CONFLUENCE
ENVIRONMENTAL COMPANY

4803 Forest Avenue SE
CRITICAL AREAS STUDY UPDATE

Prepared for:

Laurie Cropp
February 16, 2018

146 N Canal St, Suite 111 • Seattle, WA 98103 • www.confenv.com

4803 Forest Avenue SE
CRITICAL AREAS STUDY UPDATE

Prepared for:

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Mercer Island, WA 98040

Authored by:

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Confluence Environmental Company

February 16, 2018

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1.0 INTRODUCTION

On November 6, 2017, Confluence Environmental Company (Confluence) conducted a site visit at 4803 Forest Avenue SE, Mercer Island, Washington (tax parcel 4045000145) (Figure 1). The purpose of the site visit was to determine the presence and extent of wetlands on the property. Critical areas such as erosion hazard areas, steep slopes, and landslide hazard areas were not evaluated in this study. This report discusses the results of the of the site visit.

The site is currently partially developed. The western portion is developed with a detached garage, driveway, and yard. The eastern portion of the wetland is undeveloped.

Figure 1. Project Area

2.0 METHODS

Confluence conducted both a wetland and an ordinary high water mark (OHWM) delineation on the property. The OHWM delineation was conducted prior to the wetland delineation and described in Confluence (2017). This section describes the methods used to identify the presence or absence of wetlands and delineate the wetland boundary.

2.1 Desktop Analysis

Confluence evaluated the parcel for the presence of critical areas using available GIS databases. The following databases were reviewed:

- King County iMAP (King County 2017),
- National Wetland Inventory (NWI) (USFWS 2017), and
- Soil Survey (USDA NRCS 2017a).

Results of the GIS database searches are in Appendix A.

2.2 Wetlands

2.2.1 Wetland Identification and Delineation

Confluence used the methods described by the U.S. Army Corps of Engineers (Corps) in the *Corps of Engineers Wetland Delineation Manual* (Corps 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Regional Supplement; Corps 2010) to delineate wetland boundaries. The Corps usually requires that the following three characteristics be present for an area to be identified as a wetland: (1) hydrophytic vegetation, (2) hydric soil, and (3) wetland hydrology. Each criterion has a number of indicators by which it can be determined to satisfy the standard. The indicators were established so that if an area was wetland, sufficient indicators would be observed at any time of the year, including the driest months. Since "normal circumstances," as defined by the Corps (1987), exist on the site, all three criteria must be present for an area to be determined a wetland. A more detailed description of delineation methodology is in Appendix B. Wetland delineation data forms are in Appendix C.

The PLANTS Database (USDA NRCS 2017b) was used for scientific names and the 2016 National Wetland Plant List (Lichvar et al. 2016) was used to determine the wetland indicator status of plants.

2.2.2 Wetland Rating

Confluence determined wetland ratings using the Washington State Wetland Rating System for Western Washington (Hruby 2004) to assess the resource value of the wetlands identified on the

site. This rating system is based on the wetland functions and values, sensitivity to disturbance, rarity, and irreplaceability.

Wetland rating forms are in Appendix D.

3.0 RESULTS

This section describes the results of the critical areas study.

3.1 General Site Description

Available GIS databases were searched for the documented presence of wetlands, hydric soils, streams, lakes, or species listed under the Endangered Species Act as threatened or endangered ("listed species"). Results of the GIS databases searched are in Appendix A. In summary, GIS databases did not identify any wetland on the property. No wetlands were identified within ½ mile of the property.

As stated above, the western portion of the property is developed with a detached garage, driveway, and yard. The eastern portion of the property is a vegetated slope, dominated by giant horsetail (*Equisetum giganteum*), English ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), field bindweed (*Convolvulus arvensis*), and big-leaf maple (*Acer macrophyllum*).

The undeveloped portion of the property lies within a landslide and erosion hazard area (GeoTech 2015). Relatively shallow landslides, disturbing 10-15 feet of soil periodically occur along Forest Avenue SE (GeoTech 2015). Such a landslide appears to have occurred at some point in the past on the property, although review of aerial images did not reveal when, due to the forested canopy and the point in time when the aerial images were taken. Because of the landslide, soils currently within 12 inches of the surface may have historically been several feet or more below the surface. This means that hydric soil indicators present within the top 12 inches of the soil may have been formed when the soil was several feet underground (i.e., too deep to meet the hydric soil criterion).

At the top of the slope is a 12-inch concrete stormwater pipe that appears to discharge runoff from SE 48th Street and the associated houses upslope. At the time of the site visit, water was discharging from the pipe.

At the base of the hillslope is a concrete basin. The inlet of the basin is a 6-inch-diameter corrugated plastic pipe. The pipe extended upslope approximately 30 feet east before it was no longer observed. The inlet of the pipe was not found. The pipe appears to have been laid in the low spot of the hillslope. No visual indicators of a watercourse were identified adjacent to the pipe or upslope of where the pipe could be seen.

The basin discharges into another 6-inch-diameter corrugated plastic pipe via a perched outlet pipe. This corrugated plastic pipe goes west approximately 20 feet where it discharges into a catch basin. Stormwater runoff from the garage and upper driveway also enter this catch basin. This catch basin enters Lake Washington via a 12-inch-diameter corrugated metal pipe. Water from the house and lower driveway enter the 12-inch-diameter corrugated metal pipe downslope of the catch basin. The outlet of this pipe is located above the ordinary high water of the lake, in the yard. Despite the collection and concentrated discharge of runoff, there are no indicators of a watercourse or stream between the pipe outlet and the lake.

Photographs of the site are in Appendix E.

3.2 Test Plots

During the site visit, six test plots were established in both uplands and wetlands. Test plots are shown in Figure 2. The locations of the test plots were based on the presence of visual wetland indicators, such as wetland vegetation or evidence of standing water, or were chosen to represent vegetative communities on the property. Test plot summaries are detailed below. Appendix B provides explanation of technical terms.

Test Plot 1 (TP-1) was located in the eastern portion of the property, just southwest of the stormwater pipe, in an area dominated by giant horsetail. Vegetation within TP-1 passed the Dominance Test and therefore meets the wetland vegetation criterion. Soil in the top layer (0-5 inches) was a black (10YR 2/1) loam with gravel and cobble. Soil in the second layer (5-8 inches) was a greenish gray (Gley1 5/5GY) loam and gravel with 20 percent yellowish brown (10YR 5/8) redox concentrations in the matrix and pore linings. Soil in the third layer (8-12 inches) was a dark greenish gray (Gley1 4/10GY) loamy sand and gravel with 20 percent dark reddish brown (5YR 3/4) redox concentrations in the matrix and pore linings. Soils met the Depleted Below Dark Surface (A11) hydric soil indicator; therefore, the hydric soil criterion was met. Four primary indicators – Surface Water (A1), High Water Table (A2), Saturation (A3), and Oxidized Rhizospheres along Living Roots (C3) – were observed. The presence of at least one primary or two secondary indicators meets the wetland hydrology criterion. Since TP-1 met all three criteria, the area represented by TP-1 is a wetland, identified as Wetland A.

TP-2 was located south of TP-1, north of the property line, in an area dominated by English ivy and giant horsetail. Vegetation within TP-2 did not pass the Dominance Test or the Prevalence Index Test and therefore did not meet the wetland vegetation criterion. Soil in the top layer (0-5 inches) was a black (10YR 2/1) sandy loam and gravel. Soil in the second layer (5-15 inches) was a black (10YR 2/1) sandy loam and gravel with 2 percent dark yellowish brown (10YR 4/6) redox concentrations in the matrix. Soils met the Redox Dark Surface (F6) hydric soil indicator. No primary or secondary indicators of hydrology were observed and therefore the wetland hydrology criterion was not met. The presence of hydric soil indicators in a test plot without wetland hydrology indicators at this site indicates the hydric soils indicators were likely formed

prior to the landslide, when the soil was several feet below the surface and does not indicate current hydric soil. Since TP-2 did not meet all three criteria, the area represented by TP-2 is not a wetland.

TP-3 was located north of TP-1, in an area dominated by giant horsetail, Himalayan blackberry, and field bindweed. Vegetation within TP-3 did not pass the Dominance Test or the Prevalence Index Test and therefore did not meet the wetland vegetation criterion. Soil in the top layer (0-11 inches) was a very dark brown (10YR 2/2) silty loam and gravel. Soil in the second layer (11-18 inches) was a very dark grayish brown (10YR 3/2) loam and gravel. Soils did not meet any hydric soil indicator and therefore the hydric soil criterion was not met. One primary indicator – Saturation (A3) – was observed in the south side of the test pit, where surface water from stormwater runoff was saturating the soil. The presence of soil saturation within 12 inches of the surface meets the wetland hydrology indicator. Since TP-3 did not meet all three criteria, the area represented by TP-3 is not a wetland.

TP-4 was located southwest (downslope) of TP-1, in an area dominated by giant horsetail, English Ivy and big-leaf maple. Vegetation within TP-4 did not pass the Dominance Test or the Prevalence Index Test and therefore did not meet the wetland vegetation criterion. Soil in the top layer (0-8 inches) was a very dark brown (10YR 2/2) silty loam. Soil in the second layer (8-11 inches) was a very dark grayish brown (10YR 3/2) sandy loam and gravel. Soil in the third layer (11-15 inches) was a dark gray (10YR 4/1) sandy loam and gravel with 20 percent yellowish red (5YR 4/6) redox concentrations in the matrix. Soils met the Depleted Below Dark Surface (A11) hydric soil indicator; therefore, the hydric soil criterion was met. Two primary indicators –High Water Table (A2) and Saturation (A3) – was observed. The presence of at least one primary or two secondary indicators meets the wetland hydrology criterion. Since TP-4 did not meet all three criteria, the area represented by TP-4 is not a wetland and represents the transition zone between wetland and upland.

TP-5 was located west (downslope) of TP-3 and north of TP-6, in an area dominated by giant horsetail and Himalayan blackberry. Vegetation within TP-5 passed the Dominance Test and therefore met the wetland vegetation criterion. Soil in the top layer (0-6 inches) was a black (10YR 2/1) loam. Soil in the second layer (6-17 inches) was a very dark gray (10YR 3/1) sandy loam and gravel with 2 percent strong brown (7.5YR 5/8) redox concentrations in the matrix. Soils met the Redox Dark Surface (F6) hydric soil indicator; therefore, the hydric soil criterion was met. No primary or secondary indicators of wetland hydrology were observed and therefore the wetland hydrology criterion was not met. Since TP-5 did not meet all three criteria, the area represented by TP-5 is not a wetland.

Figure 2. Test Plot Locations and Wetland Boundary

TP-6 was located south of TP-5 and west of TP-4, in an area dominated by giant horsetail, English ivy, and big-leaf maple. Vegetation within TP-1did not pass the Dominance Test but did pass the Prevalence Index, and therefore meets the wetland vegetation criterion. Soil in the top layer (0-4 inches) was a black (10YR 2/1) silty loam with gravel. Soil in the second layer (4-11 inches) was a very dark gray (10YR 3/1) sand and gravel. Soil in the third layer (11-17 inches) was a dark gray (10YR 4/1) sandy loam and gravel with 2 percent strong brown (7.5YR 4/6) redox concentrations in the matrix. Soils met the Depleted Below Dark Surface (A11) hydric soil indicator; therefore, the hydric soil criterion was met. Three primary indicators – Surface Water (A1), High Water Table (A2), and Saturation (A3) – were observed. The presence of at least one primary or two secondary indicators meets the wetland hydrology criterion. Since TP-6 met all three criteria, the area represented by TP-6 is a wetland, and is located in the western portion of Wetland A.

3.3 Wetlands

TP-1 and TP-6 represented areas that met all three wetland criteria on the property. One wetland was identified and delineated on site and no wetlands were identified in GIS databases within 250 feet. The wetland delineated on site is described in detail below and its characteristics are summarized in Table 1. The wetland boundaries are shown in Figure 2.

Table 1. Wetland Summary

Wetland Name	Cowardin Classification[1]	Size	Wetland Rating				
			Hydrologic	Water Quality	Habitat	Total	Category
Wetland A	PEM	638 sq ft	12	3	4	19	IV

PEM = palustrine emergent
[1] Cowardin et al. 1979

Wetland A is sloped wetland located in the eastern portion of the property (Figure 2) and is 638 square feet in size. It begins at the outlet of the stormwater pipe in the eastern portion of the property and ends at the concrete basin in the central portion of the property. TP-1 and TP-6, described above, represent Wetland A. The existing stormwater pipe discharging at the top of the slope appears to be the primary source of hydrology for Wetland A.

According to the Cowardin classification (Cowardin et al. 1979), Wetland A is an emergent wetland. Wetland A is dominated by giant horsetail. The boundary of Wetland A was determined by topographic break, evidence of standing water, and the vegetative shift to non-hydrophytic vegetation. According to the 2004 Wetland Rating System (Hruby 2004), Wetland A was rated as a Category IV wetland.

4.0 REGULATORY IMPLICATIONS

According to Mercer Island City Code (MICC) 19.16, wetlands are defined as:

> "areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands do not include artificial wetlands, such as irrigation and drainage ditches, grass-lined swales, canals, landscape amenities, and detention facilities or those wetlands, created after July 1, 1990, that were unintentionally created as a result of the construction of a road or street unless the artificial wetlands were created to mitigate the alteration of a naturally occurring wetland. For identifying and delineating a regulated wetland, the city will use the Wetland Manual."

Wetland A meets the first part of the definition, namely it is an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

However, the definition also states that wetlands do not include artificial wetlands and then lists some examples of artificial wetlands: "such as irrigation and drainage ditches, grass-lined swales, canals, landscape amenities, and detention facilities…." While the characteristics of Wetland A do not fall into the examples listed in the definition (e.g., ditches, swales), Wetland A does meet the definition of artificial, because the source of hydrology is not a natural condition (i.e., groundwater or precipitation); rather, the source is the stormwater drain associated with SE 48th Street (i.e., artificial) and surrounding development, thus meeting the definition. That is, if this stormwater pipe did not discharge onto the property, Wetland A would not be expected to exist. While the installation date of the stormwater pipe is unknown, there have been substantial changes in the contributing basin of the stormwater pipe that have resulted in a significant increase in the volume of water entering the pipe. Since 1990, there has been a significant increase (both permitted and unpermitted) in impervious surfaces to the contributing basin, as well as the installation of a new stormwater collection pipe at 8100 SE 48th Street that connects to the subject pipe. This new stormwater pipe, which appears to be unpermitted, collects a significant amount of runoff that would have otherwise infiltrated into the ground or, at a minimum, would not have entered into the subject stormwater pipe.

Table 2 summarizes the parcels that contribute runoff into the stormwater drain that discharges onto the property and the changes to impervious surfaces or runoff collection systems that were constructed after 1990. Figure 3 shows the location of these parcels in relation to 4803 Forest Avenue SE. Appendix F shows pictures of these features.

Table 2. Stormwater Contributions Summary

Address	Post 1990 Increases to Impervious Surfaces
8100 SE 48th Street	Post 1990 – installation of a storm drain with trash rack that connects to stormwater pipe discharges onto 4803 Forest Avenue SE (no permit identified). This results in an increase of stormwater discharging onto 4803 Forest Avenue SE compared to pre-1990 flows from 8100 SE 48th Street.
8101 SE 48th Street	Post 1990 – gravel driveway was paved, increasing stormwater runoff into the stormwater pipe that discharges onto 4803 Forest Avenue SE (no permit identified). This results in an increase of stormwater discharging onto the property compared to pre-1990 flows from 8101 SE 48th Street.
8105 SE 48th Street	2011 – demolition of old house and construction of new 5,641 square foot home (permits 1103-113 and 1008-036). Runoff from home goes into a new catch basin/stormwater pipe that is connected to the stormwater pipe that discharges onto 4803 Forest Avenue SE. This results in an increase of stormwater discharging onto the property compared to pre-1990 flows from 8105 SE 48th Street.
8201 SE 48th Street	No post-1990 increases of stormwater entering compared to pre-1990 stormwater pipe that discharges onto 4803 Forest Avenue SE. This does not result in an increase of stormwater discharging onto the property compared to pre-1990 flows from 8201 SE 48th Street.
4801 W Mercer Way	1999 – demolition of old house and construction of new 4,960 square foot home (permits 981115 and 980615). Runoff from home goes into stormwater pipe that discharges onto 4803 Forest Avenue SE. This results in an increase of stormwater discharging onto the property compared to pre-1990 flows from 4801 W Mercer Way.
4803 W Mercer Way	1999 – construction of new 4,890 square foot home addition (permit 981740). Runoff from home goes into stormwater pipe that discharges onto 4803 Forest Avenue SE. This results in an increase of stormwater discharging onto the property compared to pre-1990 flows from 4803 W Mercer Way.
4805 84th Avenue SE	2009 – construction of new 1,027 square foot home addition (permit 0909118). Runoff from home goes into stormwater pipe that discharges onto 4803 Forest Avenue SE. This results in an increase of stormwater discharging onto the property compared to pre-1990 flows from 4805 84th Avenue SE.

It is likely that these changes in the contributing basin, which occurred after 1990, have resulted in sufficient flow coming out of the pipe to allow the artificial wetland hydrology to develop. Had these permitted and unpermitted activities not occurred, the volume of water discharging from the pipe would not likely have been sufficient to create wetland hydrology.

This is further demonstrated by the mapped soils. Soils on the site are mapped as Kitsap silt loam, which is characterized as a moderately well drained soil with the depth to the water table between 18 and 36 inches (USDA NRCS 2017a). For the water table to provide wetland hydrology, the depth to the water table must be 12 inches or less. Based on this information, the depth to the water table is too deep for the water table to provide wetland hydrology. This provides further evidence that Wetland A would not exist, except for the artificial (i.e., stormwater) input onto the property.

Based on the above rationale, Wetland A does not meet the MICC 19.16 definition of a wetland because there have been significant enough increases to runoff from development within the contributing basin, which occurred after 1990, to meet the criteria of artificial hydrology.

However, should the City not concur with this evaluation, the standard buffer for Wetland A would be 35 feet (Figure 4).

The water flowing from Wetland A would not be classified as a watercourse. MICC 19.16 defines watercourses as a course or route, formed by nature and generally consisting of a channel with a bed, banks, or sides throughout substantially all its length, along which surface waters, with some regularity (annually in the rainy season), naturally and normally flow in draining from higher to lower lands. This definition does not include irrigation and drainage ditches, grass-lined swales, canals, storm water runoff devices, or other courses unless they are used by fish or to convey waters that were naturally occurring prior to construction.

Confluence conducted a watercourse evaluation on this parcel and the parcel to the west (Tax parcels 2577300021 and 4045000145) to determine the presence and extent of any watercourse on both properties (Confluence 2017). As described in that report, stormwater from the concrete pipe sheet flows down the slope (in the footprint of Wetland A) into a concrete basin. The basin discharges into another 6-inch diameter corrugated plastic pipe via a perched outlet pipe. This corrugated plastic pipe goes west approximately 20 feet where it discharges into a catch basin. Stormwater runoff from the garage and upper driveway also enter this catch basin. This catch basin enters Lake Washington via a 12-inch diameter corrugated metal pipe. Water from the house and lower driveway enter the 12-inch diameter corrugated metal pipe downslope of the catch basin. The outlet of this pipe is located above the ordinary high water of the lake, in the yard. Despite the collection and concentrated discharge of runoff, there are no indicators of a watercourse or stream between the pipe outlet and the lake.

If there is not sufficient flow to create a watercourse at the outlet of the pipe, where additional runoff has been added to the water flowing out of Wetland A, then clearly there is not sufficient flow out of Wetland A to create a watercourse if the water did not go into a pipe.

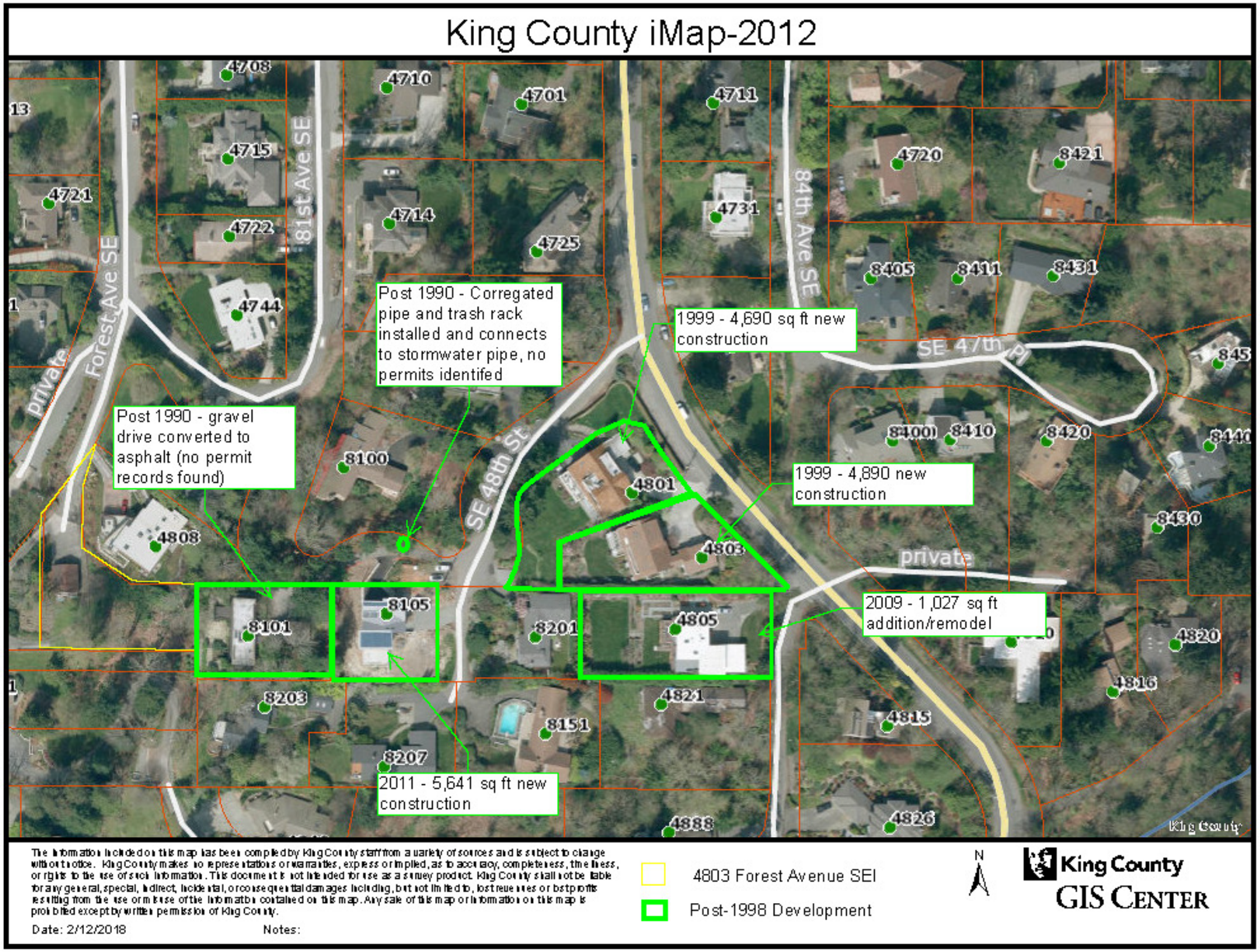

Figure 3. Post-1990 Increases to Impervious Surfaces Contributing to Runoff on 4803 Forest Avenue SE (King County 2018)

Figure 4. Wetland Boundary and Standard Buffer

5.0 REFERENCES

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Appendix A
GIS Database Search Results

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands

October 30, 2017

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Approximate Study Area
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

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.

Map Scale: 1:1,250 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 15 30 60 90

Feet
0 50 100 200 300

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

Approximate study area

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: King County Area, Washington
Survey Area Data: Version 12, Sep 8, 2016

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

Date(s) aerial images were photographed: Aug 31, 2013—Oct 6, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

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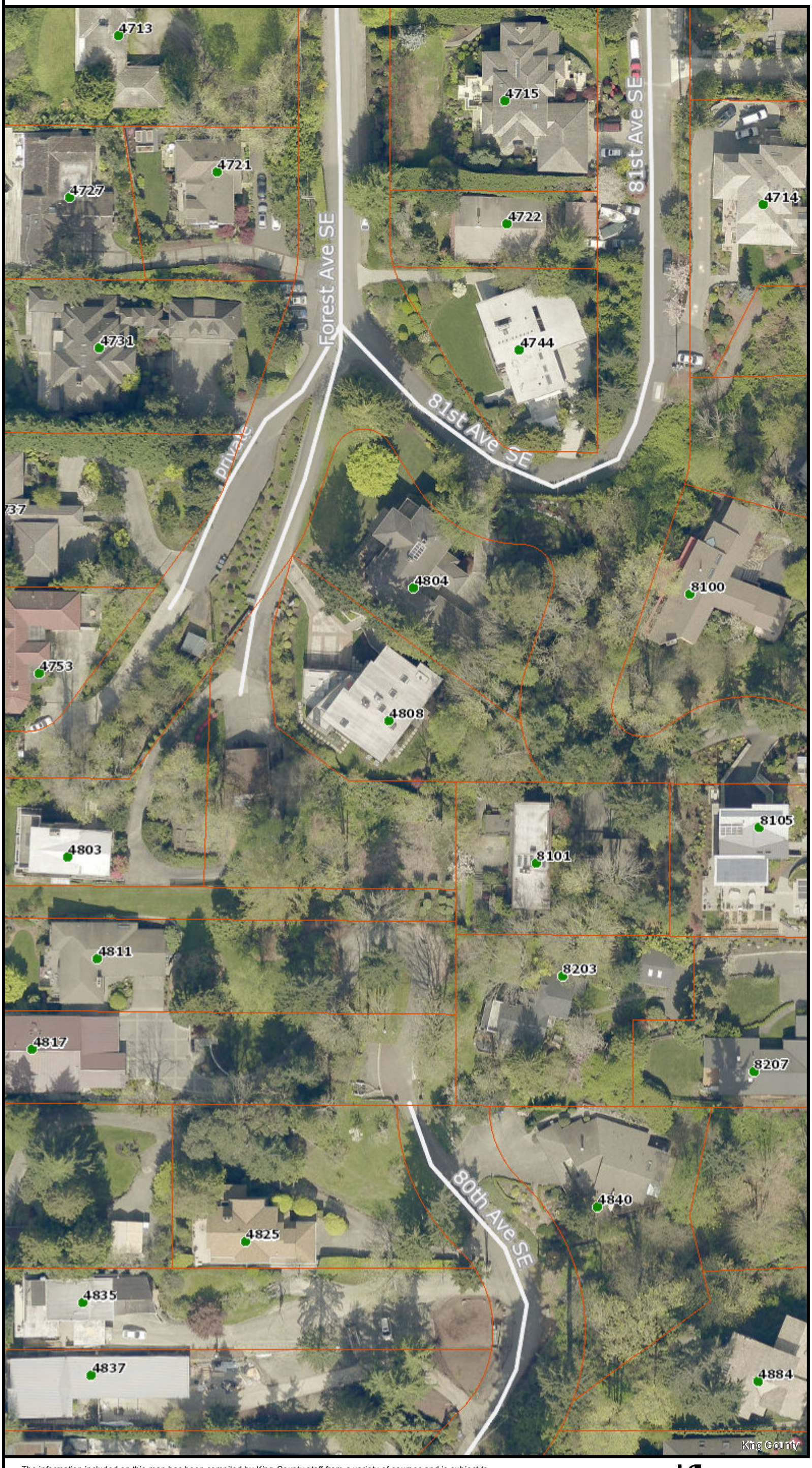
for double-sided printing

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KpB	Kitsap silt loam, 2 to 8 percent slopes	6.7	90.7%
KpD	Kitsap silt loam, 15 to 30 percent slopes	0.5	7.0%
Totals for Area of Interest		**7.4**	**100.0%**

King County iMap



Legend

- Address points
- Address labels
- Parcels
- class 1
- class 2 perennial
- class 2 salmonid
- class 3
- unclassified
- Wetland (1990 SAO)
- Sensitive area notice on title
- Streams

Date: 10/30/2017

Notes:

King County
GIS Center

Appendix B
Delineation Methods

CONFLUENCE ENVIRONMENTAL COMPANY
WETLAND DELINEATION METHODS

Prepared by:

Confluence Environmental Company
2017

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TABLE OF CONTENTS

This report describes the methods used to determine the presence or absence of critical areas in a project area.

1.0 WETLANDS

1.1 Methods Used to Determine Wetlands

Confluence delineates the boundaries of wetlands using the "Routine Determinations for Areas Less Than 5 Acres in Size" method described by the U.S. Army Corps of Engineers (Corps) in the *Corps of Engineers Wetlands Delineation Manual* (Delineation Manual; Corps 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Corps 2010) (Regional Supplement). The Regional Supplement was part of a nationwide effort to address regional wetland characteristics and improve the accuracy and efficiency of wetland-delineation procedures. The Regional Supplement uses the best available science to addresses regional differences in climate, geology, soils, hydrology, and plant and animal communities that cannot be addressed in a single national document, such as the Delineation Manual. The Regional Supplement was designed for use with the 1987 Delineation Manual and all subsequent versions. Where differences in the two documents occur, the Regional Supplement takes precedence over the 1987 Delineation Manual (Corps 2010). The Regional Supplement was developed to clarify the indicators of hydrophytic vegetation, hydric soils, and wetland hydrology found in the region (these indicators are discussed in detail in the section below). It is important to note that areas that may have been determined as a wetland under the 1987 Delineation Manual may not be determined as wetland under the Regional Supplement, and vice versa.

Confluence uses the PLANTS Database (USDA NRCS 2017) for scientific names and the 2016National Wetland Plant List (Lichvar 2016) to determine the wetland indicator status of plants. Wetlands are classified using the Cowardin Classification System (Cowardin et al. 1979). Confluence determines the wetland rating using Washington State Department of Ecology's Wetland Rating System for Western Washington (Hruby 2004). The National Wetland Inventory is also researched to determine if wetlands have previously been identified on the property (USFWS 2017).

The locations of test plots, soil cores, and wetland edges on a project property are recorded using a differential Global Positioning System with sub-meter accuracy. Delineated and surveyed wetland boundaries are subject to verification and approval by jurisdictional agencies.

1.2 Wetland Criteria

There is specific technical language that applies to the study of wetlands. This section briefly explains the language Confluence uses in its wetland delineation reports.

The identification of wetlands is based on three criteria: hydrophytic vegetation, hydric soils, and hydrology; each criterion has a number of indicators by which it can be determined to satisfy the standard. The Corps, which is the federal authority on the regulation of wetlands, has developed the guidance and the Data Sheet that are the standards used in all wetland determinations. The information presented below is based on their Wetland Delineation Manual (Corps 1987) and Regional Supplement (Corps 2010).

In order to characterize a wetland, data are collected from representative test plots. The delineator chooses areas both within and outside of a potential wetland that are representative of particular vegetative, topographic, and hydrologic features in the vicinity. Those areas then become test plots where particular data (see sections below) about vegetation, soils, and hydrology are collected to determine whether wetland characteristics are present. Plots that meet all three wetland criteria are wetland plots; plots that do not meet the three wetland criteria are upland plots. The test plots (along with topographic and vegetative shifts) then inform the wetland boundaries, with wetland plots being within the wetlands and upland plots being outside of the wetlands.

1.2.1 Hydrophytic Vegetation

Vegetation is often the first visual cue that an area is a wetland. Similarly, vegetation often also signals the shift from wetland to non-wetland. The question regarding plants to be answered when performing a wetland delineation is: "Is the vegetation hydrophytic?" That is, is the vegetation of the variety that is adapted to live in wetter-than-average conditions? To determine the answer, there are a few resources and steps to follow. First, the indicator status for each plant present in the test plot is determined from the National Wetland Plant List (Lichvar 2016). The indicator status is a continuum from almost exclusively occurring in wetlands (obligate wetland plants, or OBL) to almost exclusively never found in wetlands (obligate upland plants, or UPL). The middle ground between those two extremes is known as a facultative plant (or FAC), which is found equally in wetland and upland environments. The FAC category has two further gradations: facultative upland plants (FACU), which are plants that are usually found in uplands, and facultative wetland plants (FACW), which are plants that are usually found in wetlands.

After the status of each plant species in the test plot has been determined, the hydrophytic vegetation indicator can be applied. The application of the indicators is performed sequentially, and once one is "passed," the box for hydrophytic vegetation is "checked," and the process continues to the next criterion. The first hydrophytic vegetation indicator is the "Rapid Test," which means with a quick visual survey, all the plants in the test plot are either OBL or FACW.

The second test is the "Dominance Test." For the Dominance Test, the total number of dominant species in the test plot is divided by the number of species that are OBL, FACW, or FAC. The resulting percentage must be greater than 50 to pass this test. The third test is the "Prevalence Index." The Prevalence Index is a weighted average of the absolute cover of all the plant species present in the plot, regardless of dominance. There are also two other, less common, indicators: morphological adaptations (e.g., buttressed trunks), or non-vascular plant species (e.g., sphagnum moss).

1.2.2 Hydric Soils

The soils tell the story about the presence of water over time. The National Technical Committee 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 1994) The question to be answered here is: "Has water been present long enough and recently enough to form hydric soils?" In order to examine the soil characteristics, a test pit must be dug, usually to about 18 inches. A sliver of soil from the test pit is extracted with a shovel (i.e., the soil profile) to examine the layers. The thickness, color, texture, redox features, and any other interesting information about each layer is observed and recorded. Those features are described more fully in the bullets below.

- **Thickness.** Layers are measured to the nearest inch. Usually, each soil profile has at least two layers.
- **Color.** Color is determined by comparison to a color chart. The industry standard is the Munsell Soil-Color Chart, which assigns each color a designation for hue, value, and chroma (e.g., 10YR 3/2, where 10YR=hue, 3=value, and 2=chroma).
- **Texture.** The precision of texture description for the purpose of wetland delineation is at a general scale. The Washington State University texture chart (Cogger 2010) is often used, but the delineator just needs to determine if the soil is sandy or loamy/clayey.
- **Redox Features.** The most common redox features are concentrations or depletions of iron in the soil matrix. Concentrations occur as red or yellow deposits, and depletions occur as grayish deposits.

When the soil profile is fully described, it can be determined if any of the layers meet a hydric soil indicator. Hydric soil indicators help to identify hydric soils. The presence of any indicator signifies a hydric soil, although a soil may be hydric and not meet any indicators. There are 19 hydric soil indicators in our region, 2 of which were observed at the site (Corps 2010). Additional hydric soil terminology definitions are in the sidebar.

- **A11 – Depleted Below Dark Surface.** A soil layer with a depleted matrix, with 60 percent or more chroma of ≤2, which starts within 12 inches of the surface and is at least 6 inches thick. Layers above the depleted layer must have a value ≤3, and a chroma ≤2.

- **F6 – Redox Dark Surface.** A soil layer at least 4 inches thick, entirely within the upper 12 inches of the soil with:

  - matrix value ≤3, chroma ≤1, and 2 percent or more distinct or prominent redox concentrations, or
  - matrix value ≤3, chroma ≤2, and 5 percent or more distinct or prominent redox concentrations.

More Hydric Soils Definitions
(adapted from Corps 2010)

Matrix: the dominant soil volume in a given soil layer

Depleted Matrix: the volume of a soil horizon in which soil processes have removed or transformed iron, creating colors of low chroma and high value, specifically:

- Value ≥5, chroma = 1, with or without redox features
- Value ≥6, chroma = 1 or 2, with or without redox features
- Value of 4 or 5, chroma =2, ≥2% distinct or prominent redox features
- Value of 4, chroma =1, ≥2% distinct or prominent redox features

Distinct: readily seen, but contrasting* moderately with comparison color

Prominent: readily seen and contrasting* greatly with comparison color

*See Corps 2010, Table A1, page 130 for full key on contrast determinations.

1.2.3 Hydrology

Wetland hydrology is the broadest criterion and has to do with signs of saturation and inundation in the test plot. While hydrophytic vegetation and hydric soils are the result of hydrology, they remain even during the dry season, whereas hydrology can be less apparent or absent during the dry season. The hydrology indicators are broad enough to encompass characteristics that may be present even during the dry season. Hydrology indicators are in four groups:

- Group A is based on direct observation of surface or ground water;
- Group B consists of evidence that the site is subject to inundation;
- Group C consists of other evidence that soil is or was saturated; and
- Group D consists of landscape, vegetation, and soil characteristics indicating contemporary wet conditions.

The indicators are further divided into two categories: primary and secondary. A test plot must have either one primary or two secondary indicators to pass the hydrology criterion. Primary and secondary indicators observed during this delineation are recorded on the wetland delineation date forms in Appendix C.

2.0 REFERENCES

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Appendix C
Wetland Delineation Data Forms

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

Project/Site: 4803 Forest Ave SE City/County: Mercer Is./ King Sampling Date: 11/6/17
Applicant/Owner: Laurie Cropp State: WA Sampling Point: TP-1
Investigator(s): KAM / AER Section, Township, Range: T24N R4E S 18&24
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): ____
Subregion (LRR): A Lat: ____ Long: ____ Datum: ____
Soil Map Unit Name: Kitsap silt loam NWI classification: ____
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:
TP1 - located ≈ 25 feet downslope of stormwater outfall
Weather = Sunny & cold w/ recent snow/rain

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 10')			
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10')			
1. H. blackberry	10	✓	FAC
2.			
3.			
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: 10')			
1. bittercress	20	✓	FACW
2. Field bindweed	20	✓	FACU
3. giant horsetail	100	✓	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	140 = Total Cover		
Woody Vine Stratum (Plot size: 10')			
1. English ivy (rooted in plot)	50	✓	FACU
2.			
	50 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ 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:

SOIL

Sampling Point: TP-1

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 2/1	100					loam	roots/cobble/gravel/duff
5-8	Gley 1 5/5GY	80	10YR 5/8	20	C	M/PL	loam	lots of organic material/roots & w/ gravel
8-12	Gley 1 4/10GY	80	5YR 3/4	20	C	M/PL	loamy sand w/ gravel	

[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 Soil 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 Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): ≤1"

Water Table Present? Yes ✓ No ___ Depth (inches): 10"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0@surf.

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

recent small rain; standing water/running water from storm drain emptying onto hillslope. Standing H_2O in small (foot prints) depressions

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

Project/Site: 4803 Forest Ave SE City/County: Mercer Island/King Sampling Date: 11/6/17
Applicant/Owner: Laurie Cropp State: WA Sampling Point: TP-6
Investigator(s): KAM/AER Section, Township, Range: T24N R4E S13&24
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): ____
Subregion (LRR): A Lat: ____ Long: ____ Datum: ____
Soil Map Unit Name: Kitsap silt loam NWI classification: ____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ✓ No ____
Hydric Soil Present? Yes ✓ No ____
Wetland Hydrology Present? Yes ✓ No ____
Is the Sampled Area within a Wetland? Yes ✓ No ____

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. Big leaf maple	40	✓	FACU
2.			
3.			
4.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10')			
1. H. blackberry	20	✓	FAC
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 10')			
1. Creeping buttercup	10		FAC
2. giant horsetail	90	✓	FACW
3. Bittercress	2		FACW
4. Field Bindweed	5		FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	107 = Total Cover		
Woody Vine Stratum (Plot size: 10')			
1. English ivy (Created in plot)	40	✓	FACU
2.			
	40 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 0	x 1 = 0
FACW species 90	x 2 = 180
FAC species 30	x 3 = 90
FACU species 85	x 4 = 340
UPL species 0	x 5 = 0
Column Totals: 205 (A)	610 (B)

Prevalence Index = B/A = 2.98

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:

SOIL

Sampling Point: TP6

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR2/1	100					silty loam w/ gravel	
4-11	10YR3/1	100					sand w/ gravel	
11-17	10YR4/1	98	7.5YR4/6	2	C	M	sandy loam w/ gravel	

[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 Soil 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 Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 21"

Water Table Present? Yes ✓ No ___ Depth (inches): 0"

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: 4803 Forest Ave SE City/County: Newcastle/King Sampling Date: 11/6/17
Applicant/Owner: Laurie Cropp State: WA Sampling Point: TPS
Investigator(s): KAMINER Section, Township, Range: T24N R4E S13&24
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): flat Slope (%): _____
Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: Kitsap silt loam NWI classification: _____
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:
TPS = transition zone

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10')			
1. H. blackberry	50	✓	FAC
2.			
3.			
4.			
5.			
	50 = Total Cover		
Herb Stratum (Plot size: 10')			
1. field bindweed	40	✓	FACU
2. giant horsetail	80	✓	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	120 = Total Cover		
Woody Vine Stratum (Plot size: 10')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
___ 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:

SOIL

Sampling Point: TP-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR2/1	100					loam	
6-17	7.5YR3/1	98	7.5YR5/8	2	C	M	sandy loam	w/gravel

[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 Soil 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 Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

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:

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

Project/Site: 4803 Forest Ave SE City/County: Mercer Island/King Sampling Date: 11/6/17

Applicant/Owner: Laurie Cropp State: WA Sampling Point: TP-4

Investigator(s): KAM/AER Section, Township, Range: T24N R4E S13&24

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

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Kitsap SLT loam NWI classification: _____

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:

TP4 = transition zone

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. Bigleaf maple	40	✓	FACU
2.			
3.			
4.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10')			
1. OR. grape	5	✓	FACU
2. H. blackberry	5	✓	FAC
3.			
4.			
5.			
	10	= Total Cover	

Herb Stratum (Plot size: 10')			
1. giant horsetail	80	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80	= Total Cover	

Woody Vine Stratum (Plot size: 10)			
1. English ivy (rooted in plot)	60	✓	FACU
2.			
	60	= Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	80	x 2 =	160
FAC species	5	x 3 =	15
FACU species	105	x 4 =	420
UPL species	0	x 5 =	0
Column Totals:	190 (A)		595 (B)

Prevalence Index = B/A = 3.1

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:

SOIL

Sampling Point: TP-4

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/2	100					silty loam	
8-11	10YR 3/2	100					sandy loam w/ gravel	
11-15	10YR 4/1	80	5YR 4/6	20	C	M	sandy loam w/ gravel	

[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 Soil 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 Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 12"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 8"

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: 4803 Forest Ave SE City/County: Mercer Island / King Sampling Date: 11/6/17

Applicant/Owner: Laurie Cropp State: WA Sampling Point: TP-3

Investigator(s): KAM/AER Section, Township, Range: T24N R4E S13&24

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

Subregion (LRR): A Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Kitsap silt loam NWI classification: _____

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:
TP3 = N. of TP1

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		

Sapling/Shrub Stratum (Plot size: 10')			
1. laurel	10		N/A
2. H. blackberry	30	✓	FACU
3.			
4.			
5.			
	40 = Total Cover		

Herb Stratum (Plot size: 10')			
1. giant horsetail	100	✓	FACW
2. field bindweed (growing on horsetail & H. blackberry)	80	✓	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	180 = Total Cover		

Woody Vine Stratum (Plot size: 10')			
1. English Ivy (rooted in plot)	5		FACU
2.			
	5 = Total Cover		

% Bare Ground in Herb Stratum _____

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	115	x 4 =	460
UPL species	0	x 5 =	0
Column Totals:	215 (A)		660 (B)

Prevalence Index = B/A = 3.07

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:

SOIL

Sampling Point: TP-3

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-11	10YR 2/2	100					silt loam	w/ gravel & organic fibers
11-18	10YR 3/2	100					loam	w/ lots of gravel

[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 Soil 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 Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

Water Table Present? Yes ___ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): @ surface

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

H_2O coming into pit from S. side only = side where stormwater flows. H_2O in pit + is from stormwater runoff adjacent to TP.

↑ Saturation

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

Project/Site: 4803 Forest Ave SE City/County: Mercer Is. / King Sampling Date: 11/6/17
Applicant/Owner: Laurie Cropp State: WA Sampling Point: TP 2
Investigator(s): KAM / AER Section, Township, Range: 24N R4E S13; 24
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): _____
Subregion (LRR): A Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: Kitsap silt loam - mod. well drained NWI classification: _____
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:
TP 2 = Southeast of TP1; higher on hillslope
TP2 = transition zone

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	

Sapling/Shrub Stratum (Plot size: 10')			
1. butterfly bush	15	✓	FACU
2. OR grape	10	✓	FACU
3.			
4.			
5.			
	25	= Total Cover	

Herb Stratum (Plot size: 10')			
1. giant horsetail	30	✓	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	= Total Cover	

Woody Vine Stratum (Plot size: 10')			
1. English Ivy	100	✓	FACU
2.			
	100	= Total Cover	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 0	x 1 =	0
FACW species 30	x 2 =	60
FAC species 0	x 3 =	0
FACU species 125	x 4 =	500
UPL species 0	x 5 =	0
Column Totals: 155 (A)		560 (B)

Prevalence Index = B/A = 3.2

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:

SOIL

Sampling Point: TP-2

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR2/1	100					sandy loam w/ gravel	
5-15	10YR2/1	98	10YR4/6	2	C	M	sandy loam w/ gravel	

[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 Soil Present? Yes ✓ No ___

Remarks:

layer #2 meets F6

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (2 or more required)

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

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): _____

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 D
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): Cropp Residence - A Date of site visit: 11/6/17

Rated by Kerrie McArthur Trained by Ecology? Yes ✓ No ___ Date of training ____

SEC: 13 24 TWNSHP: 24N RNGE: 4E Is S/T/R in Appendix D? Yes ___ No ✓

Map of wetland unit: Figure ____ Estimated size ____

SUMMARY OF RATING

Category based on FUNCTIONS provided by wetland

I___ II___ III___ IV ✓

Category I = Score >=70
Category II = Score 51-69
Category III = Score 30-50
Category IV = Score < 30

Score for Water Quality Functions	12
Score for Hydrologic Functions	3
Score for Habitat Functions	4
TOTAL score for Functions	19

Category based on SPECIAL CHARACTERISTICS 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	

Wetland name or number A

Does the wetland unit 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 May 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 I 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.		✓

To complete the next part of the data sheet you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Wetland name or number A

Classification of Wetland Units in Western Washington

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

1. Are the water levels in the entire unit usually controlled by tides (i.e. except during floods)?
NO – go to 2 **YES** – the wetland class is **Tidal Fringe**

If yes, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)? **YES – Freshwater Tidal Fringe NO – Saltwater Tidal Fringe (Estuarine)**

*If your wetland can be classified as a Freshwater Tidal Fringe use the forms for **Riverine** wetlands. If it is Saltwater Tidal Fringe it is rated as an **Estuarine** wetland.* Wetlands that were called estuarine in the first and second editions of the rating system are called Salt Water Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p.).

2. The entire wetland unit is flat and precipitation is the only source (>90%) of water to it. Groundwater and surface water runoff are NOT sources of water to the unit.
NO – go to 3 **YES** – The wetland class is **Flats**

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

3. Does the entire wetland unit **meet both** of the following criteria?
___The vegetated part of the wetland is on the shores of a body of permanent open water (without any vegetation on the surface) at least 20 acres (8 ha) in size;
___At least 30% of the open water area is deeper than 6.6 ft (2 m)?
NO – go to 4 **YES** – The wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?
___The wetland is on a slope (*slope can be very gradual*),
___The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.
___The water leaves the wetland **without being impounded**?
NOTE: *Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3ft diameter and less than 1 foot deep).*
NO - go to 5 **YES** – The wetland class is **Slope**

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

____ The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river

____ The overbank flooding occurs at least once every two years.

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

NO - go to 6 **YES** – The wetland class is **Riverine**

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

NO – go to 7 **YES** – The wetland class is **Depressional**

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

NO – go to 8 **YES** – The wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM clases. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT (make a rough sketch to help you decide). Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. NOTE: Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the class listed in column 2 is less than 10% of the unit; classify the wetland using the class that represents more than 90% of the total area.

HGM Classes within the wetland unit being rated	*HGM Class to Use in Rating*
Slope + Riverine	Riverine
Slope + Depressional	Depressional
Slope + Lake-fringe	Lake-fringe
Depressional + Riverine along stream within boundary	Depressional
Depressional + Lake-fringe	Depressional
Salt Water Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics

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

Wetland name or number A

S	**Slope Wetlands** WATER QUALITY FUNCTIONS - Indicators that the wetland unit functions to improve water quality	**Points** (only 1 score per box)
S	**S 1. Does the wetland unit have the potential to improve water quality?**	*(see p.64)*
S	S 1.1 Characteristics of average slope of unit: Slope is1% or less *(a 1% slope has a 1 foot 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 25 rise per KC map / 80 run ≈ 30%	0
S	S 1.2 The soil 2 inches below the surface (or duff layer) is clay or organic *(use NRCS definitions)* YES = 3 points NO = 0 points	0
S	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 > ½ 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 ___ 6
S	**Total for S 1** *Add the points in the boxes above*	6
S	**S 2. Does the wetland unit have the opportunity 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 150ft ✓ Untreated stormwater discharges to wetland → stormwater = main source of wetland hydrology — Tilled fields, logging, or orchards within 150 feet 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
S	**TOTAL - Water Quality Functions** Multiply the score from S1 by S2 ***Add score to table on p. 1***	12

Comments

Wetland name or number A

S	Slope Wetlands HYDROLOGIC FUNCTIONS - Indicators that the wetland unit functions to reduce flooding and stream erosion	Points (only 1 score per box)
	S 3. Does the wetland unit have the potential to reduce flooding and stream erosion?	*(see p.68)*
S	S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. *Choose the points appropriate for the description that best fit 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 - horsetail + rigid 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	1
S	S 3.2 Characteristics of slope wetland that holds back small amounts of flood flows: The slope wetland has small surface depressions that can retain water over at least 10% of its area. YES points = 2 NO points = 0	2
S	*Add the points in the boxes above*	3
S	**S 4. Does the wetland have the opportunity 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 - drains to LK. WA - controlled H2O levels — 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
S	**TOTAL - Hydrologic Functions** Multiply the score from S 3 by S 4 ***Add score to table on p. 1***	3

Comments

Wetland name or number A

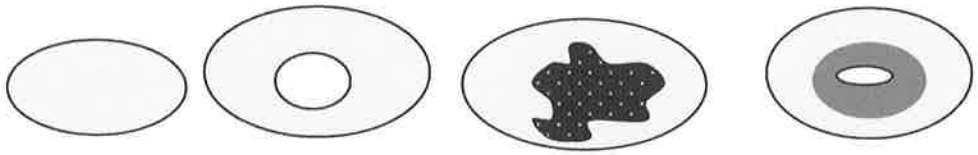
These questions apply to wetlands of all HGM classes. HABITAT FUNCTIONS - Indicators that unit functions to provide important habitat	**Points** (only 1 score per box)
H 1. Does the wetland unit have the potential to provide habitat for many species?	
H 1.1 Vegetation structure ***(see p. 72)***	**Figure ___**
Check the types of vegetation classes present (as defined by Cowardin)- Size threshold for each class is ¼ 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) – within wet. H. blackberry <30%	
___Forested (areas where trees have >30% cover)	
If the unit has a forested class check if:	0
___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 structures that qualify. If you have:	
4 structures or more points = 4 3 structures points = 2 2 structures points = 1 1 structure points = 0	
Map of Cowardin vegetation classes	
H 1.2. Hydroperiods ***(see p. 73)***	**Figure ___**
Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland or ¼ 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 types present points = 2	
___Occasionally flooded or inundated — 2 types present point = 1	0
_✓_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	
H 1.3. Richness of Plant Species ***(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 < 5 species points = 0	1
List species below if you want to:	

Total for page 1

Wetland name or number A

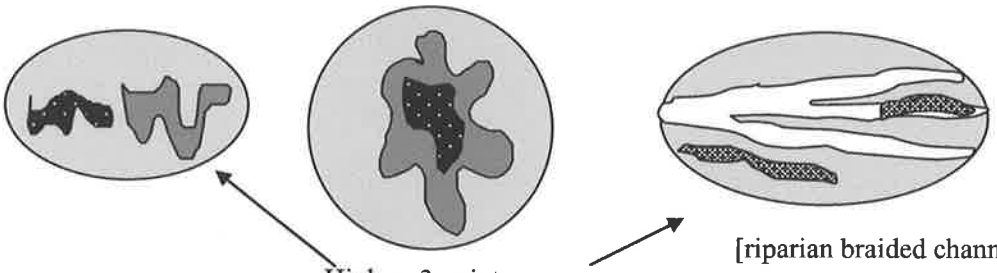
H 1.4. Interspersion of habitats *(see p. 76)* — Figure ___

Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1), or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.



None = 0 points Low = 1 point Moderate = 2 points

0



High = 3 points [riparian braided channels]

NOTE: If you have four or more classes or three vegetation classes and open water the rating is always "high". Use map of Cowardin vegetation classes

H 1.5. Special Habitat Features: *(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 (>4in. 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 (>30degree slope) OR signs of recent beaver activity are present *(cut shrubs or trees that have not yet turned grey/brown)*

____At least ¼ 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.

1

H 1. TOTAL Score - potential for providing habitat
Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5

2

Comments

Wetland name or number A

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	
H 2.1 Buffers ***(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."* — 100 m (330ft) 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** — 100 m (330 ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 50% circumference. **Points = 4** — 50 m (170ft) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. **Points = 4** — 100 m (330ft) of relatively undisturbed vegetated areas, rocky areas, or open water > 25% circumference, . **Points = 3** — 50 m (170ft) 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 25 m (80ft) of wetland > 95% circumference. Light to moderate grazing, or lawns are OK. **Points = 2** — No paved areas or 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 (6.6ft) for more than 95% of the 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** Aerial photo showing buffers	**Figure ___** 1
H 2.2 Corridors and Connections ***(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 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 50ft 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 = 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 mi of a large field or pasture (>40 acres) OR within 1 mi of a lake greater than 20 acres? - LK WA YES = **1 point** NO = **0 points**	1

Total for page 2

Wetland name or number A

H 2.3 Near or adjacent to other priority habitats listed by WDFW ***(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 330ft (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%; 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)

Wetland name or number A

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 ½ 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 ½ mile points = 5 There are at least 3 other wetlands within ½ mile, BUT the connections between them are disturbed points = 3 The wetland is Lake-fringe on a lake **with** disturbance and there are 3 other lake-fringe wetland within ½ mile points = 3 There is at least 1 wetland within ½ mile. points = 2 There are no wetlands within ½ mile. points = 0 Closest Next wetland >½ mile away	0
H 2. TOTAL Score - opportunity for providing habitat *Add the scores from H2.1,H2.2, H2.3, H2.4*	2
TOTAL for H 1 from page 14	2
Total Score for Habitat Functions – add the points for H 1, H 2 and record the result on p. 1	4

Wetland name or number A

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and circle the appropriate answers and Category.

Wetland Type *Check off any criteria that apply to the wetland. Circle the Category when the appropriate criteria are met.*	**Category**
SC 1.0 Estuarine wetlands *(see p. 86)* Does the wetland unit meet the following criteria for Estuarine wetlands? — The dominant water regime is tidal, — Vegetated, and — With a salinity greater than 0.5 ppt. YES = Go to SC 1.1 NO ✓	
SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151? YES = Category I NO go to SC 1.2	**Cat. I**
SC 1.2 Is the wetland unit at least 1 acre in size and meets at least two of the following three conditions? YES = Category I NO = Category II — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has less than 10% cover of non-native plant species. If the non-native *Spartina* spp. are the only species that cover more than 10% of the wetland, then the wetland should be given a dual rating (I/II). The area of Spartina would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of Spartina in determining the size threshold of 1 acre. — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland has at least 2 of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands.	**Cat. I** **Cat. II** **Dual rating I/II**

Wetland name or number A

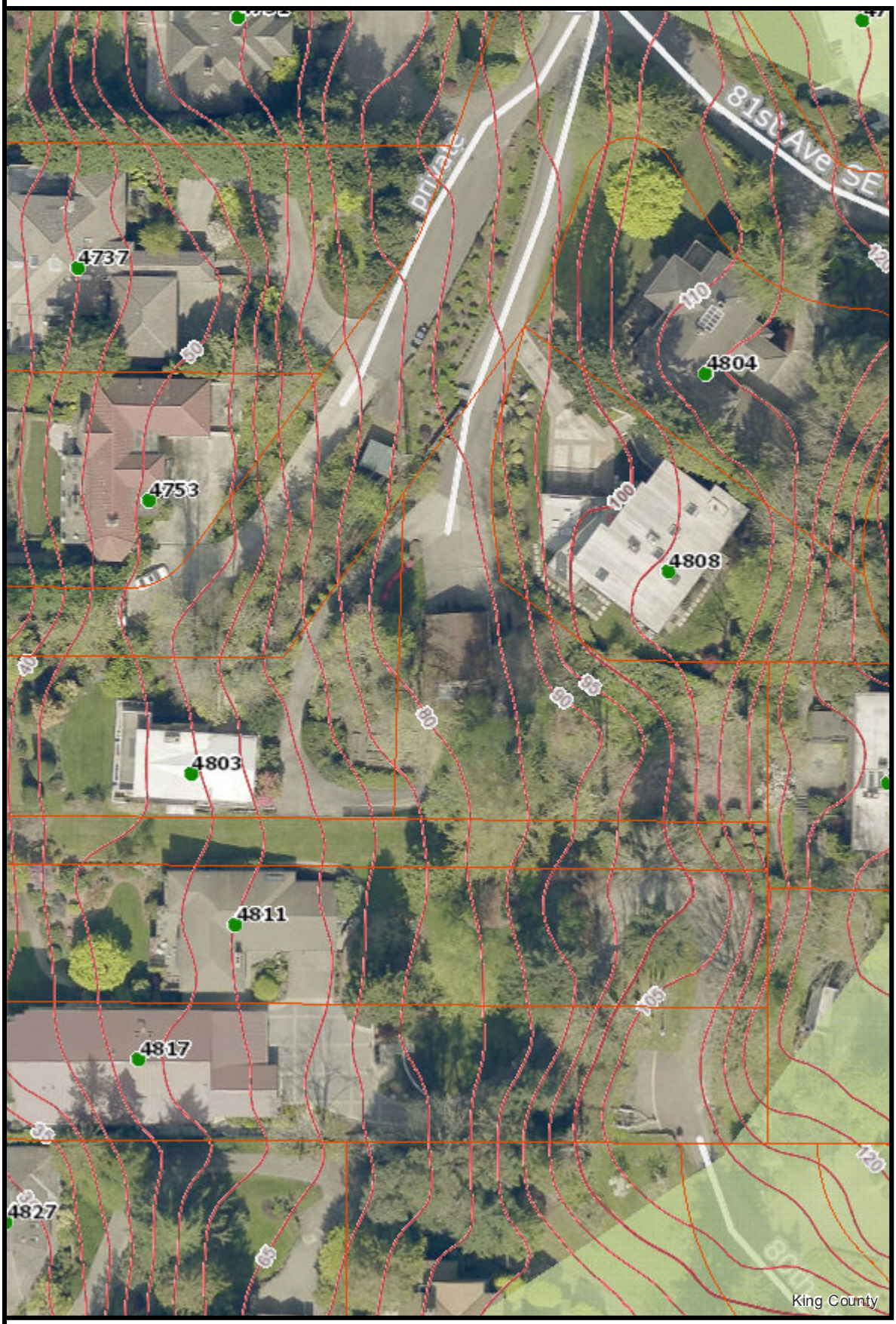
SC 2.0 Natural Heritage Wetlands ***(see p. 87)*** Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species. SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? *(this question is used to screen out most sites before you need to contact WNHP/DNR)* S/T/R information from Appendix D ___ or accessed from WNHP/DNR web site ✓ YES____ – contact WNHP/DNR (see p. 79) and go to SC 2.2 NO ✓ SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as or as a site with state threatened or endangered plant species? YES = Category I NO ✓ not a Heritage Wetland	**Cat. I**
SC 3.0 Bogs ***(see p. 87)*** Does the wetland unit (**or any part of the unit**) meet both the criteria for soils and vegetation in bogs? *Use the key below to identify if the wetland is a bog.* ***If you answer yes you will still need to rate the wetland based on its functions.*** 1. Does the unit have organic soil horizons (i.e. layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils)? Yes - go to Q. 3 No - go to Q. 2 2. Does the unit have organic soils, either peats or mucks that are less than 16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? Yes - go to Q. 3 No - Is not a bog for purpose of rating 3. Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (more than 30% of the total shrub and herbaceous cover consists of species in Table 3)? Yes – Is a bog for purpose of rating No - go to Q. 4 NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog. *1.* Is the unit forested (> 30% cover) with sitka spruce, subalpine fir, western red cedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on the bog species plant list in Table 3 as a significant component of the ground cover *(> 30% coverage of the total shrub/herbaceous cover)?* 2. YES = Category I No___ Is not a bog for purpose of rating	**Cat. I**

SC 4.0 Forested Wetlands ***(see p. 90)*** Does the wetland unit have at least 1 acre of forest that meet one of these criteria for the Department of Fish and Wildlife's forests as priority habitats? *If you answer yes you will still need to rate the wetland based on its functions.* — **Old-growth forests**: (west of Cascade crest) Stands of at least two tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20 trees/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more. NOTE: The criterion for dbh is based on measurements for upland forests. Two-hundred year old trees in wetlands will often have a smaller dbh because their growth rates are often slower. The DFW criterion is and "OR" so old-growth forests do not necessarily have to have trees of this diameter. — **Mature forests**: (west of the Cascade Crest) Stands where the largest trees are 80 – 200 years old OR have average diameters (dbh) exceeding 21 inches (53cm); 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. YES = Category I NO √ not a forested wetland with special characteristics	**Cat. I**
SC 5.0 Wetlands in Coastal Lagoons ***(see p. 91)*** Does the wetland meet all of the following criteria of a wetland in a coastal lagoon? — The wetland lies in a depression adjacent to marine waters that is wholly or partially separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks — The lagoon in which the wetland is located contains surface water that is saline or brackish (> 0.5 ppt) during most of the year in at least a portion of the lagoon *(needs to be measured near the bottom)* YES = Go to SC 5.1 NO √ not a wetland in a coastal lagoon SC 5.1 Does the wetland meets all of the following three conditions? — The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74). — At least ¾ of the landward edge of the wetland has a 100 ft buffer of shrub, forest, or un-grazed or un-mowed grassland. — The wetland is larger than 1/10 acre (4350 square feet) YES = Category I NO = Category II	**Cat. I** **Cat. II**

Wetland name or number A

SC 6.0 Interdunal Wetlands *(see p. 93)* Is the wetland unit west of the 1889 line (also called the Western Boundary of Upland Ownership or WBUO)? YES - go to SC 6.1 NO ✓ not an interdunal wetland for rating ***If you answer yes you will still need to rate the wetland based on its functions.*** In practical terms that means the following geographic areas: • Long Beach Peninsula- lands west of SR 103 • Grayland-Westport- lands west of SR 105 • Ocean Shores-Copalis- lands west of SR 115 and SR 109 SC 6.1 Is the wetland one acre or larger, or is it in a mosaic of wetlands that is once acre or larger? YES = Category II NO – go to SC 6.2 SC 6.2 Is the unit between 0.1 and 1 acre, or is it in a mosaic of wetlands that is between 0.1 and 1 acre? YES = Category III	**Cat. II** **Cat. III**
Category of wetland based on Special Characteristics *Choose the "highest" rating if wetland falls into several categories, and record on p. 1.* If you answered NO for all types enter "Not Applicable" on p.1	NA

King County iMap



Legend

- Address points
- Address labels
- Parcels
- index contours - 100 foot
- contours - 5 foot (below 1000 feet) and 10 foot
- Potential landslide hazard areas (2016, see explanation--->)
- Potential steep slope hazard areas (2016, see explanation--->)
- Erosion hazard (1990 SAO)
- Seismic hazard (1990 SAO)
- Coal mine hazard (1990 SAO)
- class 1
- class 2 perennial
- class 2 salmonid
- class 3
- unclassified
- Wetland (1990 SAO)
- Sensitive area notice on title
- Streams

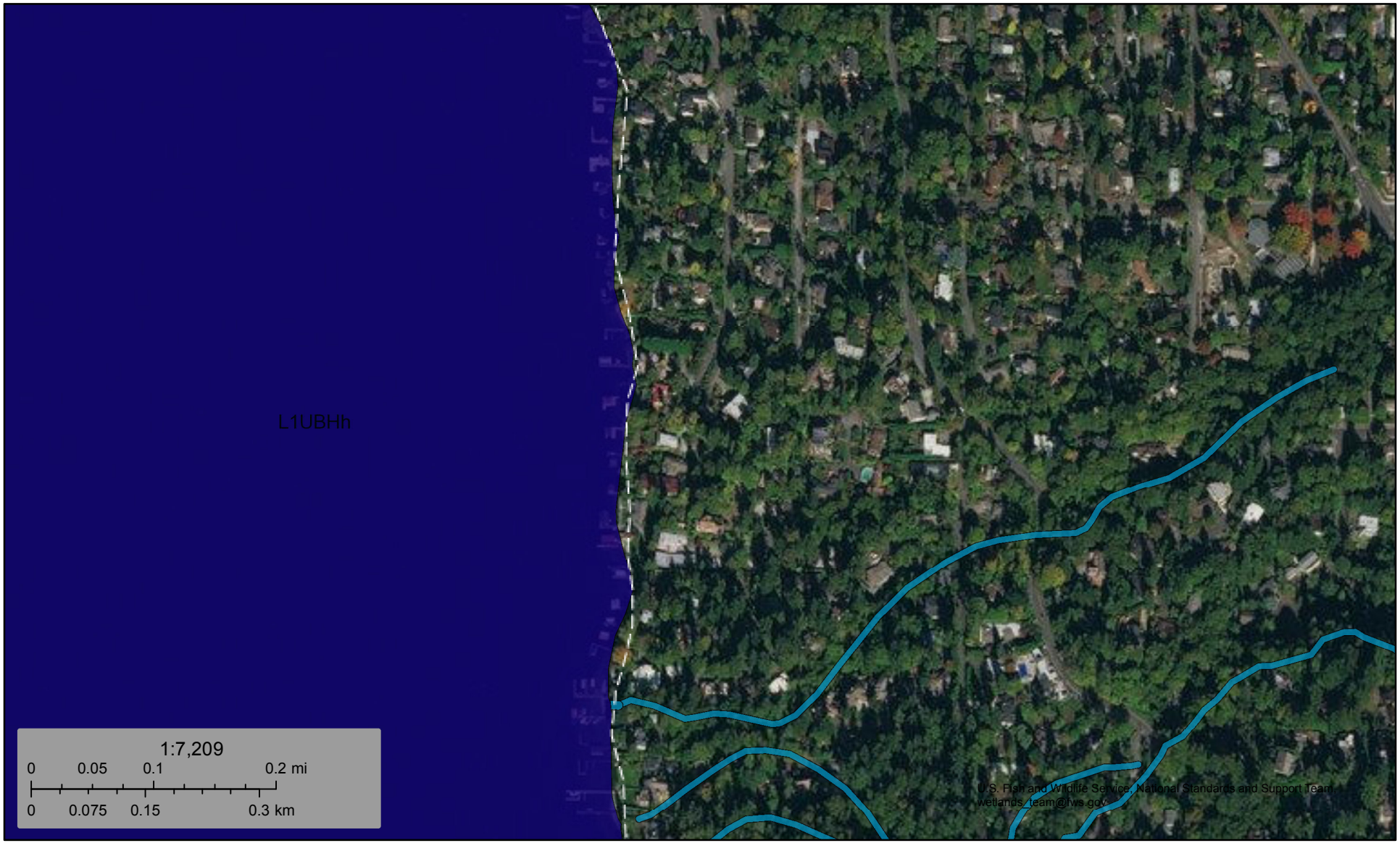
N

King County GIS Center

Date: 11/6/2017 Notes:

U.S. Fish and Wildlife Service
National Wetlands Inventory

Wetlands



November 6, 2017

Wetlands

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

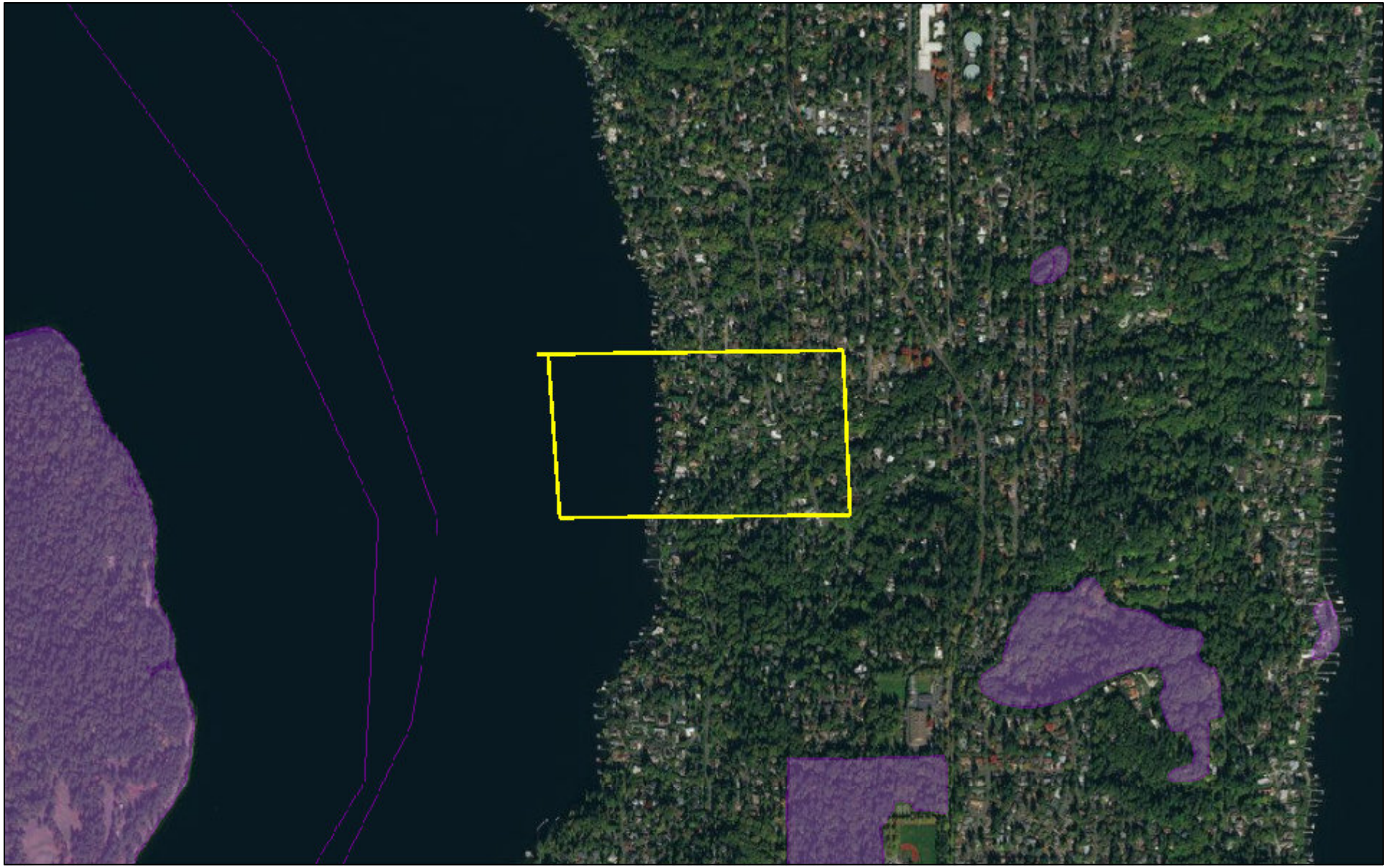
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPlusPublic
REPORT DATE: 11/06/2017 3.50

Query ID: P171106154927

Common Name	Site Name	Priority Area	Accuracy	Federal Status	Sensitive Data	Source Entity
Scientific Name	Source Dataset	Occurrence Type		State Status	Resolution	Geometry Type
	Source Record	More Information (URL)		PHS Listing Status		
Notes	Source Date	Mgmt Recommendations				

WDFW Test Map



November 6, 2017

PHS Report Clip Area

PT

LN

POLY

AS MAPPED

SECTION

QTR-TWP

TOWNSHIP

1:19,842

0 0.15 0.3 0.6 mi

0 0.275 0.55 1.1 km

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Map Scale: 1:2,020 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 25 50 100 150

Feet
0 50 100 200 300

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: King County Area, Washington
Survey Area Data: Version 13, Sep 7, 2017

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

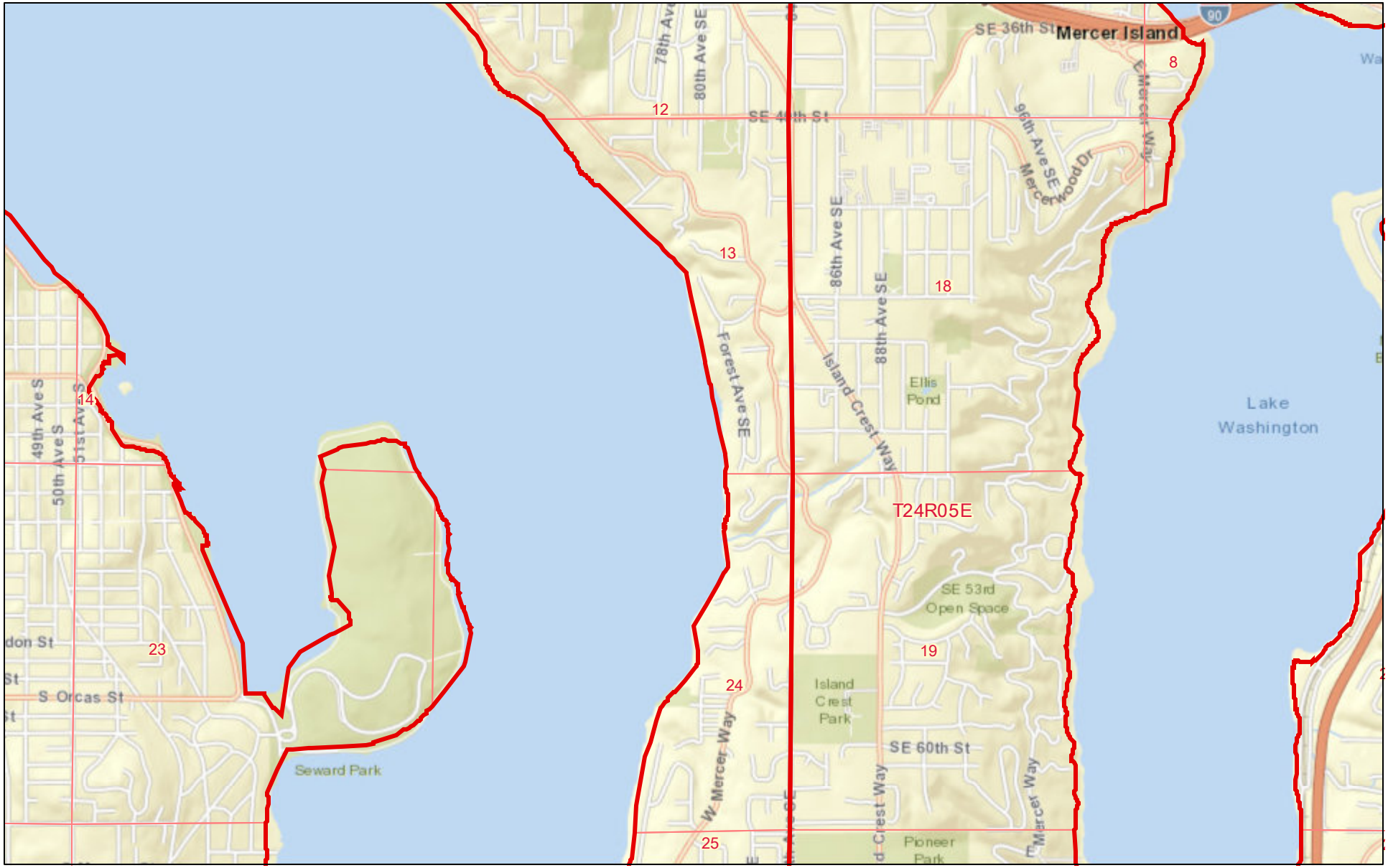
Date(s) aerial images were photographed: Aug 1, 2011—Oct 6, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KpB	Kitsap silt loam, 2 to 8 percent slopes	11.2	63.1%
KpD	Kitsap silt loam, 15 to 30 percent slopes	3.7	20.6%
Totals for Area of Interest		**17.7**	**100.0%**

WA Wetlands of High Conservation Value



November 6, 2017

Counties

Townships

Sections

1:36,112

0 0.3 0.6 1.2 mi

0 0.35 0.7 1.4 km

Sources: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand),

Washington Natural Heritage Program

County of King, Bureau of Land Management, Esri, HERE, Garmin, INCREMENT P, NGA, USGS | U.S. Fish and Wildlife Service, National Standards and Support Team, wetlands_team@fws.gov | Washington Natural Heritage Program http://www.dnr.wa.gov/natural-heritage-program |

DEPARTMENT OF ECOLOGY State of Washington

Washington State Water Quality Atlas

Home | Add Map Data | Clear Map Data | Tutorial Videos

Legend | Filter Data | Zoom To | Tools

Add or remove map data

Assessed Waters/Sediment

Water

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

Sediment

- Category 5 - 303d
- Category 4C
- Category 4B
- Category 4A
- Category 2
- Category 1

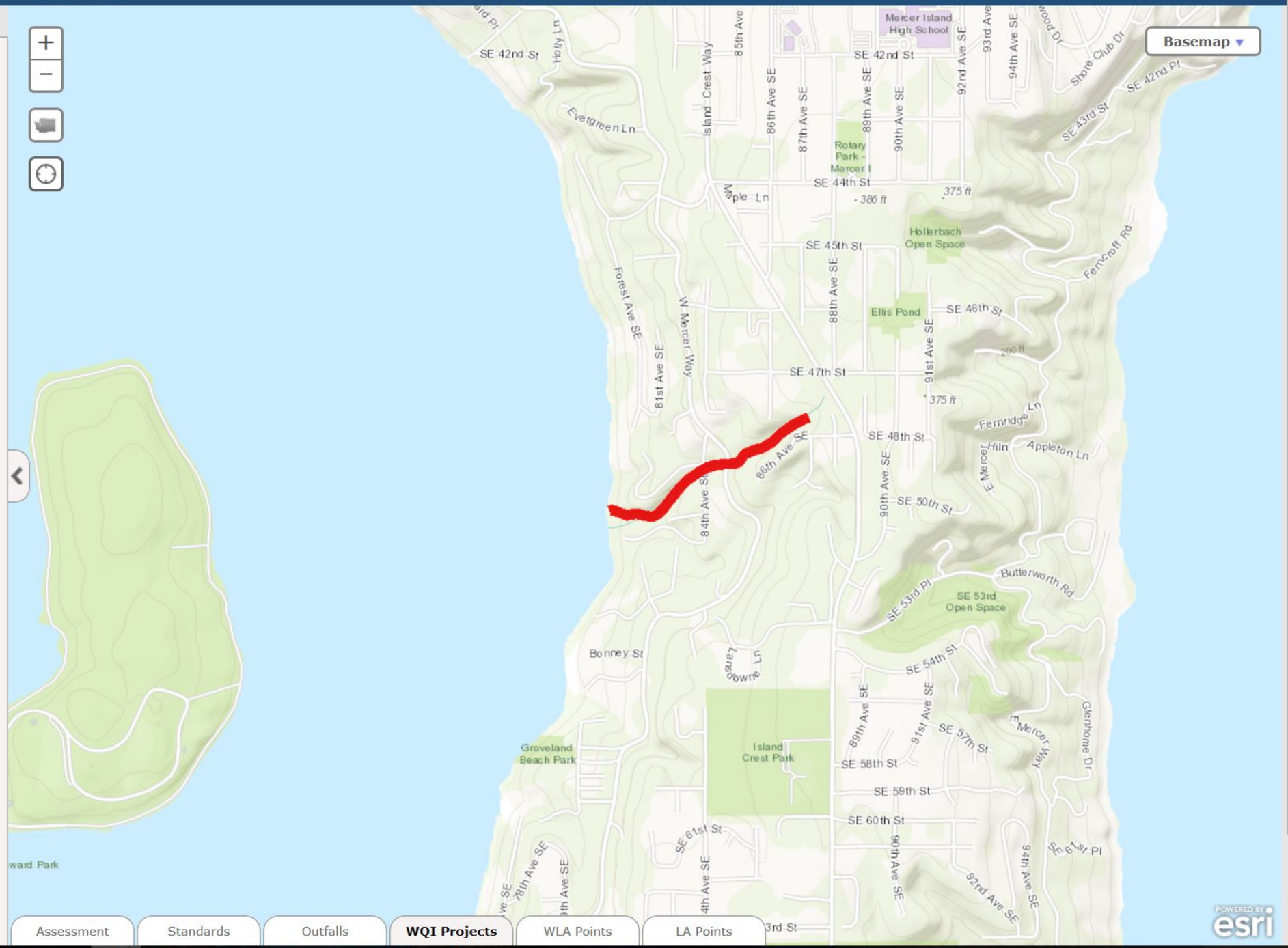
WQ Improvement Projects

- Approved
- In Development

Change map data transparency

10%

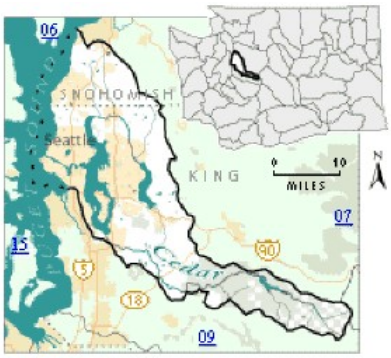
0 0.1 0.2mi



Assessment | Standards | Outfalls | **WQI Projects** | WLA Points | LA Points

Water Quality Improvement Projects (TMDLs)

WRIA 8: Cedar-Sammamish



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

Counties

- King
- Snohomish

Waterbody Name	Pollutants	Status**	TMDL Lead
Ballinger Lake	Total Phosphorus	Approved by EPA	Tricia Shoblom 425-649-7288
Bear-Evans Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
	Dissolved Oxygen Temperature	Approved by EPA	
Cottage Lake	Total Phosphorus	Approved by EPA Has an implementation plan	Tricia Shoblom 425-649-7288
Issaquah Creek Basin	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Little Bear Creek Tributaries: Trout Stream Great Dane Creek Cutthroat Creek	Fecal Coliform	Approved by EPA	Ralph Svrjcek 425-649-7165
North Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7165
Pipers Creek	Fecal Coliform	Approved by EPA	Joan Nolan 425-649-4425
Sammamish River	Dissolved Oxygen Temperature	Project is under development	Ralph Svrjcek 425-649-7165
Swamp Creek	Fecal Coliform	Approved by EPA Has an implementation plan	Ralph Svrjcek 425-649-7165

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

For more information about WRIA 8:

- Waterbodies in WRIA 8 - using the Water Quality Assessment Query Tool
- Watershed Information for WRIA 8

* The Department of Ecology and other state resource agencies frequently use a system of 62 "Water Resource Inventory Areas" or "WRIAs" to refer to the state's major watershed basins.

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Last updated April 2017

Appendix E
Site Photographs

Photo 1 — Soil profile at TP-1.

Photo 2 — View to east at TP-1.

Photo 3 — View to west at TP-1.

Photo 4 — SE 48th Street stormwater pipe outlet.

Photo 5 — Soil profile at TP-2.

Photo 6 — View to north at TP-2.

Photo 7 — View to west at TP-2.

Photo 8 — Soil profile at TP-3.

Photo 9 — View to east at TP-3.

Photo 10 — View to south at TP-3 (note TP-1 flag in lower left portion of photo).

Photo 11 — Soil profile at TP-4.

Photo 12 — View to east at TP-4 (Note TP-1 flag in center of picture).

Photo 13 — View to west at TP-4.

Photo 14 — Soil profile at TP-5.

Photo 15 — View to west at TP-5.

Photo 16 — View to east at TP-5.

Photo 17 — Soil profile at TP-6.

Photo 18 — View to east at TP-6.

Photo 19 — View to northeast from concrete pond towards TP-6.

Photo 20 — View to west from top of slope.

Appendix F
Contributing Basin Photographs

Photograph Location Map

Photo 1 — SE 48th Street (Bing Maps 2018).

Photo 2 — 4803 W Mercer Way backyard. Note pipe, which discharges runoff onto parking pad and contributes runoff directly down drive to 8101 to subject stormwater pipe.

Photo 3 — Parking pad at 8201 SE 48th Street (note pipe).

Photo 4 — Driveway and roof drains at 8201 SE 48th Street, which contribute runoff into subject stormwater pipe.

Photo 5 — New construction at 8105 SE 48th Street, which contributes runoff into subject stormwater pipe. See photo for rear/side yard and driveway.

Photo 6 — New runoff collection on private shared drive to 8101 and 8105 SE 48th Street, which contributes runoff into subject stormwater pipe, which appears relatively recent.

Photo 7 — View of new runoff collection gravel from 8100 SE 48th Street, which contributes runoff into subject stormwater pipe.

Photo 8 — New catch basin and stormwater pipe at 8100 SE 48th Street, which contributes runoff into subject stormwater pipe. Catch basin drains directly downhill through 8101 SE 48th Street to subject .

Photo 9a — View of new catch basin and stormwater pipe from downslope. Several trees were removed during installation of drain, causing an increase in runoff as well.

Photo 9b — Paved driveway of 8101 SE 48th Street with new catch basin, which contribute runoff into subject stormwater pipe.

Photo 10 — Paved driveway at 8101 SE 48th Street, which contributes runoff into subject stormwater pipe.

Photo 11 — Paved driveway at 8101 SE 48th Street, which contributes runoff into subject stormwater pipe.

Photo 12a — Paved patio at 8101 SE 48th Street, which contributes runoff into subject stormwater pipe.

Photo 12b — Paved walkway at 8101 SE 48th Street, which contributes runoff into subject stormwater pipe.

Photo 13 — New gravel and landscape area on east side of 8101 SE 48th Street, looking north. Area captures runoff from paved driveway (See Photos 10 and 11).

Photo 14 — New construction at 8105 SE 48th Street, which contributes runoff into subject stormwater pipe. Note new catch basin in driveway (See Photo 9b).

Photo 15 — New impervious surface at 8100 SE 48th Street, which contributes runoff into subject stormwater pipe. This area represents the easterly extent of the drainage basin we are representing as contributing to the subject stormwater pipe. The drainage basin may actually extend furthere northeast, but without additional survey, we are unsure and therefore did not include the area in our analysis.


CONFLUENCE
ENVIRONMENTAL COMPANY