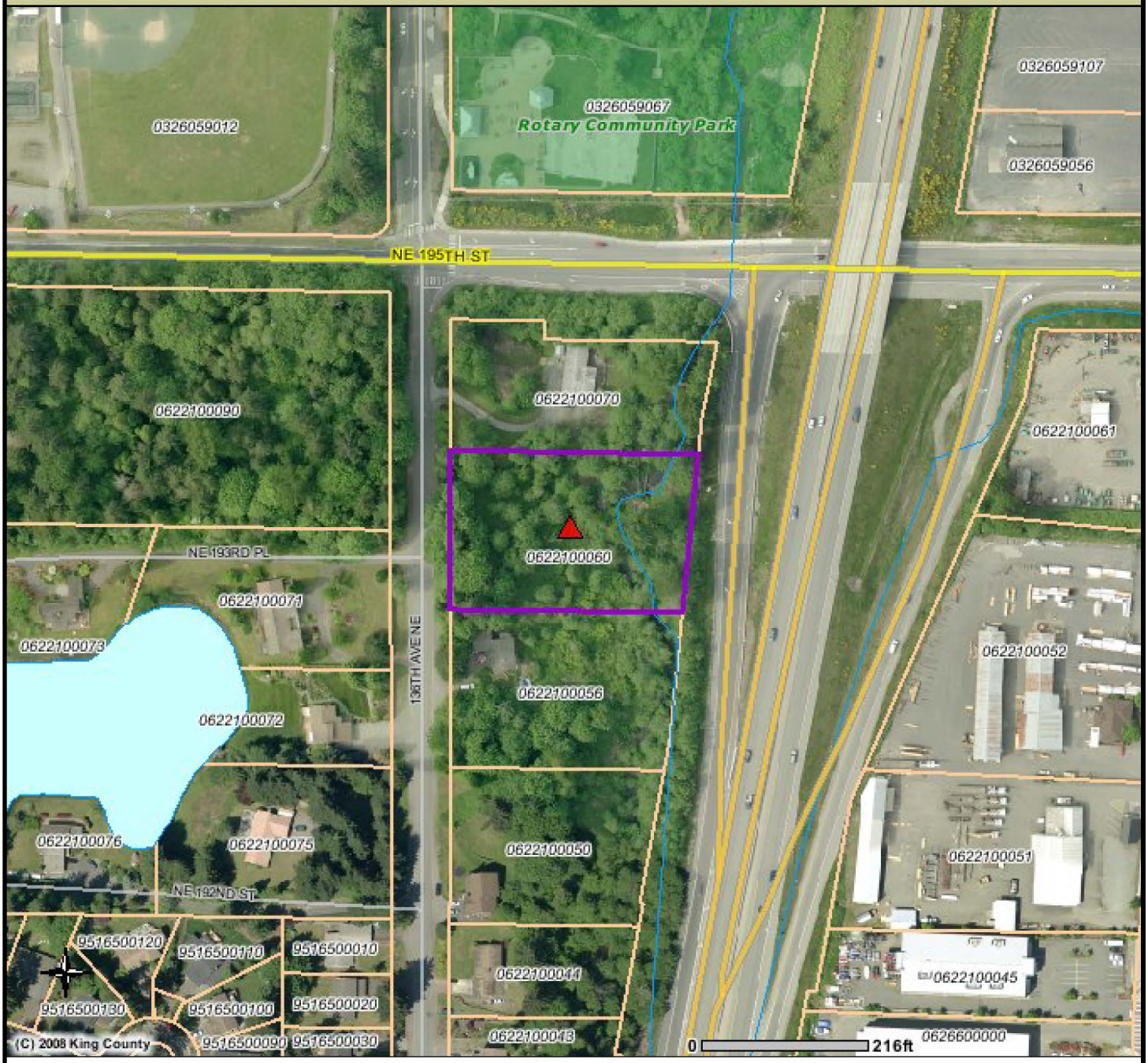
Appendix A. Figures

Figure 1



Legend

- Highlighted Feature
- County Boundary
- Mountain Peaks
- Highways
- Streets
- Highway
- Arterials
- (cont)
- Local
- Lakes and Large Rivers
- Streams
- Tribal Lands
- Parcels
- Parks
- 2009 Color Aerial Photos (6in)

2009 Color Aerial Photos (12in)

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Date: 4/28/2014 Source: King County iMAP - Property Information (http://www.metrokc.gov/GIS/iMAP)

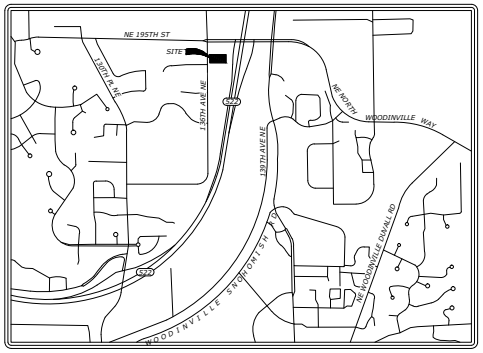
King County

A PORTION OF SECTION 3, TOWNSHIP 26 N., RANGE 5 E,. W.M.

MODI SHORT PLAT

CITY OF WOODINVILLE, WA

PARCEL #0622100060



VICINITY MAP
N.T.S

SCALE: 1" = 20'

SITE DATA

PARCEL NUMBER:	0622100060
SITE ADDRESS:	19400 136TH AVE NE WOODINVILLE, WA 98072
SITE AREA:	71,101 SF (1.63 ACRES) (SURVEYED)
SUBMERGED AREA:	7,617 SF
NET LOT AREA:	63,484 SF (1.45 ACRES)
CRITICAL AREA:	53,084 SF (75% OF SITE)
BUILDABLE AREA:	18,017 SF
ZONING:	R6, (RESIDENTIAL 6)
MAX LOTS:	1.02x6=6.12
SETBACKS:	
FRONT:	10' (20' GARAGE)
BACK:	5'
INTERIOR:	5'

DENSITY CALCULATIONS

PER WMC 21.12.030
MINIMUM DENSITY: 7 LOTS (75% OF MAX)

PER WMC 21.12.060
CRITICAL AREA & BUFFER: 75%
% MINIMUM DENSITY: 0.4
MIN LOTS: 3 LOTS

PER WMC 21.24.085
BUILDABLE AREA + 50% CRITICAL AREA: 1.02 ACRES
MAX NUMBER OF LOTS: 6 DU/AC(1.02 ACRES)=6 LOTS

MINIMUM LOT SIZE: 5,000 SF

MINIMUM FRONTAGE: 50 FT

MAX IMPERVIOUS: 70%

PROJECT INFO

OWNER/CLIENT:
XXXXXXXXXXXXXX
XXXXXXXXXXXXXX
XXXXXXXXXXXXXX
TEL: XXX-XXX-XXXX

ENGINEER:
BEYLER CONSULTING
7602 BRIDGEPORT WAY #3D
LAKEWOOD, WA 98499
TEL: 253-301-4157

SURVEYOR:
BEYLER CONSULTING
7602 BRIDGEPORT WAY #3D
LAKEWOOD, WA 98499
TEL: 253-301-4157

NO.	DESCRIPTION	INIT	DATE

BEYLER CONSULTING
Plan. Design. Manage
CIVIL ENGINEERING | LAND SURVEYING | LAND PLANNING
PROJECT MANAGEMENT | PERMIT EXPEDITING | FEASIBILITY
CONTACT
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fax: 253-396-0960
beylerconsulting.com
OFFICE
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Lakewood, WA 98498

SITE PLAN
MODI SHORT PLAT
CITY OF WOODINVILLE, WASHINGTON

DRAWN BY: BML | CHECKED BY: LCB | SCALE: HORZ: 1"=20' VERT: NA | DATE: 03/19/2014

PRELIMINARY

JOB NUMBER
13-177

SHEET 1 OF 1
PP1

U.S. Fish and Wildlife Service

National Wetlands Inventory

Figure 3

Apr 28, 2014

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

User Remarks:

Figure 4 Soil Map—King County Area, Washington

Map Scale: 1:802 if printed on A landscape (11" x 8.5") sheet.

N

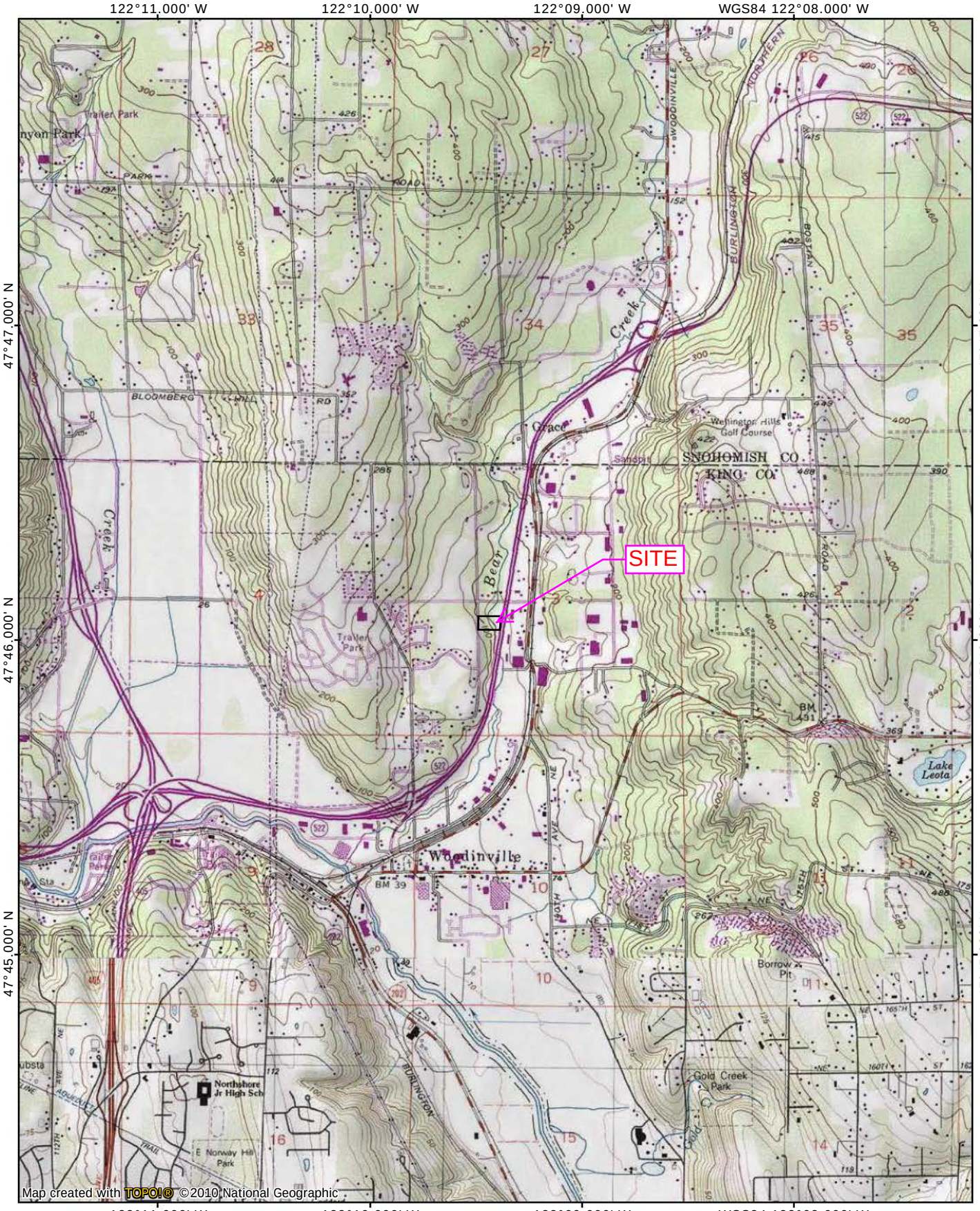
Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

47°46.093' N, 122°09.407' W WGS84TOPO! map printed on 04/28/14

Figure 5



NATIONAL GEOGRAPHIC

0 5 MILES
1000 0 1000 2000 3000 4000 5000 FEET
1 .5 0 KILOMETERS 1
1000 0 METERS 1000

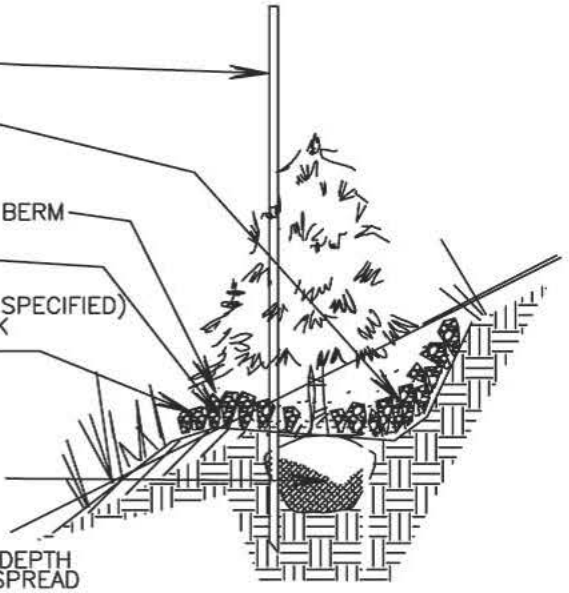
TN MN
16°
04/28/14

SLOPE PLANTING DETAIL

NOT TO SCALE

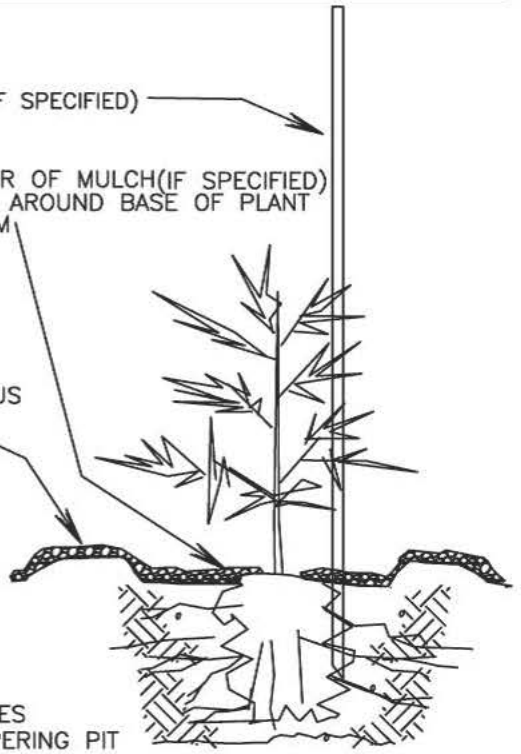
NOTES:

- LOCATER LATH (IF SPECIFIED)
- EXCAVATE APPROX. 2' DIA. WELL FOR PLANTING
- FEATHER EXCESS SOIL CREATE DOWN SLOPE WATER BASIN BERM
- SLOPE RELIEF (2:1 SHOWN, 1.5:1 MAX.)
- 3" DEPTH OF MEDIUM HEM/FIR BARK (IF SPECIFIED) MULCH OVER SAUCER SLOPING INTO BANK HOLD MULCH 3" FROM STEM
- SOD STRIPPED AWAY FROM MULCH/WELL ROOT/SOIL BALL SCARIFIED AND WORKED INTO PLANTING MEDIUM
- BARE-ROOT SIMILAR; EXCAVATE TO FULL DEPTH OF ROOT MASS AND CANOPY DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. WATER IMMEDIATELY AFTER INSTALLATION



TREE & SHRUB PLANTING DETAIL

NOT TO SCALE



NOTES:

- PLANT SHRUBS IN GROUPS OF 3 TO 5 OF SAME SPECIES AT SPACING SPECIFIED IN PLAN
- REMOVE CONTAINER & WORK ROOTS FREE OF SOIL; SPREAD ROOTS INTO EXCAVATION
- BACKFILL TO BE SETTLED USING WATER ONLY
- EXCAVATE TREE PIT AT A MIN. OF 4 TIMES DIA. OF ROOTBALL AT BALL CENTER, TAPERING PIT GRADE TO FINISH GRADE
- WATER IMMEDIATELY AFTER INSTALLATION
- BARE-ROOT SIMILAR; EXCAVATE TO FULL DEPTH OF ROOT MASS AND CANOPY DIAMETER. SPREAD ROOTS TO FULL WIDTH OF CANOPY. WATER IMMEDIATELY AFTER INSTALLATION

Appendix B. Wetland Data Sheets

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

Project Site: King County Parcel #0622100060 City/County: Woodinville/King Sampling Date: 01/27/2014
Applicant/Owner: Prakash Modi State: WA Sampling Point: SPA1w
Investigator(s): Mike Layes, PWS Section, Township, Range: 3/26N/5E
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0
Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: Everett gravelly sandy loam, 5 to 15 percent slopes NWI classification: PSS1B
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:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *n/a*			
2.			
3.			
4.			
50% = _____, 20% = _____		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 ft)			
1. *Physocarpus capitatus*	60	yes	FACW
2. *Rubus spectabilis*	40	yes	FAC
3.			
4.			
5.			
50% = 50, 20% = 20	100	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *n/a*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = _____, 20% = _____		= Total Cover	
Woody Vine Stratum (Plot size: 5 ft)			
1. *N/A*			
2.			
50% = _____, 20% = _____		= Total Cover	

% Bare Ground in Herb Stratum 90

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x1 =	
FACW species		x2 =	
FAC species		x3 =	
FACU species		x4 =	
UPL species		x5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - 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:

Project Site: King County Parcel #0622100060

SOIL

Sampling Point: SPA1w

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	10YR2/1	100					M	

[3]Sa = Sand, Si = Silt, C= Clay, L=Loam
G= Gravel, M= Muck, P =Peat, V=Very

[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: _____

Depth (inches): _____

Hydric Soils Present? **Yes** ☒ **No** ☐

Remarks:

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 Stresses 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): _____
Water Table Present?	Yes	☐	No	☒	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: King County Parcel #0622100060 City/County: Woodinville/King Sampling Date: 01/27/2014
Applicant/Owner: Prakash Modi State: WA Sampling Point: SPA2u
Investigator(s): Mike Layes, PWS Section, Township, Range: 3/26N/5E
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 5
Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: Everett gravelly sandy loam, 5 to 15 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:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	30	yes	FAC
2. *Acer circinatum*	30	yes	FAC
3. _____	_____	____	____
4. _____	_____	____	____
50% = 30, 20% = 12	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 ft)			
1. *Rubus spectabilis*	90	yes	FAC
2. _____	_____	____	____
3. _____	_____	____	____
4. _____	_____	____	____
5. _____	_____	____	____
50% = 45, 20% = 18	90	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Polystichum munitum*	10	yes	FACU
2. _____	_____	____	____
3. _____	_____	____	____
4. _____	_____	____	____
5. _____	_____	____	____
6. _____	_____	____	____
7. _____	_____	____	____
8. _____	_____	____	____
9. _____	_____	____	____
10. _____	_____	____	____
11. _____	_____	____	____
50% = 5, 20% = 2	10	= Total Cover	
Woody Vine Stratum (Plot size: 5 ft)			
1. *N/A*	_____	____	____
2. _____	_____	____	____
50% = _____, 20% = _____	_____	= Total Cover	

% Bare Ground in Herb Stratum 40

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	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - 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:

Project Site: King County Parcel #0622100060

SOIL

Sampling Point: SPA2u

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-10	10YR2/2	100					Sa/L	
10-16	10YR3/3	100					Sa/L	

[3]Sa = Sand, Si = Silt, C= Clay, L=Loam
G= Gravel, M= Muck, P =Peat, V=Very

[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: _____

Depth (inches): _____

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

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

Wetland Hydrology Present? **Yes** ☐ **No** ☒

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

Remarks:

Appendix C. Wetland Rating Forms

Wetland name or number A _____

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): A — Date of site visit: 1/27/2014

Rated by: Mike Layes, PWS Trained by Ecology? Yes ☒ No ☐ — Date of training: 4/20/2006

SEC: 03 TOWNSHP: 26N RNGE: 5E — Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure 2 Estimated size 1,800 Square Feet (0.04 Acre)

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: ☐ I ☐ II ☐ III ☒ IV

Category I =	Score > 70	Score for Water Quality Functions	8
Category II =	Score 51 - 69	Score for Hydrologic Functions	2
Category III =	Score 30 – 50	Score for Habitat Functions	13
Category IV =	Score < 30	TOTAL Score for Functions	23

Category based on SPECIAL CHARACTERISTCS of Wetland ☐ I ☐ II ☒ **Does not apply**

Final Category (choose the "highest" category from above") **IV**

Summary of basic information about the wetland unit.

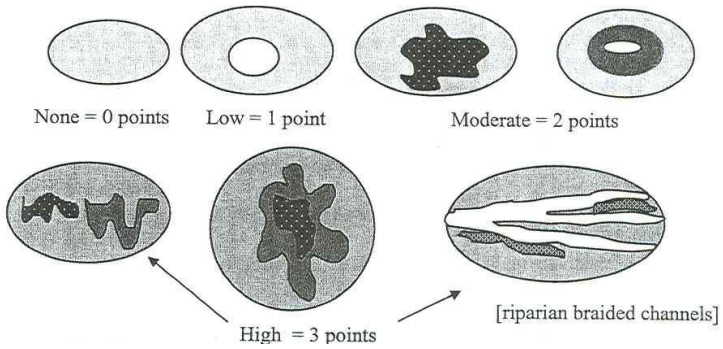
Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine	☐	**Depressional**	☐
Natural Heritage Wetland	☐	**Riverine**	☐
Bog	☐	**Lake-fringe**	☐
Mature Forest	☐	**Slope**	☒
Old Growth Forest	☐	**Flats**	☐
Coastal Lagoon	☐	**Freshwater Tidal**	☐
Interdunal	☐		☐
None of the above	☒	Check if unit has multiple HGM classes present	☐

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	☐	☒
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).	☐	☒
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	☐	☒
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	☐	☒

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
S 1	**Does the wetland have the <u>potential</u> to improve water quality?**	*(see p.64)*
	S 1.1 Characteristics of average slope of unit: • Slope is 1% or less *(a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)*.... points = 3 ☐ • Slope is 1% - 2% ..... points = 2 ☐ • Slope is 2% - 5%. ..... points = 1 ☒ • Slope is greater than 5% ..... points = 0 ☐	1
	S 1.2 The soil 2 inches below the surface (or duff layer) is clay, organic *(Use NRCS definitions).* ☒ **YES** = 3 points ☐ **NO** = 0 points	3
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* • Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 ☐ • Dense, uncut, herbaceous vegetation > 1/2 of area ..... points = 3 ☐ • Dense, woody, vegetation > 1/2 of area..... points = 2 ☐ • Dense, uncut, herbaceous vegetation > 1/4 of area ..... points = 1 ☐ • Does not meet any of the criteria above for vegetation ..... points = 0 ☒ **Aerial photo or map with vegetation polygons**	**Figure** ☐ **0**
	Total for S 1 *Add the points in the boxes above*	**4**
S 2	**Does the wetland have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging, or orchards within 150 ft. of wetland ☒ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland ☐ Other ☒ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 67)* Multiplier 2
◆	**<u>TOTAL</u> – Water Quality Functions** Multiply the score from S1 by S2; then ***add score to table on p. 1***	**8**
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
S 3	**Does the wetland have the <u>potential</u> to reduce flooding and stream erosion?**	*(see p.68)*
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: *Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).* • Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland ..... points = 6 ☐ • Dense, uncut, **rigid** vegetation> 1/2 area of wetland ..... points = 3 ☐ • Dense, uncut, **rigid** vegetation > 1/4 area..... points = 1 ☐ • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid ..... points = 0 ☒	0
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. ☒ **YES** = 2 points ☐ **NO** = 0 points	2
	Add the points in the boxes above	**2**
S 4	**Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* ☐ **YES** multiplier is 2 ☒ **NO** multiplier is 1	*(see p. 70)* Multiplier 1
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from S3 by S4; then ***add score to table on p. 1***	**2**

Comments: _____

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.	**Points** (only 1 score per box)
H 1 Does the wetland have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> *(see P. 72)*: *Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic Bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have > 30% cover) ☐ Forested (areas where trees have > 30% cover) *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. *Add the number of vegetation types that qualify. If you have:* **Map of Cowardin vegetation classes** 4 structures or more ..... points = 4 ☐ 3 structures ..... points = 2 ☐ 2 structures ..... points = 1 ☐ 1 structure ..... points = 0 ☒	**Figure** ☐ **0**
H 1.2 <u>Hydroperiods</u> *(see p.73)*: *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods).* ☐ Permanently flooded or inundated — 4 or more types present points = 3 ☐ ☒ Seasonally flooded or inundated — 3 or more types present points = 2 ☒ ☐ Occasionally flooded or inundated — 2 types present points = 1 ☐ ☒ Saturated only — 1 type present points = 0 ☐ ☒ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake-fringe wetland ..... = 2 points** ☐ **Freshwater tidal wetland ..... = 2 points** **Map of hydroperiods**	**Figure** ☐ **2**
H 1.3 <u>Richness of Plant Species</u> *(see p. 75)*: 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)* *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 ☐ List species below if you want to: < 5 species ..... points = 0 ☒ _____	0
H 1.4 Interspersion of Habitats *(see p. 76)*: Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always "high". **Use map of Cowardin classes.**	**Figure** ☐ **0**
H 1.5 <u>Special Habitat Features</u> *(see p. 77)*: *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☒ Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) ☐ 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 turned grey/brown)* ☐ At least 1/4 acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	2
H 1 TOTAL Score – potential for providing habitat *Add the points in the column above*	**4**

H 2	**Does the wetland have the <u>opportunity</u> to provide habitat for many species?**	(only 1 score per box)
	H 2.1 <u>Buffers</u> *(see P. 80)*: *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed".* ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. No structures are within the undisturbed part of buffer (relatively undisturbed also means no grazing, no landscaping, no daily human use)..... **points = 5** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference ..... **points = 4** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference ..... **points = 4** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference ..... **points = 3** ☒ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference ..... **points = 3** **If buffer does not meet any of the criteria above:** ☐ No paved areas (except paved trails) or buildings within 25m (80 ft) of wetland > 95% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ☐ No paved areas of buildings within 50m of wetland for > 50% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ☐ Heavy grazing in buffer ..... **points = 1** ☐ Vegetated buffers are < 2m wide (6.6 ft) for more than 95% circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) ..... **points = 0** ☐ Buffer does not meet any of the criteria above ..... **points = 1** **Arial photo showing buffers**	**Figure ☐** **3**
	H 2.2 <u>Corridors and Connections</u> *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft. wide, has at least a 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? *(Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).* ☐ **YES** = **4 points** (go to H 2.3) ☒ **NO** = go to H 2.2.2 H. 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50 ft. wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☐ **YES** = **2 points** (go to H 2.3) ☒ **NO** = go to H 2.2.3 H. 2.2.3 Is the wetland: • Within 5 mi (8km) of a brackish or salt water estuary OR • Within 3 miles of a large field or pasture (> 40 acres) OR ☐ **YES** = 1 point • Within 1 mile of a lake greater than 20 acres? ☒ **NO** = 0 points	0

Comments: _____

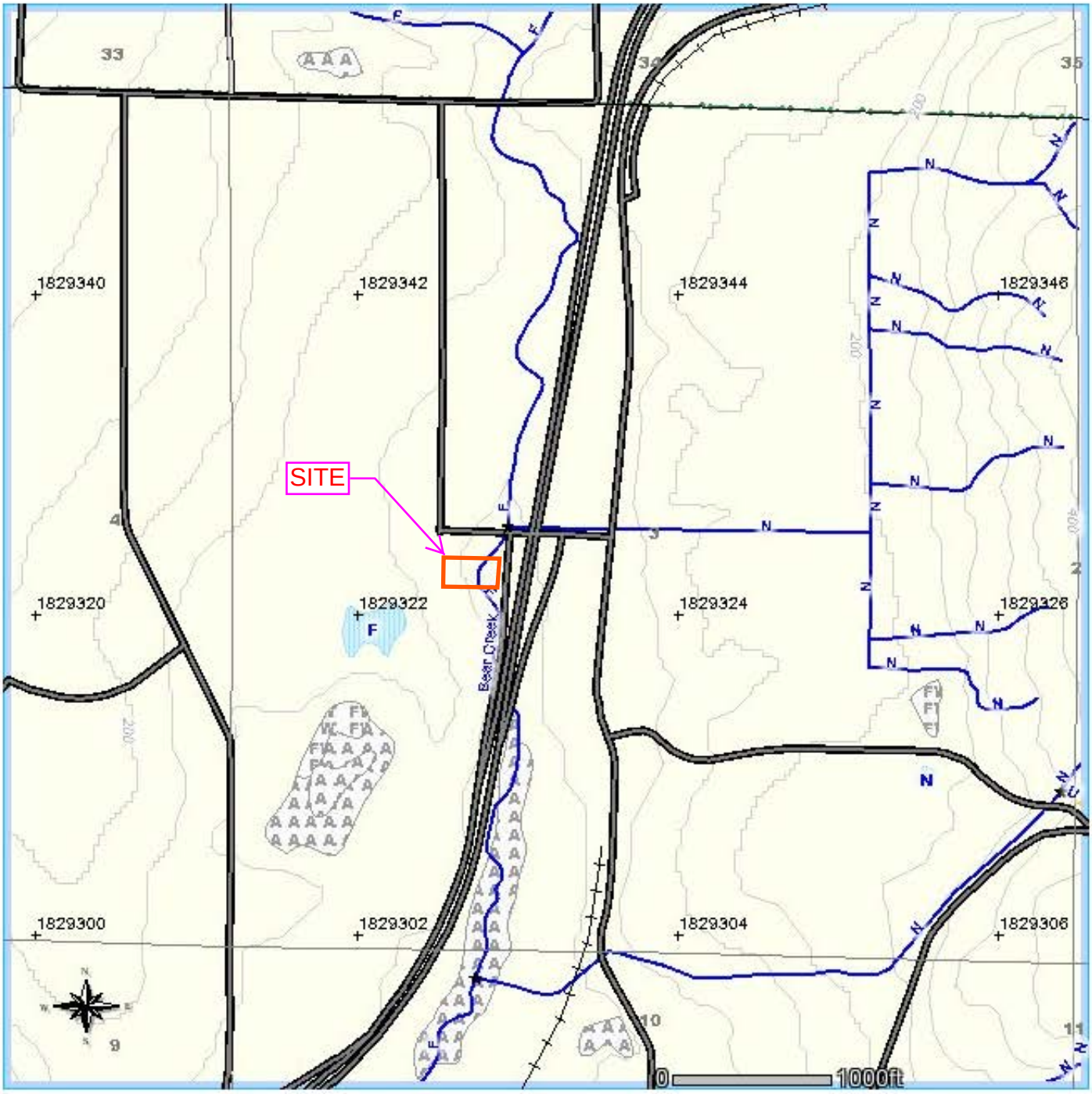
	H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82): *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)* Which of the following priority habitats are within 330 ft. (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ **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 p. 152*). ☐ **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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 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:** Woodlands 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*). ☒ **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*). ☒ **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: pp. 167-169 and glossary in Appendix A).* ☐ **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 7.6 m (25 ft) high and occurring below 5000 ft. ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **3 or more** priority habitats **= 4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat **= 1 point** No habitats = 0 points Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)	3
	H 2.4 Wetland Landscape: *Choose the **one** description of the landscape around the wetland that best fits (see p. 84)* • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.... points = 5 ☐ • The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 5 ☐ • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. ..... points = 3 ☒ • The wetland fringe on a lake **with** disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 3 ☐ • There is at least 1 wetland within 1/2 mile ..... points = 2 ☐ • There are no wetlands within 1/2 mile..... points = 0 ☐	3
	H 2 TOTAL Score – opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	9
	TOTAL for H 1 from page 8	4
◆	**Total Score for Habitat Functions** Add the points for H 1 and H 2; then ***record the result on p. 1***	**13**

Comments: _____

Figure 6 FOREST PRACTICE WATER TYPE MAP

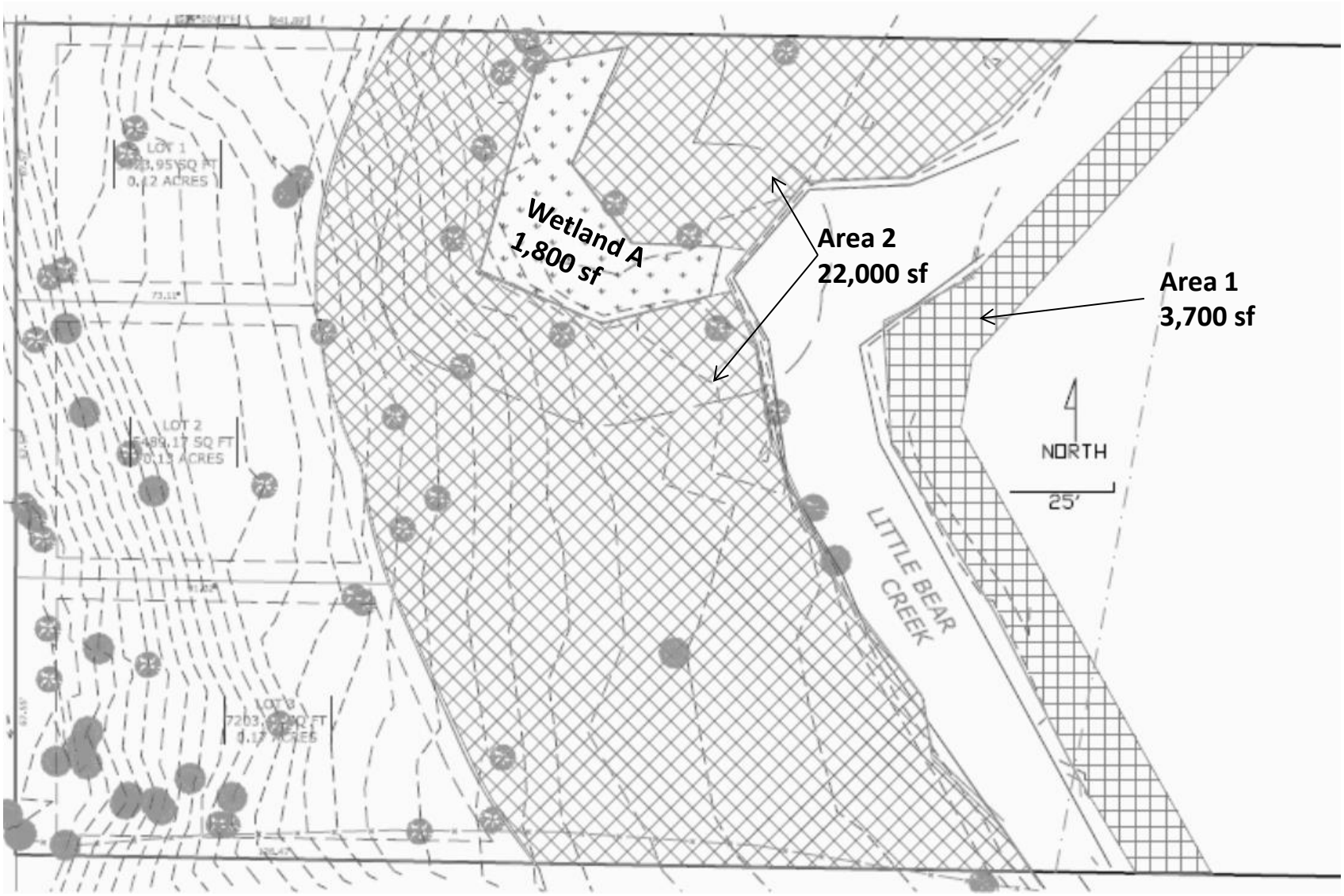
TOWNSHIP 26 NORTH HALF 0, RANGE 5 EAST (W.M.) HALF 0, SECTION 3

Application #:_____



4/29/2014 12:52:10 AM
NAD 83
Contour Interval: 40 Feet

Figure 7. Enhancement Map



Appendix B. Wetland Data Sheets

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

Project Site: King County Parcel #0622100060 City/County: Woodinville/King Sampling Date: 01/27/2014
Applicant/Owner: Prakash Modi State: WA Sampling Point: SPA1w
Investigator(s): Mike Layes, PWS Section, Township, Range: 3/26N/5E
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0
Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: Everett gravelly sandy loam, 5 to 15 percent slopes NWI classification: PSS1B
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:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *n/a*			
2.			
3.			
4.			
50% = _____, 20% = _____		= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 ft)			
1. *Physocarpus capitatus*	60	yes	FACW
2. *Rubus spectabilis*	40	yes	FAC
3.			
4.			
5.			
50% = 50, 20% = 20	100	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *n/a*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
50% = _____, 20% = _____		= Total Cover	
Woody Vine Stratum (Plot size: 5 ft)			
1. *N/A*			
2.			
50% = _____, 20% = _____		= Total Cover	

% Bare Ground in Herb Stratum 90

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - 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:

Project Site: King County Parcel #0622100060

SOIL

Sampling Point: SPA1w

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	10YR2/1	100					M	

[3]Sa = Sand, Si = Silt, C= Clay, L=Loam
G= Gravel, M= Muck, P =Peat, V=Very

[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: _____

Depth (inches): _____

Hydric Soils Present? **Yes** ☒ **No** ☐

Remarks:

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 Stresses 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): _____
Water Table Present?	Yes	☐	No	☒	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes	☒	No	☐	Depth (inches): 0

Wetland Hydrology Present? **Yes** ☒ **No** ☐

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

Remarks:

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

Project Site: King County Parcel #0622100060 City/County: Woodinville/King Sampling Date: 01/27/2014
Applicant/Owner: Prakash Modi State: WA Sampling Point: SPA2u
Investigator(s): Mike Layes, PWS Section, Township, Range: 3/26N/5E
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): convex Slope (%): 5
Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: Everett gravelly sandy loam, 5 to 15 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:

VEGETATION – Use scientific names of plants

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Alnus rubra*	30	yes	FAC
2. *Acer circinatum*	30	yes	FAC
3. _____	_____	____	____
4. _____	_____	____	____
50% = 30, 20% = 12	60	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 ft)			
1. *Rubus spectabilis*	90	yes	FAC
2. _____	_____	____	____
3. _____	_____	____	____
4. _____	_____	____	____
5. _____	_____	____	____
50% = 45, 20% = 18	90	= Total Cover	
Herb Stratum (Plot size: 5 ft)			
1. *Polystichum munitum*	10	yes	FACU
2. _____	_____	____	____
3. _____	_____	____	____
4. _____	_____	____	____
5. _____	_____	____	____
6. _____	_____	____	____
7. _____	_____	____	____
8. _____	_____	____	____
9. _____	_____	____	____
10. _____	_____	____	____
11. _____	_____	____	____
50% = 5, 20% = 2	10	= Total Cover	
Woody Vine Stratum (Plot size: 5 ft)			
1. *N/A*	_____	____	____
2. _____	_____	____	____
50% = _____, 20% = _____	_____	= Total Cover	

% Bare Ground in Herb Stratum 40

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	_____	x1 =	_____
FACW species	_____	x2 =	_____
FAC species	_____	x3 =	_____
FACU species	_____	x4 =	_____
UPL species	_____	x5 =	_____
Column Totals:	_____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ☐ 1 – Rapid Test for Hydrophytic Vegetation
- ☒ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is ≤3.0[1]
- ☐ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ 5 - 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:

Project Site: King County Parcel #0622100060

SOIL

Sampling Point: SPA2u

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture[3]	Remarks
0-10	10YR2/2	100					Sa/L	
10-16	10YR3/3	100					Sa/L	

[3]Sa = Sand, Si = Silt, C= Clay, L=Loam
G= Gravel, M= Muck, P =Peat, V=Very

[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: _____

Depth (inches): _____

Hydric Soils Present? **Yes** ☐ **No** ☒

Remarks:

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

Wetland Hydrology Present? **Yes** ☐ **No** ☒

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

Remarks:

Appendix C. Wetland Rating Forms

Wetland name or number A _____

WETLAND RATING FORM – WESTERN WASHINGTON

Version 2 – Updated July 2006 to increase accuracy and reproducibility among users
Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): A — Date of site visit: 1/27/2014

Rated by: Mike Layes, PWS Trained by Ecology? Yes ☒ No ☐ — Date of training: 4/20/2006

SEC: 03 TOWNSHP: 26N RNGE: 5E — Is S/T/R in Appendix D? Yes ☐ No ☒

Map of wetland unit: Figure 2 Estimated size 1,800 Square Feet (0.04 Acre)

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland: ☐ I ☐ II ☐ III ☒ IV

Category I =	Score > 70	Score for Water Quality Functions	8
Category II =	Score 51 - 69	Score for Hydrologic Functions	2
Category III =	Score 30 – 50	Score for Habitat Functions	13
Category IV =	Score < 30	TOTAL Score for Functions	23

Category based on SPECIAL CHARACTERISTCS of Wetland ☐ I ☐ II ☒ **Does not apply**

Final Category (choose the "highest" category from above") **IV**

Summary of basic information about the wetland unit.

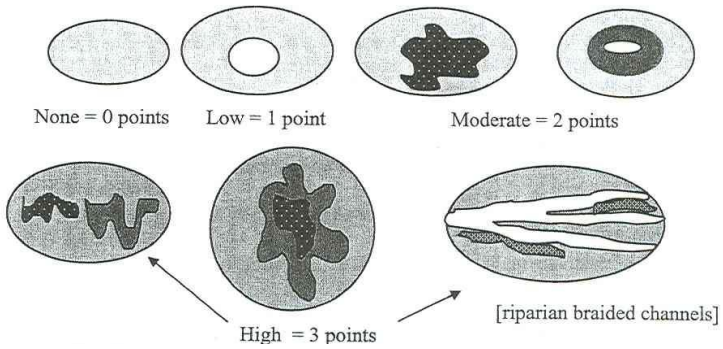
Wetland Unit has Special Characteristics		Wetland HGM Class used for Rating	
Estuarine	☐	**Depressional**	☐
Natural Heritage Wetland	☐	**Riverine**	☐
Bog	☐	**Lake-fringe**	☐
Mature Forest	☐	**Slope**	☒
Old Growth Forest	☐	**Flats**	☐
Coastal Lagoon	☐	**Freshwater Tidal**	☐
Interdunal	☐		☐
None of the above	☒	Check if unit has multiple HGM classes present	☐

Does the wetland being rated meet any of the criteria below? If you answer YES to any of the questions below you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands that Need Additional Protection (in addition to the protection recommended for its category)	YES	NO
SP1. *Has the wetland unit been documented as a habitat for any Federally listed Threatened or Endangered **animal or plant** species (T/E species)?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	☐	☒
SP2. *Has the wetland unit been documented as habitat for any State listed Threatened or Endangered **animal** species?* For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category 1 Natural Heritage Wetlands (see p. 19 of data form).	☐	☒
SP3. *Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?*	☐	☒
SP4. *Does the wetland unit have a local significance in addition to its functions?* For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.	☐	☒

S	Slope Wetlands	Points
	WATER QUALITY FUNCTIONS – Indicators that wetland functions to improve water quality.	(only 1 score per box)
S 1	**Does the wetland have the <u>potential</u> to improve water quality?**	*(see p.64)*
	S 1.1 Characteristics of average slope of unit: • Slope is 1% or less *(a 1% slope has a 1 ft. vertical drop in elevation for every 100 ft. horizontal distance)*.... points = 3 ☐ • Slope is 1% - 2% ..... points = 2 ☐ • Slope is 2% - 5%. ..... points = 1 ☒ • Slope is greater than 5% ..... points = 0 ☐	1
	S 1.2 The soil 2 inches below the surface (or duff layer) is clay, organic *(Use NRCS definitions).* ☒ **YES** = 3 points ☐ **NO** = 0 points	3
	S 1.3 Characteristics of the vegetation in the wetland that trap sediments and pollutants: *Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.* • Dense, uncut, herbaceous vegetation > 90% of the wetland area..... points = 6 ☐ • Dense, uncut, herbaceous vegetation > 1/2 of area ..... points = 3 ☐ • Dense, woody, vegetation > 1/2 of area..... points = 2 ☐ • Dense, uncut, herbaceous vegetation > 1/4 of area ..... points = 1 ☐ • Does not meet any of the criteria above for vegetation ..... points = 0 ☒ **Aerial photo or map with vegetation polygons**	**Figure** ☐ **0**
	Total for S 1 *Add the points in the boxes above*	**4**
S 2	**Does the wetland have the <u>opportunity</u> to improve water quality?** Answer YES if you know or believe there are pollutants in groundwater or surface water coming into the wetland that would otherwise reduce water quality in streams, lakes or groundwater downgradient from the wetland? *Note which of the following conditions provide the sources of pollutants. A unit may have pollutants coming from several sources, but any single source would qualify as opportunity.* ☐ Grazing in the wetland or within 150 ft ☐ Untreated stormwater discharges to wetland ☐ Tilled fields, logging, or orchards within 150 ft. of wetland ☒ Residential, urban areas, or golf courses are within 150 ft. upslope of wetland ☐ Other ☒ **YES** multiplier is 2 ☐ **NO** multiplier is 1	*(see p. 67)* Multiplier 2
◆	**<u>TOTAL</u> – Water Quality Functions** Multiply the score from S1 by S2; then ***add score to table on p. 1***	**8**
	HYDROLOGIC FUNCTIONS – Indicators that wetland functions to reduce flooding and stream erosion.	
S 3	**Does the wetland have the <u>potential</u> to reduce flooding and stream erosion?**	*(see p.68)*
	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms: *Choose the points appropriate for the description that best fits conditions in the wetland (stems of plants should be thick enough (usually > 1/8in), or dense enough to remain erect during surface flows).* • Dense, uncut, **rigid** vegetation covers > 90% of the area of the wetland ..... points = 6 ☐ • Dense, uncut, **rigid** vegetation> 1/2 area of wetland ..... points = 3 ☐ • Dense, uncut, **rigid** vegetation > 1/4 area..... points = 1 ☐ • More than 1/4 of area is grazed, mowed, tilled, or vegetation is not rigid ..... points = 0 ☒	0
	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows. The slope has small surface depressions that can retain water over at least 10% of its area. ☒ **YES** = 2 points ☐ **NO** = 0 points	2
	Add the points in the boxes above	**2**
S 4	**Does the wetland have the <u>opportunity</u> to reduce flooding and erosion?** Is the wetland in a landscape position where the reduction in water velocity it provides helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? *Note which of the following conditions apply.* ☐ Wetland has surface runoff that drains to a river or stream that has flooding problems ☐ Other *(Answer NO if the major source of water is controlled by a reservoir (e.g. wetland is a seep that is on the downstream side of a dam)* ☐ **YES** multiplier is 2 ☒ **NO** multiplier is 1	*(see p. 70)* Multiplier 1
◆	**<u>TOTAL</u> – Hydrologic Functions** Multiply the score from S3 by S4; then ***add score to table on p. 1***	**2**

Comments: _____

These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS – Indicators that wetland functions to provide important habitat.	**Points** (only 1 score per box)
H 1 Does the wetland have the <u>potential</u> to provide habitat for many species?	
H 1.1 <u>Vegetation structure</u> *(see P. 72)*: *Check the types of vegetation classes present (as defined by Cowardin) – Size threshold for each class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.* ☐ Aquatic Bed ☐ Emergent plants ☒ Scrub/shrub (areas where shrubs have > 30% cover) ☐ Forested (areas where trees have > 30% cover) *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. *Add the number of vegetation types that qualify. If you have:* **Map of Cowardin vegetation classes** 4 structures or more ..... points = 4 ☐ 3 structures ..... points = 2 ☐ 2 structures ..... points = 1 ☐ 1 structure ..... points = 0 ☒	**Figure** ☐ **0**
H 1.2 <u>Hydroperiods</u> *(see p.73)*: *Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or 1/4 acre to count (see text for descriptions of hydroperiods).* ☐ Permanently flooded or inundated — 4 or more types present points = 3 ☐ ☒ Seasonally flooded or inundated — 3 or more types present points = 2 ☒ ☐ Occasionally flooded or inundated — 2 types present points = 1 ☐ ☒ Saturated only — 1 type present points = 0 ☐ ☒ Permanently flowing stream or river in, or adjacent to, the wetland ☐ Seasonally flowing stream in, or adjacent to, the wetland ☐ **Lake-fringe wetland ..... = 2 points** ☐ **Freshwater tidal wetland ..... = 2 points** **Map of hydroperiods**	**Figure** ☐ **2**
H 1.3 <u>Richness of Plant Species</u> *(see p. 75)*: 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)* *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 ☐ List species below if you want to: < 5 species ..... points = 0 ☒ _____	0
H 1.4 Interspersion of Habitats *(see p. 76)*: Decided from the diagrams below whether interspersion between Cowardin vegetation (described in H1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.  Note: If you have 4 or more classes or 3 vegetation classes and open water, the rating is always "high". **Use map of Cowardin classes.**	**Figure** ☐ **0**
H 1.5 <u>Special Habitat Features</u> *(see p. 77)*: *Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.* ☒ Large, downed, woody debris within the wetland (> 4 in. diameter and 6 ft. long) ☐ Standing snags (diameter at the bottom > 4 inches) in the wetland ☐ Undercut banks are present for at least 6.6 ft. (2m) and/or overhanging vegetation extends at least 3.3 ft. (1m) over a stream (or ditch) in, or contiguous with the unit, for at least 33 ft. (10m) ☐ 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 turned grey/brown)* ☐ At least 1/4 acre of thin-stemmed persistent vegetation 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 each stratum of plants *NOTE: The 20% stated in early printings of the manual on page 78 is an error.*	2
H 1 TOTAL Score – potential for providing habitat *Add the points in the column above*	**4**

H 2	**Does the wetland have the <u>opportunity</u> to provide habitat for many species?**	(only 1 score per box)
	H 2.1 <u>Buffers</u> *(see P. 80)*: *Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed".* ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% of circumference. No structures are within the undisturbed part of buffer (relatively undisturbed also means no grazing, no landscaping, no daily human use)..... **points = 5** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference ..... **points = 4** ☐ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 95% circumference ..... **points = 4** ☐ 100m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference ..... **points = 3** ☒ 50m (170 ft) of relatively undisturbed vegetated areas, rocky areas, or open water for > 50% circumference ..... **points = 3** **If buffer does not meet any of the criteria above:** ☐ No paved areas (except paved trails) or buildings within 25m (80 ft) of wetland > 95% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ☐ No paved areas of buildings within 50m of wetland for > 50% circumference. Light to moderate grazing or lawns are OK ..... **points = 2** ☐ Heavy grazing in buffer ..... **points = 1** ☐ Vegetated buffers are < 2m wide (6.6 ft) for more than 95% circumference (e.g. tilled fields, paving, basalt bedrock extend to edge of wetland) ..... **points = 0** ☐ Buffer does not meet any of the criteria above ..... **points = 1** **Arial photo showing buffers**	**Figure** ☐ **3**
	H 2.2 <u>Corridors and Connections</u> *(see p. 81)* H 2.2.1 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 150 ft. wide, has at least a 30% cover of shrubs, forest or native undisturbed prairie, that connects to estuaries, other wetlands or undisturbed uplands that are at least 250 acres in size? *(Dams in riparian corridors, heavily used gravel roads, paved roads, are considered breaks in the corridor).* ☐ **YES** = **4 points** (go to H 2.3) ☒ **NO** = go to H 2.2.2 H. 2.2.2 Is the wetland part of a relatively undisturbed and unbroken vegetated corridor (either riparian or upland) that is at least 50 ft. wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands or undisturbed uplands that are at least 25 acres in size? **OR a Lake-fringe** wetland, if it does not have an undisturbed corridor as in the question above? ☐ **YES** = **2 points** (go to H 2.3) ☒ **NO** = go to H 2.2.3 H. 2.2.3 Is the wetland: • Within 5 mi (8km) of a brackish or salt water estuary OR • Within 3 miles of a large field or pasture (> 40 acres) OR ☐ **YES** = 1 point • Within 1 mile of a lake greater than 20 acres? ☒ **NO** = 0 points	0

Comments: _____

	H 2.3 Near or adjacent to other priority habitats listed by WDFW (see p. 82): *(see new and complete descriptions of WDFW priority habitats, and the counties in which they can be found, in the PHS report http://wdfw.wa.gov/hab/phslist.htm)* Which of the following priority habitats are within 330 ft. (100m) of the wetland unit? *NOTE: the connections do not have to be relatively undisturbed.* ☐ **Aspen Stands:** Pure or mixed stands of aspen greater than 0.4 ha (1 acre). ☐ **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 p. 152*). ☐ **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 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. **(**Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less that 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:** Woodlands 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*). ☒ **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*). ☒ **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: pp. 167-169 and glossary in Appendix A).* ☐ **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 7.6 m (25 ft) high and occurring below 5000 ft. ☐ **Talus:** Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. ☐ **Snags and Logs:** Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. If wetland has **3 or more** priority habitats **= 4 points** If wetland has **2** priority habitats = **3 points** If wetland has **1** priority habitat **= 1 point** No habitats = 0 points Note: All vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4)	3
	H 2.4 Wetland Landscape: *Choose the **one** description of the landscape around the wetland that best fits (see p. 84)* • There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development.... points = 5 ☐ • The wetland is Lake-fringe on a lake with little disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 5 ☐ • There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. ..... points = 3 ☒ • The wetland fringe on a lake **with** disturbance and there are 3 other lake-fringe wetlands within 1/2 mile ..... points = 3 ☐ • There is at least 1 wetland within 1/2 mile ..... points = 2 ☐ • There are no wetlands within 1/2 mile..... points = 0 ☐	3
	H 2 TOTAL Score – opportunity for providing habitat *Add the scores from H2.1, H2.2, H2.3, H2.4*	9
	TOTAL for H 1 from page 8	4
◆	**Total Score for Habitat Functions** Add the points for H 1 and H 2; then ***record the result on p. 1***	**13**

Comments: _____

Appendix D. Function Analysis

Table A. Baseline and Enhancement Functions Analysis

Location	Function	Current Baseline Conditions	Baseline Function Level	Conditions After Enhancement	Function Level After Enhancement
Stream banks, Floodplain, and portions of Wetland Buffer	Flood Control and Stormwater Attenuation	Invasive Knotweed and Himalayan Blackberry dominate the buffer along the stream bank, floodplain, and part of the wetland buffer. Both of these species completely shade out ground cover and typically have bare dirt and no herbaceous plants in the understory. Knotweed completely dies back in the winter and does not provide any structure to slow and attenuate flood waters. These species provide minimal-low levels of this function.	Minimal-Low	Invasive Knotweed and Himalayan Blackberry are removed allowing native herbaceous plants to establish. Dense plantings of native shrubs and trees provide structure to attenuate and slow flood waters.	Moderate-High
Wetland A	Flood Control and Stormwater Attenuation	Wetland A is elevated above the floodplain of the stream and does not provide flood control functions. Due to its small size and hydrogeomorphic classification of slope wetland, it provides minimal stormwater attenuation capacity.	Minimal	Proposed enhancements to wetland A and its buffer will not affect this function	Minimal
Stream and Wetland Buffers	Ground Water Recharge	There is sparse herbaceous understory within both stream and wetland buffer areas due to dense invasive blackberry and knotweed species. Native shrubs and trees are also present and intermixed with the invasives. Current buffer vegetation conditions provide a low - moderate level of function	Low-Moderate	Removal of invasive plants and dense plantings of native trees, shrubs, and herbaceous species will slow surface water runoff and result in an increased level of infiltration and groundwater recharge.	Moderate-High
Wetland A	Ground Water Recharge	The Hydrogeomorphic Classification of Wetland A is "Slope". These types of wetlands are seeps and are supported by groundwater moving to the surface and flowing out. Therefore Wetland A does not provide this function.	None	The Hydrogeomorphic Classification of Wetland A is "Slope". These types of wetlands are seeps and are supported by groundwater moving to the surface and flowing out. Therefore Wetland A does not provide this function.	None
Stream and Wetland Buffers	Water Filtration and Purification	There is sparse herbaceous understory within both stream and wetland buffer areas due to dense invasive blackberry and knotweed species. Native shrubs and trees are also present and intermixed with the invasives. Current buffer vegetation conditions provide a low - moderate level of this function	Low-Moderate	Invasive Knotweed and Himalayan Blackberry are removed allowing native herbaceous plants to establish. Herbaceous plants will slow surface sheet flows through the buffer allowing for the trapping of sediments and pollution. Dense plantings of native herbaceous plants, shrubs and trees provide additional structure to attenuate and slow surface flow through the buffer.	Moderate-High
Wetland A	Water Filtration and Purification	Wetland A is dominated by native shrubs with minimal understory of herbaceous plants. Water Filtration and Purification function is therefore low.	Low	Dense, native herbaceous plants are established in the understory of existing native shrubs. Herbaceous plants will slow surface sheet flows through the buffer allowing for the trapping of sediments and pollution.	High

Table A. Baseline and Enhancement Functions Analysis

Location	Function	Current Baseline Conditions	Baseline Function Level	Conditions After Enhancement	Function Level After Enhancement
Stream Buffers	Water Temperature Control	Invasive Knotweed and Himalayan Blackberry dominate the buffer along the stream bank, floodplain, and part of the wetland buffer. These species do not branch out over the stream channel and therefore do not provide any substantial shade to keep water temperature low in summer months	Low	Native trees and shrubs planted along the stream will provide increased shading over the stream resultung in lower water temperatures in summer months.	High
Stream and Wetland Buffers	Erosion Control	Invasive Knotweed and Himalayan Blackberry dominate the buffer along the stream bank, floodplain, and part of the wetland buffer. Both of these species completely shade out ground cover and typically have bare dirt and no herbaceous plants in the understory. The coarse rhizomes of both these species does not stabilize the banks as well as the finer roots of native trees, shrubs or herbaceous plants, making the stream banks and hillside more prone to erosion.	Low	Removal of invasive plants and dense plantings of native trees, shrubs, and herbaceous species will reduce exposed soils and stabilize the stream banks and hillslope within both the wetland and stream buffers.	High
Wetland A	Erosion Control	Wetland A is dominated by native shrubs with a minimal understory of herbaceous plants. Exposed soils are present.	Low	Herbaceous plants are established, limiting exposed soils.	Moderate
Stream and Wetland Buffers	Wildlife Habitat	Invasive Knotweed and Himalayan Blackberry dominate the buffer along the stream bank, floodplain, and part of the wetland buffer. Native vegetation is interspersed through out and dominated by young Red Alder trees over a Salmonberry shrub understory. Current buffer vegetation is low in species diversity and provides low functions for wildlife cover and forage opportunities. There are very few trees currently present along the stream bank to provide cover for native fish and a source of large woody debris for recruitment into the stream channel to create fish habitat and stabilization of the stream channel.	Low	Removal of invasive plants and dense plantings of native trees, shrubs, and herbaceous species will substantially increase both plant species and plant structural diversity within the stream and wetland buffers. The native plantings will attract greater diversity of animal species to the site and also result in increased invertebrate pray production for fish. Planting of coniferous trees will provide increased screening for wildlife from residential and highway disturbance.	High